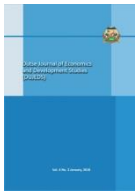
DUTSE JOURNAL OF ECONOMICS AND DEVELOPMENT STUDIES (DUJEDS)
DEPARTMENT OF ECONOMICS AND DEVELOPMENT STUDIES
FEDERAL UNIVERSITY DUTSE
E-Mail: dujeds@fud.edu.ng



IMPACT ANALYSIS OF EXCHANGE RATE PASS-THROUGH CHANNELS ON MONETARY POLICY OUTCOMES IN NIGERIA

IBRAHIM Umar Bambale — **Department of Entrepreneurship SICHST, Makarfi, Kaduna State,**

SANUSI Rafindadi Aliyu — **Department of Economics, Ahmadu Bello University, Zaria - Nigeria**

Abstract
This paper is set out to ascertain the role and impact of exchange rate pass-through channels on key macro variables following two shocks in Nigeria. This is done using a calibrated small open-economy New Keynesian Dynamic Stochastic General Equilibrium (DSGE) model of the Nigerian Economy. Within this framework, the responses of macro variables and the volatility of key monetary variables under different degree of pass-through are compared, using impulse response functions. The main results of this study are first, the role and impact of a channel depend considerably on the degree of pass-through and the shock that hit the economy and second, inflation and output gap volatility depend considerably on the degree of pass-through. Therefore, the results suggest that the central bank should consider the role and impact of exchange rate pass-through channels in the design and implementation of monetary policy in Nigeria, in order to improve monetary policy effectiveness in the economy.

Keywords: Exchange Rate, Monetary Policy; Small Open Economy DSGE Model
JEL Clasificación: E52, E58 F41

Introduction

High volatility in the world price of oil is responsible for the highly variable terms of trade Nigeria is experiencing. Terms of trade volatility pose a serious challenge to the nominal exchange rate of Nigeria, because oil export is the major source of foreign exchange earnings and the largest contributor to government revenue. Iyoha (2017) conclude that the nominal exchange rate in Nigeria respond with some lags to changes in international oil price, as every fall in oil price will lead to a depreciation in the exchange rate (a rise in the unit of Naira to Dollar) and vice-versa.

Terms of trade volatility, nominal interest rate adjustment and expenditure switching effects make the Naira exchange rate to be volatile. Such movement of the exchange rate has a considerable effect on inflation and output gap fluctuations. Thus, the exchange rate transmits the impact of any shock on the economy through its demand-side and supply-side effects on import prices and relative prices. The channel through which an exchange rate movement influences domestic prices is technically called Exchange Rate Pass-through (ERPT). Exchange Rate Pass-through may either be complete (one-to-one response of import prices to changes in the exchange rate) or incomplete (less than one-to-one response of import prices to changes in the exchange rate) (Mumtaz, Oomen, & Wang, 2006).

The effects of exchange rate on the domestic price can be transmitted through (i) the *direct effect*, whereby the shift in the exchange rate directly affects import prices through imported final consumer goods. Subsequently, consumer price index inflation (CPI) becomes affected, (ii) *indirect effect*, whereby the exchange rate fluctuations affect CPI inflation via imported inputs and intermediate goods for domestically produced products and finally(iii) *the expectation channel effects*, in the form of forward-looking firm price-setting behaviour and expected reactions of economic agents following monetary authority response (Garcia & Restrepo, 2011).
In a small open economy like Nigeria, the exchange rate channel plays a critical role in the

implementation of monetary policy, because it acts as either shock absorber or amplifier. The impact of exchange rate pass-through depends considerably on the degree of pass-through and the type of shock that hit the economy. Therefore, exchange rate pass-through determines the effectiveness of monetary policy.

Exchange Rate Pass-Through (ERPT) analysis aid in measuring the extent to which exchange rate fluctuation account for the movement in domestic prices, it aids us to understand the role of exchange rate channels and their impact on monetary policy outcomes.
For the monetary authority to conduct monetary policy effectively in a small open economy like Nigeria, the rate at which Exchange Rate Pass-through (ERPT) to relative domestic prices must be known (Choudhri & Hakura, 2001), because it plays a critical role in the design of monetary policy in a small open economy (Monacelli, 2005).

In light of the above discussion, there is several empirical works focusing on establishing the existence of low and incomplete exchange rate pass-through and the degree of such pass-through in Nigeria using different methodologies. There is a consensus regarding the existence of incomplete ERPT in Nigeria, but there are divergent positions regarding the degree and speed of such incomplete ERPT. For example, Aliyu et al. (2008), investigates the degree of ERPT to import prices and consumer prices in Nigeria, by applying the VECM technique. The study found that the degree of pass-through to import prices and consumer prices in Nigeria is significant, high, incomplete and persistent.

Ogundipe and Egbetokun (2013) and Zubair, Okorie and Sanusi (2013) investigate the degree of ERPT to imported inflation and CPI inflation in Nigeria, by applying the SVAR technique based on the variance decomposition analysis result. These studies found that the pass-through in Nigeria is low, incomplete and fairly slow. While using the same methodology Fatai and Akinbobola (2015) establish that ERPT in Nigeria is significant, moderate and persistent in the case of import prices and consumer prices. But Mohammed-gamji and Whitten (2016) and Iyoha (2016) found the exchange rate pass-through in Nigeria is low and incomplete, moreover, the speed of adjustments to structural shocks is found to be high.

Adebayo and Mordi (2010), CBN (2013) and Gracia (2010) applied a small open economy DSGE model and establish the existence of low and incomplete exchange rate pass-through to imported inflation and CPI inflation in Nigeria.

On the other hand, the impact of channels, the dynamic role of channels and inflation-output gap volatility under different degree of pass-through following different shocks were completely ignored. Therefore, this paper aims to determine the role of different channels and their impact, in addition to, inflation-output gap volatility under different degree of pass-through in the face of different shocks within the context of New Keynesian small open economy DSGE model. Low and incomplete exchange rate pass-through are introduced in the model via nominal rigidities on import prices.

This study is structured as follows: In section 2 the theoretical framework of the study and the log-linearized version of the small open economy DSGE model augmented by incomplete exchange rate pass-through are presented. In section 3, calibrations of the model used in the simulation experiments are presented. In section 4, we compare the responses of key macro variables under different degree of pass-through and then analyse the impact of different channels. In addition, the role of channels and inflation-output gap volatility are analysed. Summary and conclusion are provided in Section 5.

Theoretical Framework and the Model

The study adopts the doctrine of Purchasing Power Parity (PPP) an offshoot of the Law of One Price (LOP) gap as the theoretical underpinning of this study, in line with New Keynesian DSGE estimation technique. The PPP doctrine shows how the relationship between prices and exchange rate evolves over time, the doctrine further assumes no international trade barriers and zero transportation cost involve in international trade (Fatai & Akinbobola, 2015).

Krugman and Obstfeld (2003) cited in Fatai and Akinbobola (2015), maintain that under the PPP condition, the exchange rate between two countries must be equal to the ratio of their price level (complete Exchange Rate Pass-Through). However, imperfect market competition and product differentiation in smaller open developing economies make ERPT to be incomplete

The model used in this study is adapted from the work of Beltran and Draper (2008). The model tries to describe the Nigerian economy as a small open economy that trade with the rest of the world. For the sake of simplicity, the model assumes: complete asset markets and discrimination between domestic and foreign goods, but allows all goods to be traded internationally. In addition, the model assumes incomplete exchange rate pass-through.

This model is structured based on the behaviour of four economic agents (firms, households, the external sector and the monetary authority), which always strive to maximize their respective utility subject to the given constraint.

The representative firm maximizes the expected discounted value of profits, under the constraint given by the demand curve and the monopolistic competition. Solving this problem leads to the New Keynesian Phillips curves as below:

$$\pi_{h,t} = \frac{1}{1+\phi\beta}\pi_{h,t-1} + \frac{\beta}{1+\phi\beta}\pi_{h,t+1} + \frac{(1-\theta_h)(1-\theta_h)}{\theta_h(1+\phi\beta)}m\tilde{c}_t + mu_{pih} \quad \text{.................................} (1)$$

Eq 1 expresses domestic inflation $\pi_{H,t}$ as a function of its lag $\pi_{h,t-1}$, lead $\pi_{h,t+1}$, marginal cost $\widetilde{mc}_t^r$ and persistence of domestic inflation shock mu_{pih}. While the coefficients θ_h expressed the Calvo rigidity parameter with respect to domestic inflation and ϕ represent price indexation for home-produced goods.

$$\pi_{f,t} = E_t\pi_{f,t+1}\frac{(1-\theta_f)(1-\theta_f\beta)}{\theta_f}\psi_t + \varepsilon_{f,t} \quad \text{..} (2)$$

Eq 2 expresses imported inflation $\pi_{f,t}$ in a similar way which depends on its own lag $\pi_{f,t-1}$ and lead $\pi_{f,t+1}$. While the coefficients θ_f expressed the Calvo rigidity parameter with respect to imported inflation, ϕ represent price indexation for home-produced goods, ψ represent deviation from the law of one price gap (LOP) and ε_{pif} represent imported inflation shock:

$$\pi_t = (1-\theta)\pi_{h,t} + \theta\pi_{f,t} \quad \text{..} (3)$$

Eq. 3 is an identity equation that defines CPI inflation π_t as the sum of domestic inflation $\pi_{h,t}$ and imported inflation $\pi_{t,f}$

The representative household maximizes expected lifetime utility with respect to consumption and leisure, where consumption has a habit component. Solving the household maximization problem results to the New Keynesian dynamic IS curve as follows:

$$C_t - \vartheta C_{t-1} = y_t - \vartheta y_{t-1} + \frac{1}{\sigma}[(1-\vartheta)s_t + \psi_t] + mu_c \quad \text{...} (4)$$

In Eq 4 consumption c_t is characterized by habit formation ϑ and it depends on domestic output gap $y_{t+1} - \vartheta y_t$, risk aversion $\frac{1}{\sigma}$ and real interest rate$(i_t - E_t\pi_t)$.

The model assumes that the central bank conducts monetary policy according to a modified Taylor rule much similar to that of CBN (2013) as follow:

$$i_t = [\rho_i i_{t-1} + (1-\rho_i)](\phi_\pi\pi_t + \phi_x\tilde{x}_t + \phi_e\{e_t - e_{t-1}\}) + \varepsilon_t \quad \text{......................................…} (5)$$

Eq 5 is a modified Taylor rule, Where i_t represents the natural level of nominal interest rate, $\rho \le p \le 1$ is the interest rate smoothing coefficient while $\boldsymbol{\varepsilon_t}$ is an i.i.d interest rate shock. The parametersϕ_π, ϕ_x and ϕ_e represent the central bank's preference about inflation stability, output gap stability and nominal exchange rate stability respectively.

Calibration

In line with New Keynesian DSGE model's tradition, parameters are borrowed from the literature on the economies of similar structure, or estimate from actual data for the Nigerian economy. However, where there is no literature available on some of the model parameters, unavoidably, values are assigned based on a subjective judgment by borrowing developed economies parameter values as a reference. In addition, the Bayesian estimation technique is adopted in estimating the model with the aid of Dynare software. Table 1 present the calibrated parameters of the model.

Table 1: Calibrated Parameters

Parameter Descriptions	Parameters	Values	Source
Discounted factor	β	0.99	Sami et la. (2010)
Frisch elasticity of labour supply in SOE	φ	3.0	Sami et al. (2010)
Frisch elasticity of labour supply in ROW	φ^*	3.0	Sami et al. (2010)
The degree of habit formation in SOE	ϑ	0.72-0.94	Adebiyi and Mordi (2010) and CBN (2013)
The import share of the domestic economy	$\delta\varepsilon_B$	0.47	Olayide et al, (2011)
Calvo parameter for domestic producers	θ_h	0.64	CBN (2013)
Calvo parameter for retail importers	θ_f	0.91	Mohammed-gamji & Whitten, 2016)
Calvo parameter for foreign producers	θ_h	0.75	Steinbach et al. (2009)
AR (1) persistence shock for domestic producers	ρ_{pih}	0.2	
AR (1) persistence shock for domestic consumption	ρ_c	0.8	Steinbach et al. (2009)

Source:

Impulse Response Functions

Impulse response analyses aid us to investigate the impact of different channels and their roles under different degree of pass-through in the face of two shocks. Moreover, the relationship between the different degree of pass-through and the volatility of key macro variables in the Nigerian economy following two shocks and the reaction of monetary authority are analysed with the aid of the impulse response graphs.

Comparative Analysis of Different Degrees of Pass-Through

In this sub-section, we analyse how different degree of exchange rate pass-through determine the responses of key macro variables; to such shocks as a positive productivity shock and domestic demand shock in Nigeria. The IRFs aid us to compare the responses of key macro variables under different pass-through. In the spirit of Adolfson (2007), three different degrees of pass-through are chosen, i.e. almost zero pass-through ($1-\theta F$=0.01), the case of Nigeria ($1-\theta F$=0.09) and almost complete pass-through ($1-\theta F$=0.99). *Decrease in the degree of pass-through ($\boldsymbol{\theta F}$) implies that the import price becomes more flexible as the magnitude of the pass-through gets higher.*

Productivity Shock

Figure 1 shows that imported inflation, CPI inflation and terms of trade remain unchanged under almost zero pass-through ($1-\theta F$=0.01) and low pass-through (The case of Nigeria: 1-θF=0.09). The same variables: imported inflation, CPI inflation and terms of trade rise and fluctuate at the maximum level under almost complete pass-through. It implies that, as the nominal rigidity increases (smaller ($1-\theta F$)), the exchange rate pass-through into import price increases. *Thus, it can be deduced that as the pass-through gets lower, the price of imported goods tends to increase slightly in comparison to higher pass-through.*

It can be observed from Figure 1, that CPI inflation is positive under the almost complete pass-through, but in all the other cases it remains unchanged. Therefore, *we can generalize that the exchange rate channel is less important for monetary policy implementation under almost zero and low pass-through (Nigerian case) because it acts as a shock amplifier.*

In response to such shock, the central bank raises the nominal interest rate, so tha the exchange rate can appreciate and amplifiers the productivity shock.

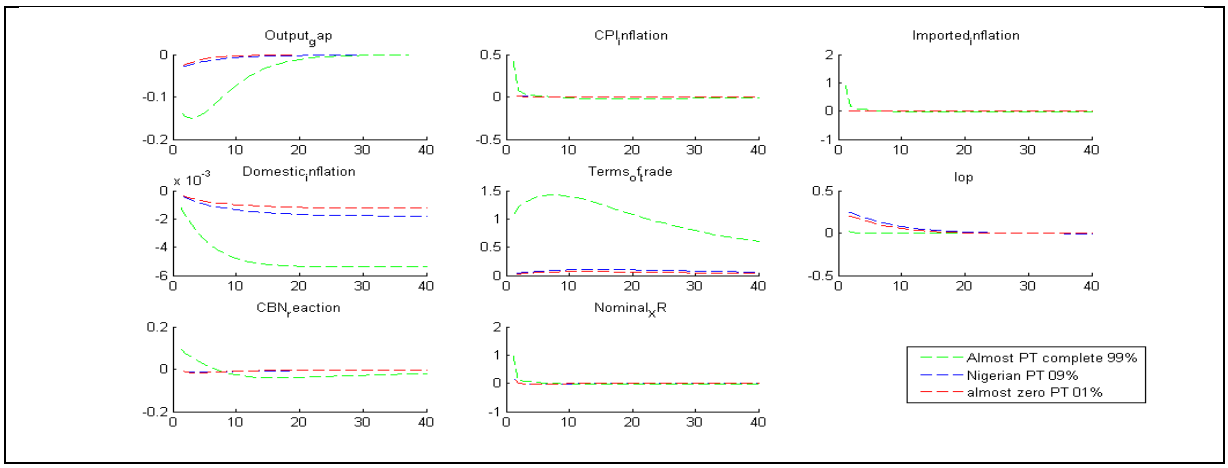
Figure 1 shows *that, domestic inflation responds more positively to the LOP gap channel of aggregate supply side as the pass-through declines***.** The red line (see domestic inflation plot in Figure 1) is higher than the other lines, implying that higher LOP gap (lower pass-through) causes the real marginal cost to increase more; as a result, the domestic price level increases. *Thus, the LOP gap channel of aggregate supply side contributes significantly in aiding monetary authority to achieve its objectives under the low pass-through compared to high pass-through. In other words, inflation volatility decreases as the pass-through declines.*

Figure 1 also shows that the exchange appreciation (demand side channel of the LOP gap) is expected to return back to its steady state in the future, according to the changes of the Unconverted Interest Rate Parity (UIP) condition under the three scenarios. As a result, the current aggregate demand decreases, which cause the output gap to decrease. We can observe from Figure 1, almost zero pass-through (see the red line in the output gap

plot in Figure 1) has the lowest output gap. Thus, the LOP gap channel of the aggregate demand side aids in narrowing the output gap as the pass-through decreases, which in turn causes the CIP inflation to decrease further. However, the aggregate demand channel of LOP gap opposed the monetary policy objective to stabilize the output gap and inflation.

Figure 1 also shows that the aggregate demand side channel of the LOP gap acts as an amplifier of the shock effect. However, the aggregate supply side channel of the LOP gap appears to have a stronger impact than the aggregate demand side channel of LOP gap under almost zero and low pass-through, because the CIP inflation is more stable under these two scenarios.

The relationship between the different degree of pass-through and volatility of key monetary variables can be observed from Figure 1. Figure 1 shows that CPI inflation is less volatile under almost zero and low pass-through while the output gap is more volatile under the almost complete pass-through. Thus, we can conclude that the lower the pass-through, the lesser the impact of the productivity shock on domestic inflation, import inflation, CPI inflation and terms of trade. However, the output gap appears to be highly volatile under the almost complete pass-through. Therefore, under the lowest pass-through, policymakers tend to face more inflation and output gap variability trade-off.



Source: Authors' calculations

Fig. 1: Productivity Shock

Domestic Demand Shock

From Figure 2, it can be observed that a positive domestic demand shock leads to an increase in domestic inflation with almost complete pass-through having a lesser volatility. Imported inflation and CPI inflation remain unchanged under almost zero and low (Nigerian case) pass-through. While the same variables: imported inflation and CPI inflation fall and fluctuate at a maximum level under the almost complete pass-through. This implies that the rise in domestic demand encourages retail importers to import more because the domestic industries are constrained to meet the immediate domestic demand.

It can be observed from Figure 2, that CPI inflation and imported inflation are negative under the almost complete pass-through, but in all the other cases they remain unchanged. The fall in imported inflation and CPI inflation can be explained by the fact that the effects of low international prices suppressed the effects of rising domestic goods prices. Therefore, we can generalize that the exchange rate channel is less important for monetary policy implementation under almost zero and low pass-through (Nigerian case). In the case of Nigeria, the exchange rate channel acts as an amplifier to demand shock because the exchange rate depreciation fails to induce the needed decrease in the domestic inflation. However, the almost complete pass-through causes the effect of the exchange rate channel on domestic inflation to reduce (see domestic inflation plots in Figure 2).

It can also be observed from Figure 2 that terms of trade is negative under the three scenarios in response to a positive domestic demand shock. The terms of trade fall and fluctuate at a maximum level under the almost complete pass-through.

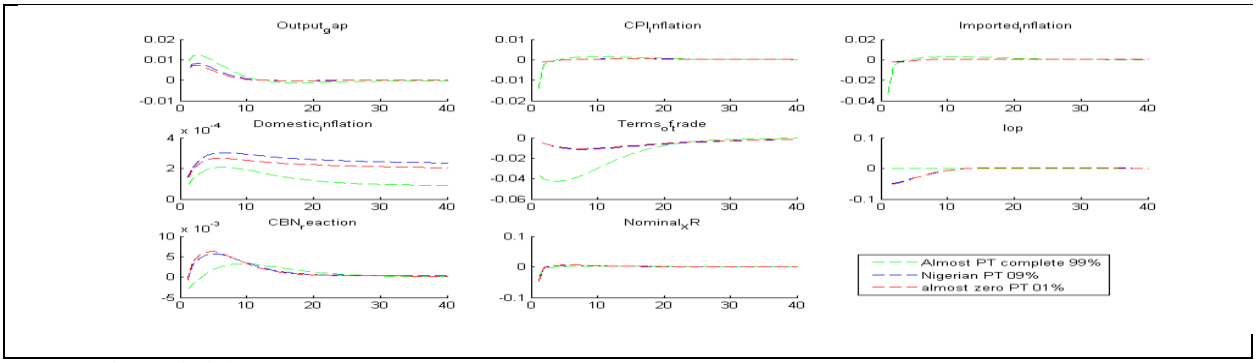
The central bank raises the nominal interest rate in reaction to the positive demand shock, in order to force the exchange rate to appreciate. But instead, the exchange rate depreciates and works in favour of the monetary authority (see nominal exchange

rate plot in Figure2). The depreciation of the exchange rate can be explained by the fact that the Nigerian economy becomes less competitive in the world market (See terms of trade plot in figure 2). Even though, the exchange rate channel serves as shock amplifier.

Figure 2 shows that domestic inflation response less positively to the LOP gap channel of aggregate supply side as the pass-through increase. Thus, the LOP gap channel of aggregate supply side opposed the objective of the monetary authority to reduce domestic inflation under all the scenarios. In other words, domestic inflation volatility decreases as the pass-through increase. Therefore, this channel serves as shock amplifier when the central bank plans to reduce the domestic inflation.

Figure 2 also shows that the exchange depreciation (demand side channel of the LOP gap) is expected to return back to its steady state in the future according to the changes of the UIP condition under all the three scenarios. As a result, current aggregate demand increases, which causes the output gap to increase. We can observe from Figure 2, almost zero pass-through (the red line in the output gap plot in Figure 2) has the lowest output gap. Thus, the LOP gap channel of the aggregate demand side, aid in narrowing the output gap as the pass-through decreases, which in turn may cause domestic inflation to decrease**.** However, aggregate demand channels of LOP gap aid the monetary policy objective to reduce domestic inflation because it acts as a shock absorber.

Figure 2 also shows that the aggregate demand side channel of LOP gap acts as an absorber of the shock effect. As future exchange rate appreciation expectations increase, the current output gap decreases while the expected future output gap increases as the pass-through get higher. In this case, almost zero pass-through tends to have less variability of the output gap and better inflation stability.



Source: Authors' calculation

Fig 2: Positive Domestic Consumption Shock

Impact of Channels under Different Degree of Pass-Through

In this sub-section, we analyse the impact of exchange rate channels, aggregate demand side channel of the LOP gap and aggregate supply side channel of LOP gap under different degree of pass-through following domestic productivity shock and domestic demand shock. The aim of this sub-section is to examine how different degrees of pass-through determine the impact of a channel following a shock.

Productivity Shock

Figure 1 allows us to summarize the impact of different exchange rate pass-through channels under different degree of pass-through following domestic productivity shock in Table 2.

From Table 2, we can conclude that the higher the pass-through the larger the impact of the exchange rate channel and the LOP gap of aggregate demand channel on CPI inflation. But in the case of the LOP gap of aggregate supply channel, the low pass-through (Nigerian case) has the largest impact followed by almost zero pass-through while almost complete pass-through has the lowest impact on the key target.

From Table 2, we can observe that the exchange rate channel and the LOP gap of aggregate demand channel amplify the impact of a productivity shock on CPI inflation. While the LOP gap of aggregate supply channel absorbed the impact of a productivity shock on CPI inflation.

Table 2 also shows that almost zero pass-through ensures minimum volatility of inflation. Thus, as the pass-through decreases, CPI inflation volatility decreases. But in the case of the output gap volatility, almost complete pass-through has the minimum volatility. Thus, as the pass-through decreases, output gap volatility increases.

Table 2: The Impact of Productivity Shock Table

Source: Authors' calculation

CASES	PASS-THROUGH (%)	DEGREE OF PASS-THROUGH (%)	THE EXCHANGE RATE CHANNEL	THE L.O.P GAP OF DEMAND CHANNEL	THE L.O.P GAP OF SUPPLY CHANNEL	VOLATILITY OF KEY MONETARY VARIABLES	
			The impacts of the channels			π	$\hat{y}$
Almost zero pass-through	1	99	Lowest impact	Lowest impact	Larger than 99% impact	Lowest	Highest
Low pass-through (Nigerian case)	9	91	Larger than 1% impact	Larger than 1% impact	Largest impact		
Almost complete pass-through	99	1	Largest impact	Largest impact	Lowest impact	Highest	Lowest
Role			Amplifier	Amplifier	Absorber		

Domestic Demand Shock

From Figure 2 we summarize the impact of different exchange rate pass-through channels under different degree of pass-through following domestic demand shock in Table 3.

Table 3 shows that the lower the pass-through the larger the impact of the exchange rate channel and the LOP gap of aggregate demand channel on domestic inflation and the output gap. But in the case of the LOP gap of aggregate supply channel, the low pass-through (Nigerian case) has the largest impact followed by the almost complete pass-through while almost zero pass-through has the lowest impact on the key variable monetary target.

Table 3, shows that the exchange rate channel and the LOP gap of aggregate supply channel amplify the impact of domestic demand shock on domestic inflation. While the LOP gap of aggregate demand channel absorbed the impact of domestic demand shock on domestic inflation.

It can be observed from Table 3 that almost zero pass-through ensures minimum volatility of inflation and output gap. Thus, as the pass-through decreases, CPI inflation and output gap volatility decrease.

Table 2: The Impact of Domestic Demand Shock

CASES	PAS-THROUGH (%)	DEGREE OF PASS-THROUGH (%)	THE EXCHANGE RATE CHANNEL	THE L.O.P GAP OF DEMAND CHANNEL	THE L.O.P GAP OF SUPPLY CHANNEL	VOLATILITY OF KEY MONETARY VARIABLES	
			The impacts of the channels			π	$\hat{y}$
Almost zero pass-through	1	99	Largest impact	Largest impact	Larger than 99% impact	Lowest	Lowest
Low pass-through (Nigerian case)	9	91	Larger than 99% impact	Larger than 99%impact	Largest impact		
Almost complete pass-through	99	1	Lowest impact	Lowest impact	Lowest impact	Highest	Highest
Role			Amplifier	Absorber	Amplifier		

Source: Authors' Calculation

Summary and Conclusion

The paper uses a New Keynesian small open economy model to analyse the impact of channels on key macro variables in the Nigerian economy, in order to ascertain the implication of each channel on monetary policy outcomes under different degree of pass-through following productivity shock and domestic consumption shock. The analysis is achieved by comparing the impulse responses of different degree of pass-through following the above-mentioned shocks.

The paper concludes**:** First that inflation and output gap variability depend considerably on the degree of pass-through following a particular shock. Second, the impact of a channel depends considerably on the pass-through channels and the shock that hit the economy. Third, the role of the

channel on monetary policy outcomes depends considerably on the type of shock that hit the economy.

The main recommendation of this paper is that the central bank of Nigeria should consider the impact of channels in the design and implementation of monetary policy, in order to improve the effectiveness of monetary policy in Nigeria.

It should be noted that the results have some limitations: First, our analysis is based on simulation results that are obtained by making some assumptions and simplifications. The conclusion depends on a specific parameterization and should not be taken as general propositions. However, the parameters chosen fit the Nigerian economy, so the conclusions should have some empirical relevance. A second limitation has to do with those aspects that the model omits such as fiscal influence. However, the model incorporates elements of the Nigerian economy and its findings are in accordance with its characteristics: However, further research is still needed. One direction for further research is to use a model that incorporates additional sectors such as the fiscal and oil sector.

References

Adebayo, A. M., & Mordi, C. O. (2010). A Dynamic Stochastic General Equilibrium Model of Exchange Rate Pass-through to Domestic Inflaton in Nigeria. *Central Bank of Nigeria*.

Aliyu, S. R., Yakub, M. U., Sanni, G. K., & Duke, O. O. (2008). *Exchange Rate Pass-through in Nigeria: Evidence from a Vector Error Correction Model.* Central Bank Nigeria.

Central Bank of Nigeria. (2013). Dynamic stochastic general equilibrium for monetary policy in Nigeria. *Central Bank of Nigeria.*

Choudhri, E., & Hakura, D. (2001). *Exchange Rate Pass-Through to Domestic Prices: Does the Inflationary Environment Matter?* IMF Working Paper No.194.

Fatai, M. O., & Akinbobola, T. O. (2015). Exchange Rate Pass-Through to Import Prices, Inflation and Monetary Policy in Nigeria. *International Finance and Banking* .

Garcia, C. J., & Restrepo, J. E. (2011). *Price Inflation and Exchange Rate Pass-Through in Chili.* Central Bank of Chile Working Paper No 128.

García, J. C. (2010). Is the Phillips curve useful for monetary policy in Nigeria? *Central Bank of Nigeria.*

Iyoha, F. A. (2017). An Empirical Investigation of The Exchange Rate Pass-Through. *Archives of Business Research* .

Mohammed-gamji, A. A., & Whitten, G. W. (2016). Retrieved 02 25, 2018, from Exchange Rate Pass Through into Consumer Price Inflation and Macroeconomic Shocks in Nigeria: An Empirical Investigation: https://works.bepress.com/gregory_whitten/12/

Monacelli, T. (2005). Monetary Policy in a Low Pass-Through Environment. *Journal of Money, Credit and Banking* .

Mumtaz, H., Oomen, Ö., & Wang, J. (2006). Exchange Rate Pass-through into UK Import Prices. *The Bank of England's Working Paper Series* .

Ogundipe, A. A., & Egbetokun, S. (2013). Exchange Rate Pass-Through to Consumer Prices in Nigeria. *Journal of Business Management and Applied Economics* .

Zubair, Okorie, & Sanusi. (2013). Exchange Rate Pass-Through to Domestic Prices in Nigeria: An Empirical Investigation. *Central Bank of Nigeria Economic and Financial Review* .