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## Article

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# Oil Price Fluctuation and Current Accounts: Exploring Mediation Effects for Oil Importing Nations

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## ABSTRACT

The study is an attempt to examine empirically the effects of oil price shock on current account imbalances. The analysis is carried out on the cross-country panel of 160 countries that are divided into three different groups base on their level of oil imports. The relationship between the oil price shock and current account imbalances is rigorously assessed using two different approaches. Firstly, the seemingly unrelated regression models are used to estimate the effects of oil price shock on current account imbalances with transmission channels namely trade, valuation, and wealth. Secondly, to examine the indirect effects of oil price shock three different mediator effects that direct, indirect, and total are estimated. The findings of the study reveal that for all three groups of countries the oil price shock pose a positive effect on the current account through the trade channel. Whereas, the current account of all three groups is negatively associated with oil price shock with the wealth channel. The valuation channel holds a mix results across country groups about the effect of oil price shock on the current account balances. In the case of low and major oil importer countries, oil price shock is negatively associated with the current account, whereas the current account of medium oil importer countries is improving with an increase in oil prices. The mediation analysis holds mix results across groups of countries.

**Keywords:** Current-account Imbalances, Oil Importing Economies, Seemingly Unrelated Regression, Mediation Effects

**JEL Classifications:** F4, F41

## 1. INTRODUCTION

Having set threats to the stability of the global economy, current-account imbalances is one of the hot debatable subjects among the international trade issues from the right beginning of the twenty-first century Rebucci and Spatafora (2006). The related literature Kim (2012) on the subject reaches a consensus that the unpredictable and high volatile oil price is the driving force behind this issue. Besides, studies on the subject also reach a consensus that oil price fluctuations affect differently the current-account of oil importer and exporter countries. In the case of oil importer countries, fluctuation in oil price causes an imbalance in the adjustment of these imbalances. For instance, on the supply side, the rise in oil price worsens the trade balance and therefore increasing the current account deficit that in turn deteriorates the net foreign asset position of the oil-importing countries. Whereas

on the demand side, an increase in oil price tends to decrease private disposable income and corporate profitability that reducing domestic demand. In addition, an increase in the current account deficit tends to depreciate the exchange rate, hence reduction in domestic demand and exchange rate depreciation bring the current account back into equilibrium. However, the speed and output cost of the adjustment rests on the transmission channels.

In this context, the related literature Sen (1994) on the subject highlighted a number of transmission channels that play its role in the adjustment of imbalance. However, among these, three channels namely trade Kilian et al. (2009), Allegret et al. (2015), financial or valuation Lane and Milesi-Ferretti (2006), Gourinchas and Rey (2007), Kilian et al. (2009), Bodenstein et al. (2011), Allegret et al. (2015) and wealth channel Czudaj and Beckmann (2013) are the most prominent channels presented in the literature.

As for as trade channel is concern, Kilian et al. (2009) argued that trade channel plays its role in the adjustment of imbalance, as generally price and quantity of traded goods mostly change with oil price fluctuation. In addition, some others Rebucci and Spatafora (2006), Kilian et al. (2009), Bodenstein et al. (2011), and Le and Chang (2013) argued that oil price shocks have both direct and indirect effects on the current-account imbalances of both oil importer and exporter countries.

About the indirect effects, these studies came with an argument that an increase in oil price puts inflationary pressure that in turn rises the price of traded goods in both importer and exporter countries. Thus, the policy response to manage inflation is the increasing interest rate that reduces consumption, investment, and hence the economic growth of trading partners. More specifically, in the case of the oil-exporting economy, the direct effects of an increase in oil prices generally pose positive effects due to an increase in revenue. However, the indirect effects of an increase in oil prices should be negative for oil-exporting economy why? As Le and Chang (2013) argued that an exogenous increase in world oil price account for a negative supply shock to net oil importer resulting in a slowdown in economic growth that in turn reduces their oil exports.

In the case of a net oil-importing country, an increase in oil price is often regarded as negative terms of trade shock through their effect on production decisions. The mechanism presented in existing studies is the increase in the input prices, for instance Backus et al. (2000) argue that an increase in oil prices leads to a direct increase in inputs cost that in turn affect firms' investment decisions and thus cause a productivity shock. However, the effects of oil fluctuation through trade shock on aggregate output are still uncertain on two grounds. Firstly, imported oil enters the production function as an input, which segregated in value-added and imported energy, but not produces as domestic value-added. Hence, keeping others inputs remain the same, oil price shocks do not change value-added and consequently can't generate productivity shocks for real GDP of oil-importing countries. Secondly, as Kilian (2010) explains that if oil price shock is treated as cost shock, the impact on domestic output should be captured through the cost share of imported oil, which not capable to explain large fluctuations in real GDP. In view of the cost-share of imported oil, in this study, we divide the sample countries into three different groups based on the share of oil imports in the overall imports. The countries that its oil imports holding zero to ten percent of its total imports are classified lower oil-importing countries. The countries having (10-20) and (20-30) percent are categorized medium and high oil-importing countries respectively.

The second transmission channel of oil price shock recognized in literature is the valuation channel. According to Lane and Milesi-Ferretti (2006) and Gourinchas and Rey (2007), the valuation channel is the transmission channel of oil price shock that changing the net foreign asset value. Numerous empirical insights existing on the relationship between oil price shock and asset value. However, the empirical literature is still away from consensus. Some studies argued for the positive response of oil the price shock on asset value, whereas others found a negative

association between the oil price shock and asset values. However, the positive and negative effects of oil price shock is mainly allied with changes in aggregate demand and aggregate supply. Gogineni (2008), for instance, found positive association of oil price with stock prices in case of G-7 countries, if oil price shocks reflect changes in aggregate demand and negative, if they reflect changes in supply. Similarly, recently Bai and Koong (2018) examine the effects of oil prices on the stock market capitalization through its effects on demand and supply of oil. They came with the findings that oil price and supply oil have an unanticipated and negative association, whereas the association is unanticipated however positive for oil demand.

Dividing the oil shocks into oil-supply shocks, aggregate global-demand shocks and oil-market idiosyncratic demand shocks, Apergis and Miller (2009) came with the findings that in all sample countries oil shock carry negative effects on stock market returns. In addition, they found that among these the idiosyncratic demand shocks hold stronger effect on stock market returns. Bastianin et al. (2016) argued that demand side shocks have a relatively stronger effect on the volatility of stock prices. Moreover, stock prices respond asymmetrically to changes in oil prices. Similarly, estimated the conditional volatility Boldanov et al. (2016) found heterogeneous behave of oil price to financial markets in different time periods. For instance, the correlation is found positive during events which trigger the demand and negative during events which affect the supply. Some studies have a pessimistic view of the impact of the oil price shock and asset values. Jones and Kaul (1996), for instance, explore the effect of change in oil prices on the stock returns of the four stronger economies US, UK, Japan, and Canada. According to their findings in the sample, economies change in oil prices pose a negative effect on the real stock returns.

The third channel is the wealth channel, the studies e.g. Beckmann and Czudaj (2013a, 2013b) captures transmission channel with the exchange rate. The received studies termed this transmission channel the wealth channel under the hypothesis that with an increase in oil price wealth transfer to oil-exporting countries and vice versa in the case of oil-importing countries. Beckmann and Czudaj (2013a) argue that an increase in oil price exchange rate of oil-exporting is appreciating, whereas oil-importing countries' exchange rate is depreciating. Many others (Amano et al., 1998; 1998a; Coudert et al., 2008; Bénassy-Quéré et al., 2007; and Beckmann and Czudaj, 2013a, 2013b) came with the same findings. However, some studies (Taylor et al., 2001; Kilian et al., 2003; Sarno, 2005) casts doubt to argue that the effects of oil price shock not always positive/negative on the exchange rate of oil-exporting/importing countries but differ remarkably across countries. Kim et al. (2019) analyzed the exchanges rate movement of Korea being high oil importing economy and found significant effect of oil price on exchange rate in high volatility regime.

Having played a vital role in the determination of both supply (production), and demand (consumption) sides determination, a large segment of empirical literature cover the impact of oil prices on macro variables see Rahman and Serletis (2012), Elder and Serletis (2010); Hamilton (2003, 2009); Kilian (2008); Jones and Kaul (1996) Jones et al. (2004); and Brown and Yücel (2002)

among others. However, the oil price shock and the current account is less ventured avenue of research in general and for oil-importing economies in particular.<sup>1</sup>The following are the basic motivation to undertake this research study.

Firstly, the received literature on the current account dynamics cannot take in the impact of oil prices on current account balances with its full-length. Secondly, the inconclusiveness in the related literature about the role of different transmission channels in the adjustment of current account imbalances. Thirdly, being an important ingredient of the production process, oil plays an important role in the growth and development process of an economy. However, a large number of countries across the globe depend on their imports, which are vulnerable to oil price shocks. In this context, the oil-importing countries are divided into three different groups, in order to examine how much the current account imbalances of oil-importing countries are volatile with a change in oil price. Subsequent to the said motivations, the contribution of this study is threefold. Firstly, unlike existing studies, we have taken a broad sample of oil-importing countries that divided into three sub-groups based on their oil import bill as appearing in trade balance. Secondly, all three transmission channels (i.e. trade, valuation, wealth) have rigorously investigated for all three groups of countries. Thirdly, the study provides a rich analysis of oil price shocks by taking a broader perspective with paying particular attention to the adjustment channels. In this context, the mediation effects of all channel variables are estimated.

The need of the hour is to provide the policymakers with the necessary tools for developing policy responses that mitigate the adverse effects of oil price shocks. For the development of policy moderating the adverse effects of oil price shocks for economies dependent on the imported oil, the prerequisite is to analyze the transmission channel. The study bears much significance on the grounds for the analysis of current account balances in the presence of oil price shocks for oil importing economies. The rest of the paper is organized as follows. Section 2 builds methodology for the study, which includes empirical models, definition and construction of variables under consideration, data and data sources, sample, and estimation technique. Section 3 illustrates estimated results and its interpretations. Finally, section 4 shows some concluding remarks extracted from study findings.

## 2. METHODOLOGY

The methodology section includes four subsections; the first section (3.1) presents empirical models that have been estimated. Section 3.2 describes the definition and construction of variables under consideration. Section 3.3 states sample, data, and data sources, where section 3.4 presents estimation techniques.

### 2.1. Empirical Models

As discussed in the opening part that the study is devoted to examined the effects of different transmission channels in the

current-account imbalances adjustment. In this context three different empirical models have been presented. Section 3.1.1 (Eqs. 1,2,3) presents the specification of empirical models for the trade channel, whereas sections 3.1.2 and 3.1.3 (Eqs. 3,4 and 5,6) presents empirical models for valuation and wealth channels respectively.<sup>2</sup>

#### 2.1.1. Empirical specifications for the trade channel

To assess the mediator effects of trade in the oil price and current-account imbalances relationship, the following three models (Eqs. 1,2,3) have been estimated. The empirical specifications mainly based on related studies on the subject (e.g. Kilian et al., 2009; Bodenstein et al., 2011; BEŞEL, 2017; Rafiq and Bloch, 2016, Raheem, 2017, and Belke and Baas, 2019).

$$TOT_{it} = \alpha_1 + \alpha_2 OILP_{it} + Z_{it} \alpha_3 + u_{it} \quad (1)$$

$$CA_{it} = \beta_1 + \beta_2 OILP_{it} + \beta_3 TOT_{it} + Z_{it} \beta_4 + u_{it} \quad (2)$$

$$CA_{it} = \theta_1 + \theta_2 OILP_{it} + \theta_3 TOT_{it} + \theta_4 NTB_{it} + Z_{it} \theta_5 + u_{it} \quad (3)$$

In empirical model 1 (Eq. 1) the dependent variable is the term of trade ( $TOT_{it}$ ). ( $OILP_{it}$ ) is oil price which is our variable of interest, whereas ( $Z_{it}$ ) is the set of control variables including the stock of net foreign assets as a percentage of GDP, trade openness, population growth, dependency ratio, GDP per capita; and the GDP growth rate. In empirical model 2 (Eq. 2) the dependent variable is the current account balance ( $CA_{it}$ ) of oil-importing countries, whereas the dependent variable of model 1 (Eq.1) is taking as an independent variable. The variable of interest ( $OILP_{it}$ ) and set of control variables are the same as of model 1 (Eq.1). In empirical model 3 (Eq.3) the variable non- oil trade balance ( $NTB_{it}$ ) is added in order to capture the trade composition effect. The rationale of Eq. 3 can be stated in the following two reasons why? Firstly, due to the reasonable availability of alternative energy sources in the oil-importing countries, adjustment of cost-share of oil in their production process may not be an issue. Secondly, the net-oil importing countries can also reduce the adverse effect of oil shocks by increasing non-oil exports to their oil-exporting counterparts, thus improving their trade balance (the trade composition effect) as specified by Kilian et al. (2009), Shudhasattwa Rafiq and Bloch (2016).

#### 2.1.2. Empirical specifications for the valuation channel

The second channel through which oil price shock can affect a country's current account balances is the valuation channel. In general, the valuation channel captures the effect of oil price shock on current account balances through the change in the external portfolio position and asset prices Kilian et al. (2009). The related literature argues for the different mediator roles of this channel in the oil price and external balances of oil-importing and exporting economies. However, to analyze the mediator role of valuation channel in the oil price shock and current account balances the

<sup>1</sup> The evidence being the much fewer theoretical Bodenstein et al. (2011), Backus et al. (2000) and empirical Özlale and Pekurnaz (2010); Kilian et al. (2009); Huntington (2015); Le et al. (2013); Raheem (2017) has focused issue partially.

<sup>2</sup> The variables included in the analysis have been derived from the previous empirical studies on current accounts see Calderón et al. (2007), Calderon et al. (2002), Chinn et al. (2003); Gruber et al. (2007), Chinn et al. (2007), Cheung et al. (2010), Brissimis et al. (2012), Allegret et al. (2014); Kilian et al. (2009).

following two models have been estimated (Eqs. 4,5). The received studies (Lane and Milesi-Ferretti, 2006; and Gourinchas and Rey (2007) explains the valuation channel is a moment in asset prices are due movement in the exchange rate. Follows Gourinchas and Rey (2007) the following empirical specifications have been estimated in order to capture the impact of oil price shock on current account imbalances through the valuation channel.

$$EQP_{it} = \gamma_1 + \gamma_2 OILP_{it} + Z_{it} \gamma_3 + \varepsilon_{it} \quad (4)$$

$$CA_{it} = \tau_1 + \tau_2 OILP_{it} + \tau_3 EQP_{it} + Z_{it} \tau_4 + \varepsilon_{it} \quad (5)$$

In Eq. 4 the dependent variable is the price of equities ( $EQP_{it}$ ), whereas the variable of interest is oil price ( $OILP_{it}$ ) and ( $Z_{it}$ ) is set of control variables as described earlier in case of Eq. and Eq. 2.  $\gamma_2$  is the effect of oil price on equity price of the country it is expected to be negative/positive for oil importing/exporting economy. In Eq. 5 the dependent variable is the current account balance  $CA_{it}$ , whereas  $\tau_3$  is the equity price effect on current account balances in the presence of oil price shocks.

### 2.1.3. Empirical specifications for the wealth channel

The third channel that we want to investigate is the wealth channel. The received literature came with different effects of an oil price change on the current account of oil exporting and importing countries. Bénassy-Quéré et al. (2007) argue that with an increase in oil price, wealth transferred to oil-exporting countries in terms of export earnings that improve its current account balance. Improvements of current-account balance in terms of the local currency, in turn, appreciate currency of the exporting country, whereas in the case of importing countries it works in the opposite direction. To investigate the role of wealth channel, the following empirical specifications (Eqs. 6 and 7) are estimated;

$$EX_{it} = \omega_1 + \omega_2 OILP_{it} + \omega_3 Z_{it} + \varepsilon_{it} \quad (6)$$

$$CA_{it} = v_1 + v_2 OILP_{it} + v_3 EX_{it} + v_4 Z_{it} + \varepsilon_{it} \quad (7)$$

In Eq. 6 the dependent variable is exchange rate ( $EX_{it}$ ), whereas the variable of interest is the price of oil ( $OILP_{it}$ ) and ( $Z_{it}$ ) is a vector of control variables as in previous models. In Eq. 7 current account is our dependent variable, whereas the exchange rate is used as an explanatory variable. In Eq. 6  $\omega_2$  is the effect of oil price on the exchange rate of the economy which is expected to be negative for the oil-importing economy and vice versa for oil exporting economy.  $v_3$  will show the effect of exchange rate appreciation/depreciation on the current accounts of the oil exporting/importing economy and is expected to be positive/negative for oil exporting/importing) economy.

## 2.2. Derivation of the Mediators Effects

Having present empirical specifications of the different mediators, now we are able to derive effects of mediators. Three types of mediators' effects can be derived, that indirect, direct, and total effects. The indirect effect is derived by taking derivative of the presented empirical specifications using chain rule as follows;

$$\frac{\partial CA_{it}}{\partial OILP_{it}} = \frac{\partial TOT_{it}}{\partial OILP_{it}} \times \frac{\partial CA_{it}}{\partial TOT_{it}}$$

According to this formula, from Eqs. 1 and 2 we can calculate the indirect effect as follows;

$$\frac{\partial CA_{it}}{\partial OILP_{it}} = \alpha_2 \beta_3 \quad (8)$$

Eq. 8 consists of two coefficients from separate regressions, which gives the indirect effect of term trade influence on oil price to current account. Similarly, indirect effects for valuation and wealth channels using Eqs. 4,5, 6 and 7 are as follows;

$$\frac{\partial CA_{it}}{\partial OILP_{it}} = \delta_2 \theta_3 \quad (9)$$

$$\frac{\partial CA_{it}}{\partial OILP_{it}} = \gamma_2 \tau_3 \quad (10)$$

$$\frac{\partial CA_{it}}{\partial OILP_{it}} = \omega_2 v_3 \quad (11)$$

The magnitude and significance of the Eqs. 9,10, and 11 are more interesting and informative for oil importing economy as it will convey the knowledge about the significance of different mediators playing their role in oil price current account relationships. These equations consists of two coefficients from separate regressions the significance of which can be tested using Bruin (2006) commands in Stata package.

The direct effects are captured with the estimated coefficients of empirical models. The estimated coefficients  $\beta_2$ ,  $\theta_2$ ,  $\tau_2$ ,  $v_2$  in Eqs. 2,3,5, and 7 presents the direct effect of oil price on the current account as indicated by Baron and Kenny (1986). The total effect of mediator is the sum of indirect and direct effect.

## 2.3. Definition and Construction of Variables

This section of the study presents definition and construction of variables under consideration.

### 2.3.1. Dependent variable

As the study aims to analyze the impact of oil price on current account balances, hence in this context two measures have been used, namely the current account balance ( $CA_{it}$ ), and the term of trade ( $TOT_{it}$ ). The first proxy current account balance is measure is the sum of the balance of trade (goods and services exports minus imports), net income from abroad and net current transfers, which is taken as percentage of GDP. The data is taken from the World Bank data set, World Development Indicator (WDI), and IMF data set, World Economic Outlook (WEO). The second proxy used in the study is terms of trade, which is the relative price of exports in terms of imports of an economy. Follow this definition, term of trade is constructed by dividing the exports value index to import value index multiplied by 100. The data

of both export and import index has been taken from WDI with base period 2000=100.

### 2.3.2. Independent variables

Among independent variables, oil price ( $OILP_{it}$ ) is our variable of interest that has taken Crude Oil Price, Brent series. Brent oil is the leading global price benchmark. Data on the oil prices of the sample countries is taken from the EEO of the IMF data set, which measures the US \$ per barrel. Population growth ( $POP_{it}$ ) is one of the control variables, which is the percentage change in the total population over a unit of the time period. Data on the population growth is taken from WDI of World Bank data set. Another demographic variable used in the study is the dependency ratio ( $DPR_{it}$ ), which is measure as the ratio of the dependent population (below 15 and above 65) to the working-age population (between 15 and 64). Data on the dependency ratio is taken from WDI. Another control variable used in the study is trade openness ( $TOPN_{it}$ ), which is measure as trade (exports plus imports) to GDP ratio.

The data on trade openness is taken from WDI. Net foreign assets ( $NFA_{it}$ ) measures the value of overseas assets owned by a nation, minus the value of its domestic assets that are owned by foreigners, adjusted for changes in valuation and exchange rates. Data on net foreign assets is taken from WDI, however, it is in the current local currency, which is converted in US dollars by adjusting the country exchange rate and is taken as a percentage of GDP. The data on the annual growth of GDP ( $GDPG_{it}$ ) is taken from WDI. Follows Kilian et al. (2009) and Shudhasattwa Rafiq and Bloch (2016) we analyzed the trade composition effect. In this context, in the case of high oil-importing countries, the non-oil balance is used as an independent variable. Follows to Kilian et al. (2009), the non-oil balance is calculated by subtracting the oil balance from the total balance. Data on oil and non-oil balances are taken from WDI. The data on variables under consideration are annual that covers the time period from 1980-2019.

### 2.4. County's Sample and Selection Criteria

We carried out the analysis on the cross-country panel of 160 countries that are divided into three groups based on their level of oil imports. The low oil importer countries having oil import holds 0-10 % of overall imports, medium oil importer countries that holding 10-20% of overall imports, and major oil importer countries holding 20-30% of the overall import bill. The low and medium groups include 50 and 89 countries respectively, whereas the major oil importer group contains 21 countries.<sup>3</sup> The sample countries are grouped on the basis of the average fuel imports data from the period 1980 to 2018.

### 2.5. Estimation Techniques

As our empirical specifications for the different channels of transmission presents the system of linear equations, hence estimation carried out with the Seemingly Unrelated Regression (SUR) estimation technique developed by Zellner (1962). The SUR is the most appropriate estimation technique, the following reasons may justify why? Firstly, the SUR model captures efficiency due to

the correlation of disturbances across country-specific equations. Secondly, the SUR model is designed to estimate the system of linear equations with a potentially different set of explanatory variables and which accounts for the cross-equations correlation of error term. In addition, to check the robustness of the results, the empirical models are also estimated with the 3SLS estimation technique.

## 3. EMPIRICAL FINDINGS AND INTERPRETATION

As the study aims to examine the impact of oil price fluctuation on the current account while exploring the mediation effects. Therefore, we approach this section in different sub-sections. The first section (3.1) presents the results of our estimated empirical models (Eqs. 1 to 7). The second section (3.2) presents the results and interpretation of the mediation analysis (Eqs. 8 to 11).

### 3.1. Estimated Results of the SUR Models and Interpretation

This section comprises three sub-sections. The first sub-section 4.1.1 discusses the results of SUR models for trade channel (Eqs. 1, 2,3), sub-section 4.1.2 presents the results of SUR models for valuation channel (Eqs. 4,5), finally, sub-section 3.1.3 shows the estimated SUR models results of wealth channel.

#### 3.1.1. Discussion of results of SUR models for trade channel

Following Table 1 presents the estimated results of our empirical models (1 to 3) that capture the impact of price fluctuation on current account balances through the trade channel. As discussed earlier that the sample countries are divided into three groups. Country groups A, B and C presents low, medium, and major oil-importing countries respectively. In the case of each group, empirical models 1, 2 (Eqs. 1,2) are estimated, whereas empirical model 3 (Eq.3) is estimated only in the case of country group C (major oil-importing countries).

Results presented in Table 1 show that the coefficient of oil price ( $OLP_{it}$ ) in the first equation (column 2) is showing a positive elasticity (0.068) which is significant for group A. Results indicates that a one percent increase in oil price increases the terms of trade by 0.06 percent for economies having least oil imports. Similarly, for group B (column 4) this coefficient appears positive (0.012) and statistically significant, however relatively lower than group A. Whereas for country group C(column 6) it holds the lowest (0.001) value, which is statistically insignificant. Generally, results indicate that the term of trade of the oil-importing country is positively associated with the increase in oil prices. However, the impact is decreasing with an increase in the share of oil imports in total imports. The results may be justified in the exports' earning of oil-importing countries, that increase in oil price may increase the exports demand of oil-importing countries in the oil-exporting countries. Hence, the positive increase in exports' earning may overlap the negative effects of the increase in oil prices. The results are in line with the findings of Backus et al. (2000) that came with the findings that there exists a positive correlation between an increase in oil prices and term of trade for importers' countries.

<sup>3</sup> See Appendix Table 6 for the list of groups of countries.

**Table 1: Estimated results of empirical models (1,2,3) trade channel**

| Variables                   | Country Group A     |                      | Country Group B     |                      | Country Group C     |                      | Country Group C (NTB) <sup>4</sup> |                      |
|-----------------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|------------------------------------|----------------------|
|                             | Eq.1                | Eq.2                 | Eq.1                | Eq.2                 | Eq.1                | Eq.2                 | Eq. 3 (TOT)                        | Eq. 3 (CA)           |
| OLP <sub>it</sub>           | 0.068***<br>(0.007) | 0.821<br>(0.504)     | 0.012***<br>(0.004) | -0.538***<br>(0.154) | 0.001<br>(0.006)    | -1.371***<br>(0.406) | -0.003<br>(0.015)                  | -1.504***<br>(0.525) |
| GDPG <sub>it</sub>          | 0.002***<br>(0.001) | 0.155***<br>(0.035)  | 0.002***<br>(0.001) | -0.111***<br>(0.023) | 0.002*<br>(0.001)   | -0.081<br>(0.059)    | 0.004*<br>(0.003)                  | -0.110<br>(0.084)    |
| TOT <sub>it-1</sub>         | 0.860***<br>(0.013) | -                    | 0.911***<br>(0.009) | -                    | 0.937***<br>(0.016) | -                    | 0.959***<br>(0.033)                | -                    |
| POP <sub>it</sub>           | 0.004<br>(0.002)    | -                    | -0.002<br>(0.002)   | -                    | 0.003<br>(0.003)    | -                    | 0.009*<br>(0.006)                  | -                    |
| CA <sub>it-1</sub>          | -                   | 0.660***<br>(0.028)  | -                   | 0.749***<br>(0.021)  | -                   | 0.640***<br>(0.042)  | -                                  | 0.385***<br>(0.090)  |
| CA <sub>it-2</sub>          | -                   | 0.092***<br>(0.028)  | -                   | 0.088***<br>(0.021)  | -                   | 0.045<br>(0.042)     | -                                  | -0.005<br>(0.067)    |
| DPR <sub>it</sub>           | -                   | -0.050***<br>(0.015) | -                   | -0.017***<br>(0.006) | -                   | -0.056***<br>(0.014) | -                                  | 0.003<br>(0.019)     |
| TOPN <sub>it</sub>          | -                   | -0.009**<br>(0.004)  | -                   | 0.005***<br>(0.002)  | -                   | -0.022***<br>(0.006) | -                                  | 0.054***<br>(0.010)  |
| LNTB <sub>it</sub>          | -                   | -                    | -                   | -                    | -                   | -                    | -0.001<br>(0.005)                  | 0.612***<br>(0.204)  |
| CONS.                       | 0.402***<br>(0.054) | 1.525<br>(3.839)     | 0.376***<br>(0.042) | 4.114**<br>(1.806)   | 0.280***<br>(0.076) | 14.193***<br>(4.709) | 0.195<br>(0.222)                   | -19.170**<br>(8.609) |
| No. Obs.                    | 1081                | -                    | 2046                | -                    | 554                 | -                    | 88                                 | -                    |
| R <sup>2</sup> <sub>1</sub> | 0.862               | -                    | 0.846               | -                    | 0.870               | -                    | 0.932                              | -                    |
| R <sup>2</sup> <sub>2</sub> | 0.586               | -                    | 0.705               | -                    | 0.592               | -                    | 0.690                              | -                    |

Standard error in parenthesis \*indicates P &lt; 0.10 \*\*P &lt; 0.05 \*\*\*P &lt; 0.01

The control variable GDP growth (GDPG<sub>it</sub>) that is common in all specifications holds a positive coefficient and statistically significant in Eq.1 for all three groups. That result shows that the country term of trade is improving with an increase in GDP growth. The result is in line with the findings of Mendoza (1997) that came with the findings that GDP growth and term of trade are moving in parallel. Results show that the term of trade is positively and significantly associated with its lag (TOT<sub>it-1</sub>). This is evident from the fact that for all three groups the lag values of the term of trade enter the model positively and statistically significant. The control variable population growth (POP<sub>it</sub>) does not have significant effect on the term of trade for all three groups.

Here and now we are presenting an interpretation of our second empirical model (Eq.2), whereas the dependent variable is the current account (CA<sub>it</sub>). The variable of interest is oil price (LOP<sub>it</sub>), and control variables are trade openness (TOPN<sub>it</sub>), dependency ratio DPR<sub>it</sub>, and the lags of dependent variables (CA<sub>it-1</sub>), (CA<sub>it-2</sub>). The variable of interest oil price (OLP<sub>it</sub>) enters the model with a positive sign, however not significant for group A. The result indicates that the current account of countries having a low dependency on oil imports is not affected by the change in oil prices. However for group B, oil prices have a significant and negative effect on the current account. The result indicates that a one percent increase in oil prices generates a 0.0053 deficit of the current account. Some received studies on the subject came with similar findings. Similarly, for group C the oil price holds a negative sign which is statistically significant. The estimated coefficient indicates that a 10 percent increase in oil price causes 0.13 units of current account deficit. The result is in line with the Huntington (2015) findings that the intensity of oil price shocks on the

current account increases with an increase in oil imports. In general, the estimated results seem quite interesting. For instance, in case of group A, having lowest oil imports, oil prices cannot signify its role in the determination of their current account. Whereas, for higher oil-importing countries (Groups B,C), oil prices pose negative and significant effects on the current account.

The first and second lags of dependent variable (CA<sub>it-1</sub>), (CA<sub>it-2</sub>) enters the model positively and significant statistically, apart from one coefficient (second lag in case of group C). Results indicate that whatever the nature of the economy in terms of oil imports, the position of the current account depends on the past profile. The findings are in line with the findings of Calderón et al. (2007) who found a positive and significant relationship between the current account and its past values.

The demographic variable, dependency ratio (DPR<sub>it</sub>) holds a negative sign and statistically significant in all three cases. The result may be explained in the view of Life-Cycle-Hypothesis, which explains that an increase in dependency ratio increases current consumption that an intern increases the demand for imported goods. Our result indicates that for group A the dependency ratio holds a negative coefficient (-0.50), in the same way for group B and C it holds (-0.017) and (-0.056) respectively. Our findings are consistent with the findings of Chinn and Ito (2007); (Chinn and Ito, 2008; Gruber and Kamin, 2007) among others.

The trade openness (TOPN<sub>it</sub>) enters for all three groups significantly, however, for groups A and C it holds a negative sign. However for group B, the trade openness is positive (0.005) and significant at one percent level of significance. The one possible justification of negative sign is in the nature of traded goods, that most of the developing countries' exports primary goods, whereas imports value-added goods. Therefore, outward trade policies

4. NTB represent Non-Oil Trade Balance, which captures trade composition effect.

putting a negative effect on their current account. Some studies on the subject, for example (Allegret et al., 2014); Chinn and Prasad (2003) among others. The positive coefficient for group B may be justified in the volume of exports of these economies that should increase because of trade openness.

The GDP growth has a positive (0.155) and significant effect on current account for group A. However for group B GDP growth enters the model negatively and statistically significant, in the case of group C it holds a negative sign, however statistically insignificant. In table columns 8 and 9 presents the estimated results for country group C, whereas the effects of non-oil trade balance are examined on dependent variables TOT and AC respectively. Results reveal that non-oil trade balance has no significant effect on TOT, whereas AC increasing with an increase in the non-oil trade balance. All other variables hold almost the same results as in previous cases.

### 3.1.2. Discussion of results of SUR models for valuation channel

The oil price shocks have an impact on the net foreign asset position of oil importer countries. In order to examine how oil price shocks, affect the net foreign asset position of oil importer, we estimate empirical models (Eqs. 4,5). Table 2 presents the estimated results of our empirical models for all three country groups. Follow Kilian et al. (2009) in Eq.4 the dependent variable is net foreign assets as a percentage of GDP, whereas in Eq.5 the dependent variable is the capital gain as a percentage of GDP.

Our variable of the interest oil price ( $OLP_{it}$ ) in the first model (Eq. 4) has a different response to the dependent variable (net-foreign assets as a percent of GDP). For group A (column 2) it holds a negative sign, however statistically insignificant. The result indicates that oil price shocks have no effects on the net foreign assets of economies having oil imports less than 10 of their total imports. Whereas, for group B the oil price enters the model negatively and statistically significant. Result reveals that economies relatively more dependent on imported oil, their net foreign assets increases with an increase in oil price.

On the other hand, in the case of economies heavily dependent on imported oil (Group C), the rise in oil price decreases net foreign assets. This is evident from the fact that for group C (column 6), the oil price holds a negative sign that is statistically significant. In general, the estimated results appear justifiable. For instance, in the case of group A, having the lowest oil imports, any change (rise) in oil prices has no substantial effect on net foreign assets. Whereas, for higher oil-importing countries (Groups B,C), oil prices pose significant effects on the net foreign assets. More interestingly, in the case of economies heavily dependent on imported oil (Group C) net foreign asset decreasing with an increase in oil prices.

The first lag ( $NFA_{it-1}$ ) of the dependent variable enters the model positively and statistically significant for all three groups. The results indicate that net foreign assets depend on its lag values, the greater are the existing stock of assets the greater would be the current stock of assets. Similarly, the second lag ( $NFA_{it-2}$ ) enters the model positively and statistically significant for group A, and B, however insignificant in the case of group C. The term of trade with its first lag ( $TOT_{it-1}$ ) enters positively and significantly in case of group A, however, for other two groups (Groups B, C), it holds positive sign but statistically insignificant. Population growth ( $POP_{it}$ ) poses a negative effect on capital gains in the lower importer of oil (group A), and a higher importer (group C), whereas in the case of group B (countries having oil imports holding 10-20 percent share of its total imports) population growth can not signify its role in the determination of capital gain.

Almost for all three groups, the growth of GDP ( $GDPG_{it}$ ) cannot signify its role in the determination of capital gain. For the first two groups (A, B) results indicate that countries having more open to international trade improves their capital gain compare to their less open counterparts. Whereas for group C (higher oil importer countries) trade openness has no effect on the capital gain.

The results of our second regression (Eq. 5), the dependent variable (value addition) is measure with the current account as a percentage of GDP, instead of net foreign assets as a percentage of GDP.

**Table 2: Estimated results of empirical models (4,5) valuation channel**

| Variables    | Country Group A   |                   | Country Group B  |                   | Country Group C   |                   |
|--------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|
|              | Eq.4              | Eq.5              | Eq.4             | Eq.5              | Eq.4              | Eq.5              |
| $OLP_{it}$   | -0.038 (0.033)    | -0.482 (0.481)    | 1.200* (0.668)   | -0.665*** (0.160) | -0.947*** (0.355) | -1.489*** (0.396) |
| $NFA_{it-1}$ | 0.804*** (0.034)  | -                 | 0.356*** (0.013) | -                 | 0.921*** (0.042)  | -                 |
| $NFA_{it-2}$ | 0.178*** (0.035)  | -                 | 0.208*** (0.012) | -                 | 0.038 (0.042)     | -                 |
| $TOT_{it-1}$ | 0.110* (0.058)    | 2.401*** (0.818)  | 0.061 (1.644)    | 0.298 (0.381)     | -0.850 (0.855)    | -0.339 (0.937)    |
| $POP_{it}$   | -0.027*** (0.009) | -                 | 0.097 (0.357)    | -                 | -0.437*** (0.157) | -                 |
| $GDPG_{it}$  | 0.001 (0.003)     | 0.062 (0.039)     | 0.124 (0.102)    | -0.130*** (0.024) | -0.067 (0.053)    | -0.077 (0.058)    |
| $TOPN_{it}$  | 0.000* (0.000)    | 0.002 (0.004)     | 0.141*** (0.009) | 0.004* (0.002)    | 0.008 (0.005)     | -0.025*** (0.006) |
| $NFA_{it}$   | -                 | 0.059 (0.156)     | -                | 0.006* (0.003)    | -                 | 0.026 (0.018)     |
| $DPR_{it}$   | -                 | -0.047*** (0.015) | -                | -0.016*** (0.006) | -                 | -0.051*** (0.013) |
| $CA_{it-1}$  | -                 | 0.808*** (0.033)  | -                | 0.745*** (0.022)  | -                 | 0.628*** (0.041)  |
| $CA_{it-2}$  | -                 | -0.035* (0.033)   | -                | 0.080*** (0.022)  | -                 | 0.080* (0.043)    |
| CONS.        | -0.287 (0.237)    | -6.910* (3.641)   | -9.654 (7.762)   | 1.573 (1.873)     | 8.900** (4.062)   | 11.164** (4.538)  |
| No. Obs.     | 815               | -                 | 1981             | -                 | 533               | -                 |
| $R^2_1$      | 0.918             | -                 | 0.742            | -                 | 0.909             | -                 |
| $R^2_2$      | 0.703             | -                 | 0.695            | -                 | 0.623             | -                 |

Standard error in parenthesis \*indicates  $P < 0.10$  \*\* $P < 0.05$  \*\*\* $P < 0.01$

Apart from the dependency ratio ( $DPR_{it}$ ), that replaced population growth ( $POP_{it}$ ), all other explanatory variables are the same. Results presented in Table 2 show that variable of interest and other control variables holds the same results as in the case of Eq. 4. As far as lags of the dependent variable are concerned ( $CA_{it-1}$ ,  $CA_{it-2}$ ), both lags appear significant and positive for all three groups, which indicate that the current shape of current account depends on the past, whatever oil imports profile the country holding.

### 3.1.3. Discussion of results of SUR models for wealth channel

Table 3 presents the estimated results of our empirical models (6,7) that captures the impact of oil price fluctuation on current account balances through the wealth channel. As discussed earlier that the sample countries are divided into three groups. Country groups A, B and C presents low, medium, and major oil-importing countries respectively. In empirical model 6 the dependent variable is the exchange rate, whereas, in model 7 the dependent variable is current account balance. The following Tables 3 and 4 show the estimated results of our empirical models. In Table 3, the dependent variable of model 6 is real exchange rate, whereas Table 4 illustrates the estimated results of model 6 with the nominal exchange rate as a dependent variable.

Results presented in Table 3 indicate that for country group A our variable of interest oil price ( $OLP_{it}$ ) enters the model negatively, which is statistically insignificant. The result shows that a change in oil price cannot shape the real exchange rate of economies having less dependency on imported oil. Like group A, country groups B and C, the variable of interest ( $OLP_{it}$ ) holds a negative sign, however statistically significant. The results indicate that an increase in oil price decreases the real exchange rate in economies that relatively reliance more on imported oil. The response of oil price to the nominal exchange rate presented in Table 4 shows that for all country groups, an increase in oil price has a negative effect on the nominal exchange rate. The main conclusion that can be drawn from the findings is that increase in oil price posing a negative effect on exchange rates (real and nominal) in spite of whatever position a country holding in terms of oil imports.

The net foreign asset as a percentage of GDP ( $LPNF_{it}$ ) to real exchange rate is insignificant in all three groups, results indicate that net foreign asset has no effect on the determination of real exchange rate. However, for the groups B and C, the nominal exchange rate is negatively associated with a net foreign asset of countries relatively more dependent on importing oil. Similarly,

**Table 3: Estimated results of empirical models (6,7) wealth channel (using real exchange rate)**

| Variables     | Country Group A  |                    | Country Group B   |                   | Country Group C   |                   |
|---------------|------------------|--------------------|-------------------|-------------------|-------------------|-------------------|
|               | Eq.6             | Eq.7               | Eq.6              | Eq.7              | Eq.6              | Eq.7              |
| $OLP_{it}$    | -0.544 (0.645)   | -0.468 (0.644)     | -0.246*** (0.069) | -0.503*** (0.178) | -0.149*** (0.054) | -1.443*** (0.471) |
| $LREX_{it-1}$ | 0.948*** (0.005) | -                  | 0.928*** (0.005)  | -                 | 0.943*** (0.008)  | -                 |
| $LPNFA_{it}$  | 0.000 (0.000)    | -0.000 (0.000)     | 0.000 (0.002)     | 0.004 (0.004)     | -0.003 (0.003)    | 0.041* (0.022)    |
| $POPG_{it}$   | 0.044 (0.196)    | -                  | 0.041 (0.038)     | -                 | 0.030 (0.023)     | -                 |
| $GDPG_{it}$   | -0.021 (0.043)   | 0.239*** (0.042)   | -0.033*** (0.011) | -0.097*** (0.027) | -0.021** (0.009)  | 0.030 (0.074)     |
| $TOT_{it}$    | -0.543 (1.191)   | 4.833*** (1.155)   | 0.162 (0.174)     | 0.367 (0.432)     | -0.052 (0.144)    | -0.486 (1.228)    |
| $TOPN_{it}$   | -0.001 (0.005)   | -0.012** (0.005)   | -0.000 (0.001)    | 0.003 (0.003)     | 0.000 (0.001)     | -0.029*** (0.008) |
| $REX_{it}$    | -                | 0.000 (0.006)      | -                 | 0.001 (0.013)     | -                 | -0.043 (0.073)    |
| $CA_{it-1}$   | -                | 0.680*** (0.035)   | -                 | 0.761*** (0.025)  | -                 | 0.595*** (0.047)  |
| $CA_{it-2}$   | -                | 0.070** (0.034)    | -                 | 0.068*** (0.025)  | -                 | 0.087* (0.050)    |
| $DPR_{it}$    | -                | -0.061*** (0.020)  | -                 | -0.022*** (0.006) | -                 | -0.053*** (0.016) |
| CONS.         | 4.981 (4.772)    | -16.956*** (5.105) | 0.316 (0.803)     | 0.981 (2.068)     | 0.886 (0.673)     | 11.220* (5.756)   |
| No. Obs.      | 828              | -                  | 1594              | -                 | 439               | -                 |
| $R^2_1$       | 0.98             | -                  | 0.98              | -                 | 0.98              | -                 |
| $R^2_2$       | 0.61             | -                  | 0.70              | -                 | 0.59              | -                 |

Note: Standard error in parenthesis \*indicates  $P < 0.10$  \*\* $P < 0.05$  \*\*\* $P < 0.01$

**Table 4: Estimated results of empirical models (6,7) wealth channel (using nominal exchange rate)**

| Variables    | Country Group A   |                    | Country Group B   |                   | Country Group C   |                   |
|--------------|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|
|              | Eq.6              | Eq.7               | Eq.6              | Eq.7              | Eq.6              | Eq.7              |
| $OLP_{it}$   | -0.066*** (0.013) | -0.738 (0.619)     | -0.031*** (0.008) | -0.471*** (0.176) | -0.030* (0.018)   | -1.389*** (0.462) |
| $LEX_{it-1}$ | 0.990*** (0.003)  | -                  | 0.974*** (0.002)  | -                 | 0.926*** (0.005)  | -                 |
| $LPNFA_{it}$ | 0.000 (0.000)     | -0.000 (0.000)     | -0.002*** (0.000) | 0.002 (0.002)     | -0.007*** (0.001) | 0.044* (0.023)    |
| $POPG_{it}$  | 0.006* (0.004)    | -                  | 0.029*** (0.004)  | -                 | 0.003 (0.008)     | -                 |
| $GDPG_{it}$  | -0.001 (0.001)    | 0.187*** (0.040)   | -0.006*** (0.001) | -0.104*** (0.027) | -0.002 (0.003)    | 0.025 (0.074)     |
| $TOT_{it}$   | -0.048** (0.024)  | 4.645*** (1.106)   | 0.007 (0.019)     | 0.453 (0.437)     | -0.072 (0.051)    | -0.560 (1.224)    |
| $TOPN_{it}$  | -0.000 (0.000)    | -0.012** (0.005)   | 0.000 (0.000)     | 0.004 (0.002)     | -0.001** (0.000)  | -0.030*** (0.008) |
| $CA_{it-1}$  | -                 | 0.670*** (0.033)   | -                 | 0.754*** (0.024)  | -                 | 0.587*** (0.047)  |
| $CA_{it-2}$  | -                 | 0.058* (0.033)     | -                 | 0.079*** (0.024)  | -                 | 0.087* (0.050)    |
| $DPR_{it}$   | -                 | -0.056*** (0.021)  | -                 | -0.021*** (0.006) | -                 | -0.055*** (0.018) |
| $LEX_{it}$   | -                 | -0.324** (0.151)   | -                 | 0.012 (0.053)     | -                 | -0.005 (0.161)    |
| CONS.        | 0.557*** (0.095)  | -14.063*** (4.816) | 0.211** (0.088)   | 0.373 (2.079)     | 0.886*** (0.236)  | 11.430** (5.783)  |
| No. Obs.     | 885               | -                  | 1640              | -                 | 439               | -                 |
| $R^2_1$      | 0.99              | -                  | 0.99              | -                 | 0.99              | -                 |
| $R^2_2$      | 0.61              | -                  | 0.70              | -                 | 0.59              | -                 |

Note: Standard error in parenthesis \*indicates  $P < 0.10$  \*\* $P < 0.05$  \*\*\* $P < 0.01$

the growth rate of population ( $POPG_{it}$ ) cannot signify its role in the determination of real exchange rate for all groups, but for country group A and B nominal exchange is positively associated with population growth. The growth rate of GDP ( $GDPG_{it}$ ) enters the model with a negative sign and statistically insignificant for group A. However, for groups B and C the growth rate of GDP enters the model negatively and statistically significant. The result indicates that the real exchange rate is depreciating with the increase of the growth of GDP for countries having dependent more on imported oil. The terms of trade ( $TOT_{it}$ ) have no significant effect on the real exchange rate for all three groups of countries, however, it poses a negative effect on the nominal exchange rate in the case of country group A. For all three groups of country trade openness, ( $TOPN_{it}$ ) is insignificant, which indicates that trade openness does not play any role in the determination of the real exchange rate of countries under consideration. The lag of real exchange rate ( $LREX_{it-1}$ ) enters the model with a positive sign that is statistically significant for all three groups. Similar results have been found in the case of the nominal exchange rate.

Tables 3 and 4 are present the estimated results of our empirical model 7 (Eq. 7), whereas the wealth channel has been captured with the current account. Hence, the dependent variable exchange rate is replaced with the current account as a percentage of GDP. Two changes have been made in independent variables. Firstly, the population growth is replaced with the dependency ratio, and secondly, the exchange rate is used as an independent variable.

Our variable of interest ( $OLP_{it}$ ) enters the model with a negative sign that is statistically insignificant in the case of group A. The result indicates that countries that relies less on the imports of oil (less than 10%), their current account cannot affect by a change in oil prices. Whereas, for groups B and C the variable oil price holds negative sings that are statistically significant. The estimated results point towards the findings that countries' relatively more

reliance on the imported oil, their current account balance is dropping with an increase in oil prices. The estimated results make sense that with an increase in oil prices imported bill of oil importing countries increases with increase in oil prices and therefore worsening current account balance.

Among the control variables, growth of GDP ( $GDPG_{it}$ ) shows the mixed result, in the case of group A, for instance, it holds a positive sign, whereas for group B it enters the model with a negative sign. For both groups (A, B) growth of GDP has s significant effect on the current account. Estimated results reveal current account balance of countries having more reliance on imported oil is not changing with the change in the growth of GDP. The impact of the terms of trade ( $TOT_{it}$ ) on the current account is not the same among different groups. For instance, for group A, it enters the model positively and statistically significant, which indicates that terms of trade and current account have a parallel moment. For other groups (B, C), terms of trade have no significant effect on the current account. Trade openness ( $TOPN_{it}$ ) has a negative and significant effect on the current account in case of group A and C, whereas insignificant in case of group B. In all three groups exchange rate can not signify its role in the determination of current account. The dependency ratio ( $DPR_{it}$ ), in all three cases, enters the model negatively and statistically significant, which indicates that the current account of oil-importing countries is dipping with the increasing of dependency ratio. Both lags of the dependent variable appear significant and positive for all three groups, which indicates that the current account depends on its lag values.

### 3.2. Discussion of Mediation Analysis Results

This section of the study presents estimated results of Eqs 8-11, that capture the indirect effects of independent variables on the dependent variable. The following Table 5 presents the estimated results of different mediator variables on dependent variables for different groups. Table 5 segregated into four panels, panel

**Table 5: Mediation effects of different variables**

| Country Groups-Fuel imports as percentage of total imports |                  |                   |                   |                               |
|------------------------------------------------------------|------------------|-------------------|-------------------|-------------------------------|
| (A) Mediation effect of terms of trade                     |                  |                   |                   |                               |
|                                                            | Indirect effect  | Direct effect     | Total effect      | Proportion of effect mediated |
| Group A                                                    | -0.011 (0.058)   | 0.821 (0.504)     | 0.807* (0.478)    | -0.032 (0.125)                |
| Group B                                                    | -0.004 (0.005)   | -0.538*** (0.154) | -0.542*** (0.154) | 0.004 (0.005)                 |
| Group C                                                    | -0.001 (0.006)   | -1.371*** (0.406) | -1.372*** (0.406) | -0.000 (0.002)                |
| Group C: (Non- Oil Balance)                                | -0.044 (0.046)   | -1.512*** (0.523) | -1.588*** (0.544) | -0.016 (0.022)                |
| (B) Mediation effect of net foreign assets                 |                  |                   |                   |                               |
|                                                            | Indirect effect  | Direct effect     | Total effect      | Proportion of effect mediated |
| Group A                                                    | -0.002 (0.006)   | -0.483 (0.482)    | -0.485 (0.483)    | 0.003 (0.007)                 |
| Group B                                                    | 0.007 (0.005)    | -0.665*** (0.161) | -0.658*** (0.159) | -0.003 (0.003)                |
| Group C                                                    | -0.024 (0.019)   | -1.489*** (0.396) | -1.514*** (0.402) | -0.008 (0.008)                |
| (C) Mediation effect of capital gains                      |                  |                   |                   |                               |
|                                                            | Indirect effect  | Direct effect     | Total effect      | Proportion of effect mediated |
| Group A                                                    | 0.033 (0.091)    | -2.031* (1.3161)  | -1.998* (1.317)   | 0.016 (0.047)                 |
| Group B                                                    | -0.022* (0.013)  | -0.595*** (0.161) | -0.618*** (0.161) | 0.015 (0.014)                 |
| Group C                                                    | -0.085 (0.069)   | -1.110*** (0.385) | -1.196*** (0.389) | -0.008* (0.027)               |
| (D): Mediation effect of real exchange rate                |                  |                   |                   |                               |
|                                                            | Indirect effect  | Direct effect     | Total effect      | Proportion of effect mediated |
| Group A                                                    | -0.0002* (0.003) | -0.468* (0.644)   | -0.468 (0.643)    | 0.001* (0.004)                |
| Group B                                                    | -0.000* (0.003)  | -0.503*** (0.177) | -0.503*** (0.177) | 0.001* (0.003)                |
| Group C                                                    | 0.006* (0.011)   | -1.443*** (0.471) | -1.436*** (0.469) | 0.001 (0.004)                 |

Standard error is in parenthesis, \*, \*\*, \*\*\* denotes level of significance at 10, 5 and 1 percent respectively

A presents the mediation effect of terms of trade, B presents net foreign assets, and panels C and D presents the mediation effects of capital gain and real exchange rate respectively.

Panel A of Table 5, which presents the mediation effects of the term of trade, estimated results indicate the mediation effects decrease with an increase in the imports of oil. For instance, for group A having the least importer of oil holds a relatively stronger coefficient ( $-0.011$ ). For group B where imports increase to 10-20%, it holds a relatively lower coefficient ( $-0.004$ ) and holds lowest ( $-0.0005$ ) for countries for higher oil importer countries (oil imports are 20-30%). Results indicate that the effect of oil price on the current account of the oil importing is sharking with an increase in oil imports. The insignificance of indirect effect of term of trade provides a plausible reason to agree for the potential role of additional mediator present to play its role in the relationship of oil price to current accounts. This argument is further justified by significant direct effect as direct effect is significant negative for group B and group C. The significance of direct effect provides the evidence of partial mediation.

Panel B shows the indirect effects of net foreign assets. Results indicate that for all three groups of economies the indirect effect appears insignificant. Whereas the direct effect of the net foreign asset on oil price current account relationship is negative and significant for group B and C relatively higher importer countries. This term provides important information about the presence of partial mediation taking place in oil price and current account relationships.

The capital gain is calculated as the difference between changes in net foreign assets and current account balances taken as a percentage of GDP. Panel C of Table 5 presents the mediation effects of the capital gain channel. Results show that among groups of countries, for group B the indirect effect is significant, which indicates that countries having depends on 10 to 20 percent on imported oil imports capital gains signify its role as a mediator. The direct effect is significant for all of the groups indicating the presence of partial mediation. The total effect is also significant and negative being for all three groups. The proportion of effect mediated goes on to decrease as imports of oil go on increase down the groups. The proportion of meditated effect is significant for a group having reliance 20-30 percent on imported oil.

The mediation role of the wealth channel is assessed in the oil price and current account relationship through the real exchange rate. Panel D of Table 5 presents the mediation effect of the real exchange rate. Results show that for all groups the indirect effect is significant, which provides evidence for the presence of wealth effects for the adjustment of imbalances due to oil price shocks. Similarly, the direct effects for all groups are significant indicating the presence of partial mediation. As for the total effect is concern, it appears positive and significant for group A and B, and insignificant for group C. Two key outcomes can be drawn from the mediator's results presented in Table 5. Firstly, in all mediators, the direct effect goes on increasing with the increase in oil imports. Secondly, proportion of mediation effects decreasing with oil imports in the case of trade assets and wealth channel,

whereas in the case of the real exchange rate channel it increases as oil imports increases.

## 4. CONCLUSION

Lesser dependence on imported oil can decrease trade or current account balances of oil importing nations and also decreases their vulnerability to fluctuation in its price. The decrease in vulnerability of oil importing economies to oil price fluctuation demands to explore the role of different mediators in adjustments of balances. In this context this study is an attempt to examine empirically the effects of oil price shock on current account imbalances. The analysis is carried out on the cross-country panel of 160 countries that are divided into three different groups based on their level of oil imports. The findings of the study reveal that for all three groups of countries the oil price shock pose a positive effect on the current account through the trade channel. Whereas, the current account of all three groups is negatively associated with oil price shock with the wealth channel. The valuation channel holds a mix results across country groups about the effect of oil price shock on the current account balances. In the case of low and major oil importer countries, oil price shock is negatively associated with the current account, whereas the current account of medium oil importer countries is improving with an increase in oil prices. The findings of the mediation analysis show that real exchange rate signify its role as a mediator in the relationship between oil price shock and current account imbalances.

Despite the fact that the study entails some limitations, however, we believe that our analysis may prove beneficial to direct policies about the adjustment of the current account of the oil-importing countries. As our findings provide the evidence about the negative effects of the oil price shock on current account imbalances of oil-importing countries through valuation and wealth channels. This entails oil-importing countries' exchange rate policy to mitigate the negative effect of oil price shock on the current account. Similarly, the results of mediation effects (wealth effects) direct for the exchange rate policy of the oil-importing countries. In addition, the findings indicate a positive effect of the oil price shock on current account imbalances through the trade channels, which entails trade policy of oil-importing to encourage exports in order to harvest potential gain from the oil-exporting countries markets.

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## APPENDIX

The list of countries used in the analysis is as follows:

**Table 6: List of countries**

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Less oil importing Economies<br>(Group A)   | Albania, Algeria, Angola, Argentina, Aruba, Austria, Australia, Azerbaijan, Bolivia, Brunei, Canada, Central African Republic, China, Colombia, Comoros, Congo, Czech Republic, Denmark, Djibouti, Dominica, Ecuador, Egypt, Equatorial Guinea, Gabon, Grenada, Hong Kong SAR, China, Iran, Iraq, Ireland, Kuwait, Lesotho, Libya, Luxembourg, Macao SAR China, Malaysia, Mexico, Namibia, Nigeria, Norway, Oman, Qatar, Russia, Rwanda, Saudi Arabia, Slovenia, St. Kitts and Nevis, Switzerland, United Arab Emirates, United Kingdom, Venezuela                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Medium oil importing Economies<br>(Group B) | Antigua and Barbuda, Armenia, Bangladesh, Barbados, Belgium, Belize, Benin, Bhutan, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cameroon, Chad, Chile, Costa Rica, Croatia, Cyprus, Dominican Republic, El Salvador, Estonia, Ethiopia, Finland, France, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Honduras, Hungary, Iceland, Indonesia, Israel, Italy, Jordan, Kazakhstan, Lebanon, Lesotho, Macedonia, Madagascar, Malawi, Maldives, Malta, Mauritius, Morocco, Mozambique, Netherlands, Nepal, New Zealand, Niger, Nicaragua, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Samoa, Serbia, Seychelles, Singapore, Slovak Republic, South Africa, Spain, Sri Lanka, St. Vincent and the Grenadines, Sudan, Suriname, Sweden, Syrian Arab Republic, Thailand, The Gambia, Togo, Tonga, Tunisia, Turkey, Uganda, United States, Uruguay, Vanuatu, Vietnam, Yemen, Zambia, Zimbabwe |
| High oil importing Economies<br>(Group C)   | Bahrain, Brazil, Côte d'Ivoire, Fiji, Guyana, India, Jamaica, Japan, Kenya, Korea, Kyrgyz Republic, Liberia, Lithuania, Mali, Mauritania, Moldova, Mongolia, Pakistan, Senegal, Tanzania                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

No of countries in Group A = 50 B = 90 C = 20