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COMPARING THE EFFECT OF COMMERCIAL SHOCKS ON PRODUCTION IN OIL AND NON-OIL DEVELOPING COUNTRIES

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ABSTRACT

This study investigates the effects of commercial shocks on gross domestic product (GDP) by classifying the foreign exchange system in oil developing countries and non-oil developing countries in the period 1990-2015 using Friedman's hypothesis. The results of the research indicate that commercial shocks cause more changes in real product in countries with a fixed exchange rate regime than countries with floating exchange rate regime in non-oil developing countries that this hypothesis in oil developing countries is rejected both in fixed exchange regime and in floating exchange regime. This result is true in all countries investigated. Also, analysis of variance analysis shows that in countries with a fixed exchange rate regime (non-oil), commercial shocks have the highest percentage in explaining the volatility of GDP. The share of commercial shocks in explaining real product volatility in countries with a fixed exchange rate regime is between 51-67%. Also, in countries with a floating exchange rate regime, this amount is 1-6%. In general, the results in non-oil countries are consistent with Friedman's hypothesis, but the effects of commercial shocks on GDP, with the classification of the foreign exchange system in oil developing countries (in all three types of fixed exchange regime, managed floating, floating) don't have a certain rule and Friedman's hypothesis cannot be accepted.

Keywords: *Commercial Shock, Commercial Volatility, Structural Var.*

INTRODUCTION

One of the most important issues in macroeconomics is the effects of commercial shocks on macroeconomic variables. Given that commercial volatilities affects total supply and demand through export and import channels. Hence, their investigation has a particular importance. The effect of commercial shocks on exchange rate volatility and other economic variables can have different effects on economic variables, depending on the initial condition and situation.
For this reason, developments in foreign exchange systems in the past few decades caused that the category of exchange rate to be raised as a key variable in economic policy in the present age. The exchange rate in economics is considered as a major variable and it is important according to the policy makers due to influencing other macroeconomic variables. Over the past decades, major volatilities have occurred in various sectors of the economy. Therefore, its impact on macroeconomic variables can be used in decision making and policy making to achieve economic goals.
In this paper, we examine the effect of commercial shocks on macroeconomic variables in different exchange regimes. In order to investigate the effect of commercial shocks on

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macroeconomic variables in different foreign exchange regimes in oil and non-oil countries, a brief description of the research has been presented. In the following, theoretical foundations will be presented. After that, the model and analysis of results will be considered. In the final section, a summary of these analyzes will be presented.

THEORETICAL FOUNDATIONS:

One of the factors influencing the choice of the exchange regime is the random conditions of the economic environment. These conditions are created due to shocks and disruptions to the economy. In this study, we examine the effect of commercial shocks on GDP in different countries with a different exchange system. Friedman (1953) states that when countries' economies are affected by real shocks, those countries which can change relative prices faster, their values change (production) less, also, in slippery prices, the adjustment of relative prices to the exchange rate regime is heavily dependent on the exchange rate regime. In a floating exchange rate regime, relative prices are immediately adjusted through nominal exchange rate changes, while in the fixed exchange rate regime, changes occur by the permitted rates, which is usually slow. Therefore, flexible regimes have fewer changes in values (production) and faster adjustments in prices than fixed exchange rate regimes.

Determining the effects of choosing an exchange rate regime on economic stability is important for two reasons. First, despite the fact that a large number of economists have provided theoretical interpretations about selecting exchange rate regime, few empirical studies have been conducted on the validity of Friedman's hypothesis. Second, the empirical studies of the exchange rate regime do not distinguish between real and nominal shocks, so the direct test of Friedman's theory has a particular importance.

In general, shocks can be domestic, i.e, the origin of disruption is the domestic or foreign economy I.e, the origin of disruption is derived from other countries. Shocks are real and monetary. In real shock, the origin of disruption comes from the real sector of the economy (such as the shock of productivity on the supply of economy, the real demand shock on demand side, which can be caused by disruption in private or public demand), and in monetary shock, the origin of disruption is money market (such as shock of money demand and ...). Also, the disruption is permanent and temporary. Permanent disruption is a disruption that has long remained in the economy (such as the shock of productivity resulting from technical progress that affects the economy for a relatively long time, or the shock of increased demand caused by increasing population, or access to a new market) and a temporary shock is a disruption that affects the economy only in a short time (such as the shock of increasing demand caused by seasonal changes). Also, shocks can be predicted or not predicted. Predicted shocks, such as the shock of increasing demand caused by seasonal changes that are usually predictable and unpredicted shocks such as a disruption in demand or supply that occur unexpectedly. In addition, symmetry or asymmetry of shocks also affects the choice of the exchange regime. If the shocks that the partner countries are facing are very different, the fixed exchange rate that relates their money with each other cannot be desirable. Asymmetric shocks are usually a problem for a fixed exchange rate regime or a monetary union. In this paper, we examine the effect of shocks in the economy on exchange rate volatilities.

RESEARCH BACKGROUND

Alyu (2009) in a study has investigated the effects of oil price shocks and floating exchange rate on economic growth in Nigeria during 1986-2007. The results of the research using the VAR model

Based on the Johansson's co-integration indicate that the causality is from oil shocks to gross domestic product and the two-way causality between the real exchange rate and the gross domestic product. Also, positive oil price shocks and increasing exchange rate have a positive impact on GDP. Fisher and Baum (2002) using VAR models have studied the effects of nominal shocks on exchange rates. Research results for the G7 countries indicate that shocks on real exchange rate have real effects. Also, shocks have a positive effect on the commercial balance of the countries under study. Fatas, A and I. Mihov (2002) have investigated the effects of financial policies on consumption and employment using VAR. The results of the research indicate that after increasing government spending, both consumption and employment variables increase. Agnor et al. (2000) have investigated commercial shocks in developing countries. The results of the research indicate that developing countries show relative stability against shocks. Also, commercial cycles are positively correlated with volatilities of production.

Haffmaister, A. W. & J. E. Roldo (1997) compare commercial cycles in Latin America and Asia based on a structural VAR pattern using the Blanchard-Quah approach. The evidence from this study shows that the main source of production volatilities, even in the short run, is supply momentum such as productivity (structural reforms) and labor supply. Evidence obtained is consistent with a weak form of patterns of commercial cycles where supply momentum in explaining the short-term volatilities of production plays a more important role in demand shocks. The share of external momentum, especially external interest rate in production volatilities is higher in Latin American countries than in Asian countries. This issue indicates that Asian countries have less vulnerability to external momentums and have been able to quickly improve the domestic economy against these momentums. Demand momentums also play a more important role in the short-term volatility of Latin American countries to Asian countries. Thus, the difference in economic performance in the two regions is the result of the political instability in Latin America and in general the various policies adopted following the debt crisis of the 1980s.

Kamijani and Asadi Mehman Dusti (2010) have studied the dynamic effects of oil shocks and monetary policy on economic growth during the period 1974-2006 and analyzed the dynamic interactions from momentums created in the model using a vector autoregression (VAR) model including forecast error variance decompositions (FEVDs) and instantaneous response functions (IRFs). The results of this study indicate that oil shocks in the country have significantly affected economic growth. But despite the impact of oil shocks on liquidity and the creation of monetary expansion policies, monetary shocks have not been effective on economic growth.

Noferesti and Mohammadi (2009) investigate the shocks caused by macro variables and policy shocks that to what extent and how long contributes to the inequality of income distribution and how the mechanism of transferring impact of these shocks is on the income of urban and rural households is. For this purpose, firstly, using a macro model that is a vector autoregression model, the macroeconomic variables and the effects of various shocks on macro

variables have been simulated for ten years (2004-2014), then, in the framework of a microeconomic model, the effects of shocks of macro variables on household income in each urban and rural area are estimated. Then, inequality between households is calculated using the Gini coefficient index. The findings show that the exchange rate shock as well as inflation increases the inequality of income distribution in urban areas, but its effect on income distribution in rural areas is not so significant. The shock of rising oil revenues in the short term will reduce the inequality of income distribution in rural and urban areas, while in the long run; it will lead to an increase in inequality in urban areas. A production shock will also lead to increasing inequality in urban areas and reducing inequality in rural areas. Hadian and Rezaei Sakha (2009) in studying the effect of macroeconomic shocks of Mehrara (2004) in a research have investigated exchange rate variability in Iran using a structural VAR model during the period of 1959-2003. In this study, four structural shocks of nominal demand, real demand, supply and oil price shocks have been investigated. The results of the research indicate that financial and nominal shocks have affected the product and the exchange rate even in the short term. Also, the response to shocks is similar to the economic model of economic volatility.

METHODOLOGY AND RESEARCH MODEL:

In the last half century, in spite of the convergence among the various views, there were significant differences between them. Economists try to specify models and test theories by resorting to macroeconomic patterns that derive from the assumptions of any particular theory. The construction of macroeconomic patterns began with the model of *Tinbergen* in 1939 to explain American economic volatilities in 1919-1932. Following his pattern, we can refer to Klein's (1950) and Klein-Goldberger (1952) patterns as pioneers of macroeconomic structural patterns. Sims (1980), in his paper titled Macroeconomics and Reality, states that the specification of large macroeconomic models is unrealistic, and in practice and experience, there is no need to impose artificial constraints to identify the equations of a system. By presenting some criticisms, Sims proposed a rival approach in which a system of equations, including some macro variables, is used without theoretical aspect of estimation and to examine macroeconomics. He called this method vector autoregression (VAR).

The vector autoregression approach has a data orientation, so that the endogenous variables are expressed in form of their interruptions. Then estimation and forecasting are done using statistical calculations and there is no need for a particular theory at this stage. This method in predicting the turning points (Perihelion and aphelion) of economic volatility provides acceptable results. The first step in the development of a (VAR) is the selection of macroeconomic variables necessary for analysis. According to Sims, regardless of endogenous or exogenous issues, assuming macro variables, it can design a system that obtains better prediction from macro variables. Based on this method, the class of exogenous variables is not existed and only a set of summarized equations is estimated with equal interruptions for all variables (Tavakkoli, 1999).

In this research, the main emphasis is on comparative-analytic method using structural VAR model. The realm of research is developing countries, and the research period is from 1980 to 2015, and the empirical behavior, real GDP (GDP), real exchange rate (RER), consumer price

index (CPI), trade-off relation (TOT), in developing countries are modeled in different exchange rate regimes. In this regard, Friedman's hypothesis is used by using a structural model for estimation. The research model is as follows.

$$A_o Y_t = A(L)Y_t + B(L)X_t + u_t \quad (1)$$

In which $Y_t = (tot_t, gdp_t, rer_t, cpi_t)$ the vector of endogenous variables is non-stationary. Also, $u_t = (u_t^{TT}, u_t^{AS}, u_t^{CF}, u_t^{AD})$ is structural errors, $X_t$is the vector of indigenous variables, A(L)and B(L) are the polynomial matrix in the operator of interruption and $variance(u_t) = \sum = I$.

Model estimation

Suppose that Y_t a moving average process follows as below:

$$Y_t = A_0\varepsilon_t + A_1\varepsilon_t + \cdots = \sum_{i=0}^{\infty} A_i\varepsilon_{t-i} = \sum_{i=0}^{\infty} A_i L^i \varepsilon_t \quad i = 0, 1, 2, \ldots. \quad (2)$$

$$A_i = \begin{bmatrix} a_{11} & 0 & 0 & 0 \\ a_{21} & a_{22} & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix} \quad variables: \begin{bmatrix} tot \\ \cdots \\ \cdots \\ \cdots \end{bmatrix} \quad shocks: \begin{bmatrix} u_{TT} \\ u_{AS} \\ u_{CF} \\ u_{AD} \end{bmatrix}, \quad \varepsilon_t = \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \end{bmatrix}$$

L is the time lag operator and $\varepsilon_t$has a normal distribution and the noise is white so that:

$$E(\varepsilon_t) = 0 \quad , \quad E(\varepsilon_t \acute{\varepsilon_t}) = \sum_s = I \quad , \quad E(\varepsilon_s \acute{\varepsilon_t}) = 0 \qquad \forall\ s \neq t \quad (3)$$

A_i is considered as a matrix of long-term effects. An element of a kind of matrixA_i, for example, $a_{ij}(i)$ shows the response of the ith dependent variable to the j-th structural shock. As you can see, the matrix of long-term effectsA_i is a triangular lower matrix, and elements above the main diameter are zero.

In order to determine the structural shocks and to find the coefficients of reaction momentum, it is first necessary to estimate a vector autoregression as follows:

$$Y_t = B_1 Y_{t-1} + B_2 Y_{t-2} + \cdots + B_P Y_{t-P} = \sum_{i=1}^{P} B_i L^i Y_t + e_t = B(L)Y_t + e_t \quad (4)$$

$$\rightarrow\ Y_t = B(L)Y_t + e_t \ \rightarrow\ [I - B(L)]Y_t = e_t \ \rightarrow\ Y_t = [I - B(L)]^{-1} e_t \quad (5)$$

By applying the rule of geometric progression, it is possible to write:

$$Y_t = [I + B(L) + B(L)^2 + \cdots]e_t$$

$$Y_t = e_t + C_1 e_{t-1} + C_2 e_{t-2} + \cdots$$

$$C_{i=}\begin{bmatrix} C_{11}(i) & 0 & 0 & 0 \\ C_{21}(i) & C_{22}(i) & 0 & 0 \\ C_{31}(i) & C_{32}(i) & C_{33}(i) & 0 \\ C_{41}(i) & C_{42}(i) & C_{43}(i) & C_{44}(i) \end{bmatrix} \quad , \quad e_t = \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ e_{4t} \end{bmatrix}$$

$$E(e_t) = 0 \qquad E(e_t e_t') = \sum_e = \begin{bmatrix} \sigma_1^2 & \sigma_{12} & \sigma_{13} & \sigma_{14} \\ \sigma_{21} & \sigma_2^2 & \sigma_{23} & \sigma_{24} \\ \sigma_{31} & \sigma_{32} & \sigma_3^2 & \sigma_{34} \\ \sigma_{41} & \sigma_{42} & \sigma_{43} & \sigma_4^2 \end{bmatrix}$$

$$E(e_s e_t') = 0 \qquad \forall\ s \neq t \tag{6}$$

By comparing (2) and (5) we have:

$$e_t = A_i \varepsilon_t$$

$$\begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ e_{4t} \end{bmatrix} = \begin{bmatrix} a_{11} & 0 & 0 & 0 \\ a_{21} & a_{22} & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix} \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \end{bmatrix} \tag{7}$$

ε_t includes the following structural disruptions: $\varepsilon_{1t}$is shock to the trading market, ε_{2t}shock to the supply side, ε_{3t} exchange market shock, ε_{4t}shock to the demand.
It is assumed that the sentences of structural disruption are orthogonal to each other. The relationship between components of disruption of structural shocks and errors of summarized form of vector autoregression model is obtained from the application of six zero-constraints on the summarized form of structural pattern to identify the pattern and also to show the absence of simultaneous effect of the shocks, where n is the number of pattern variables. The approach used in this study to investigate the effect of commercial volatility on exchange rate policy is the structural vector autoregression method based on the Blanchard-Quah model (1993). In Blanchard-Quah approach, structural shocks are identified by imposing restrictions on the long-term effects of shocks on some variables. In order to apply long-term restrictions on the SVAR pattern, the vector of variables is firstly considered as follows:

$$Y_t = [\text{lGDP}, \text{lTOT}, \text{lCPI}, \text{lRER}]$$

$Y_t$is the vector of indigenous variables in which: $lGDP$is logarithms of gross national product, $lTOT$is logarithms of commercial exchange value, $lCPI$is consumer price index log, $lRER$is the real effective exchange rate logarithm.
The key question in this methodology is how to identify the exogenous variable and its coefficient to be zero. For this purpose, it's better to use the theoretical foundations in this regard.

Determining the most exogenous variable based on theoretical foundations

To select the most exogenous variable, the theoretical foundations are used. According to broda (2004) analysis, in the study of the structural VAR model, the commercial exchange

relationship has been chosen as the most exogenous variable. The most important reason for this choice is that developing countries in the world economy act as price receiver from global markets and cannot have a significant impact on these markets. In his analysis, Broda states that countries developing undertake a small share of global trade and a limited number of countries have as potential role in the buying and selling global markets so, the commercial exchange relationship as the most exogenous variable can have a proper choice against other variables (Broda, 2004).

In the estimation of the VAR model, all variables must be stationary. So first, the unit root test about variables is performed.

Unit root test

One of the important issues in the estimation of econometric models is the property of data in terms of stationary. It is necessary that all the variables to be stationary, because in the case of non-stationary of variables, the t and f statistics derived from the least squares estimate lose their effectiveness and there is a possibility of a false regression. The necessary and sufficient condition for a vector autoregression model to be stationary is that the roots of the coefficients of variables to be out of the unit circle. Also, the necessary condition for using the least squares method to estimate the equations of the VAR model is to disrupt the lack of autocorrelation of the sentences. Therefore, in order to study the stationary of the time series used in this study, the unit root test of the Augment Dickey and Fuller is used. The results indicate that all variables in the pattern with the presence of a constant sentence and a trend and with a differential degree are stationary.

Optimal interruption

In the estimation of the VAR model, after investigating the stationary of variables, the length of optimal interruption of pattern should be determined. Determining the optimal interruption is important due to the fact that, by increasing each interruption, the degree of system freedom decreases. In this regard, the *Schwarz and Beizian* criterion is used that is more suitable for small data volumes. The results of determining the optimal interruption of the pattern by using the Eviews 6 software indicate that the model estimation with 2 interruptions will realize the necessary conditions for stationary for all countries.

The analysis of dynamic interactions from the shocks created in the model is carried out using the methods of impulse response functions and the analysis of variance (structural analysis).

Impulse response functions

What is important in the discussion of estimating vector autoregression patterns is the relationship between variables and how they affect each other. Therefore, the significance test of the parameters is less important. Therefore, in practice, IRF impulse response functions are estimated. The impulse response function shows the dynamic response of each of the indigenous variables of the system over time against a standard deviation of the disruption created by other system variables. In the following chapter, we present the diagrams of the impulse response functions and analyze them.

Analysis of impulse response functions

In this section, the dynamic response of the variables caused by the structural shocks in amount of a standard deviation for the next 5 courses (5 years) will be investigated. To investigate the response functions, because different countries have different exchange systems and react different response in dealing with commercial shocks, therefore the countries under

consideration are categorized according to their exchange system and then the results are analyzed. In this paper, the effect of commercial shocks on other variables in a model in various foreign exchange systems is investigated. The diagram shows the impulse response functions against commercial shocks in amount of a standard deviation. In this section, the effect of commercial shocks in different modes of foreign exchange regimes in oil and non-oil countries is compared. Due to the large number of countries surveyed, several countries have been evaluated from any kind of foreign exchange regimes.

A) Floating exchange system

The second column of Table (1) and diagrams (1) and (2) show that if a shock or a sudden change in size of a standard deviation occurs in the amount of trade, how will be its effect on the GDP in subsequent periods?. According to the diagrams, a sudden shock in the amount of trade in the first period causes to an increase in the GDP of Pakistan and Chile about 0.01 units, and after 5 years, it reaches to 0.017 for Pakistan and 0.014 for Chile. During nearly one year, any shock to the amount of trade will cause little increase in the GDP of these countries, and this is consistent with the expectations of the research. According to the views, the effect of commercial shocks in countries with a floating exchange rate system has less volatility and less relative effects (there is no floating exchange system in oil countries.

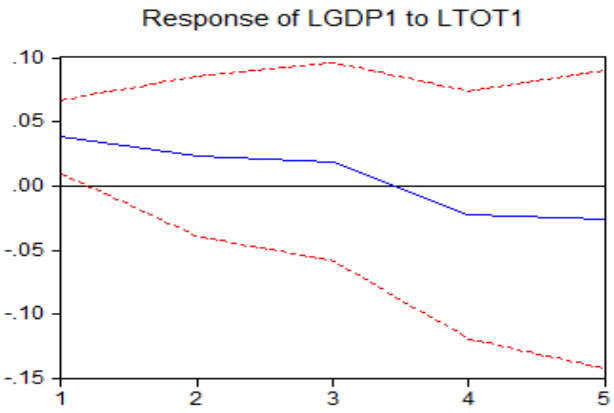

Diagram 1) Impulse response function of trade versus GDP of Pakistan

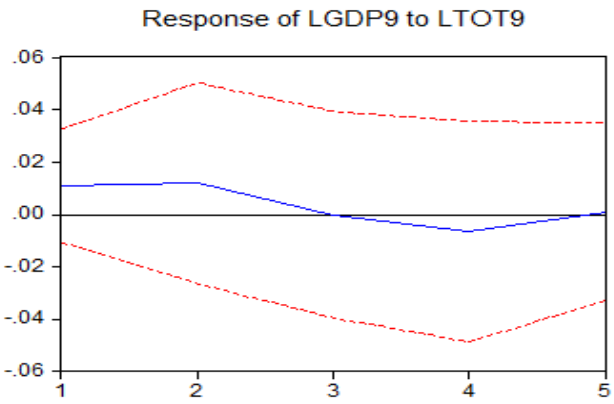

Diagram 2) Impulse response function of trade versus GDP of Chile

Table 2) Impulse response function of value of commercial exchange of Pakistan and Chile

Period	Log(gdp_p)	Log(gdp_{ch})
1	0.010899	0.038546
2	0.011897	0.023321
3	-0.00018	0.019121
4	-0.006633	-0.022565
5	0.001054	-0.025867
log(gdp) log(rer) log(cpi) Cholesky Ordering: log(tot)		

B) Floating exchange system managed

In the following analysis, the impulse response function of the non-oil countries of Costa Rica, Paraguay and Malaysia and the Iranian oil country, which have a floating exchange system managed is compared and investigated. The second column of table (2) and diagram (3), (4), (5), (6) shows that if a shock or a sudden change occurs as a standard deviation in the trade value, how will be its effect on gross domestic production in the next periods. In accordance with diagram (3), a sudden shock in the amount of trade for the Costa Rica country in the first period will decrease about 0. 008 in GDP, and after 5 years, it will reach 0.001. During nearly 1 year, any shock to the amount of trade will causes a little increase in GDP, and in the long term (5 years), a slight effect will decrease, which the result is for non-oil countries of Costa Rica, Paraguay and Malaysia, and this is compatible with research expectations. According to the views, the effect of commercial shocks in countries with floating exchange rate system has less volatility and relative effects, while the effect of commercial shocks in the first year of the country was 0.03. This effect in the fifth year increases to 0.1 percent, which is a significant effect comparing non-oil developing countries and Friedman's hypothesis cannot be accepted for Iran.

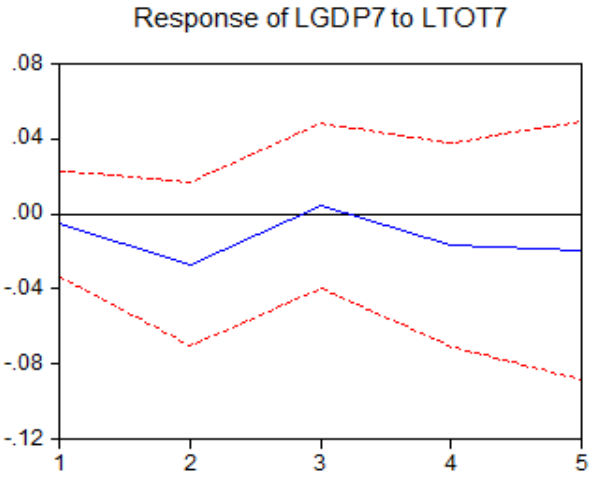

Diagram 3: Impulse response function of trade against Costa Rica

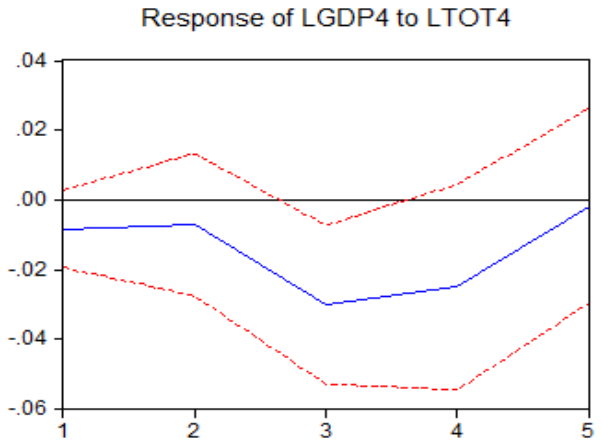

Diagram 4) Impulse response function of trade against GDP of Malaysian

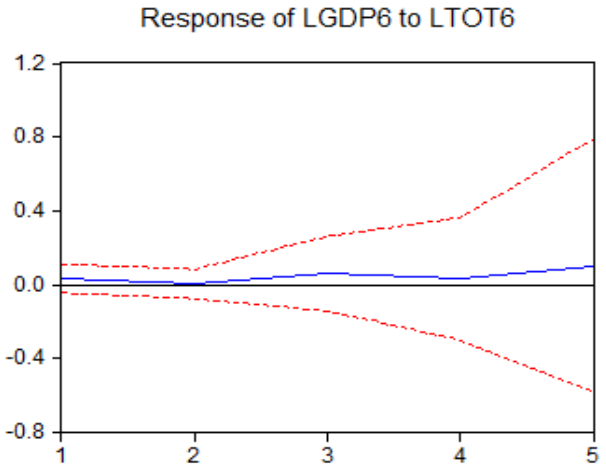

Diagram 5: Impulse response function of trade against Paraguay

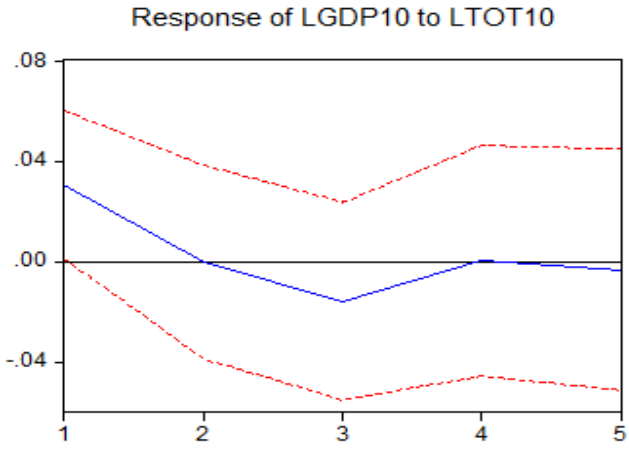

Diagram 6: Impulse response function of trade against GDP of Iran
Source: Research findings

Table 2: Impulse response function of commercial exchange of Iran, Malaysia, Costa Rica and Paraguay

Period	Log(gdp_i)	Log(gdp_m)	Log(gdp_c)	Log(gdp_p)
1	0.036005	-0.005261	-0.008170	0.030633
2	0.05229	-0.026898	-0.007076	-0.000248
3	0.061257	0.004155	-0.030069	-0.015768
4	0.031479	-0.016726	-0.024885	0.000331
5	0.105803	-0.019569	-0.001639	-0.003318
Cholesky Ordering: log(tot) log(gdp) log(rer) log(cpi)				

Source: Research findings

C) Fixed exchange system

To compare the effect of commercial shocks on production of oil and non-oil countries, we use the two countries of Gabon and Saudi Arabia, both of which have a fixed exchange system. The second column of table (2) and diagram (7) shows that if a shock or a sudden change occurs as much as a standard deviation in trade, how will be its effect on GDP in Gabon. According to daiagram (5), a sudden shock unit in the amount of trade in the first year increases the GDP of Gabon about 0.05 units, and after four years, this amount reaches 0.17, which is a significant amount which is consistent with the theoretical foundations of the research and indicates that countries with a fixed exchange system do not have the ability to adjust against commercial volatility, and the shocks will significantly affect real economic values.

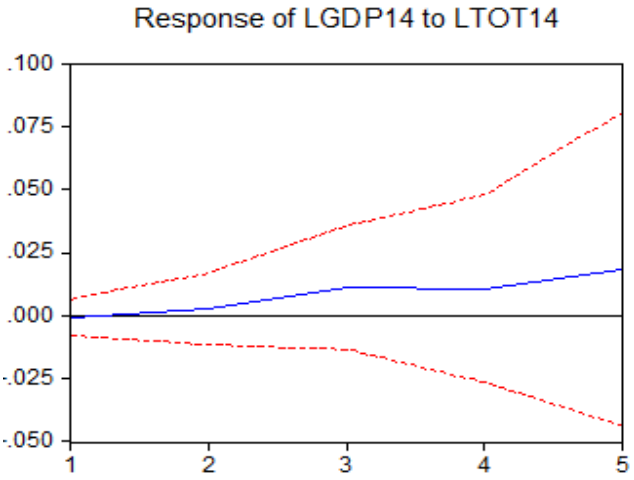

Diagram 7: Impulse response function of trade against GDP of Gabon

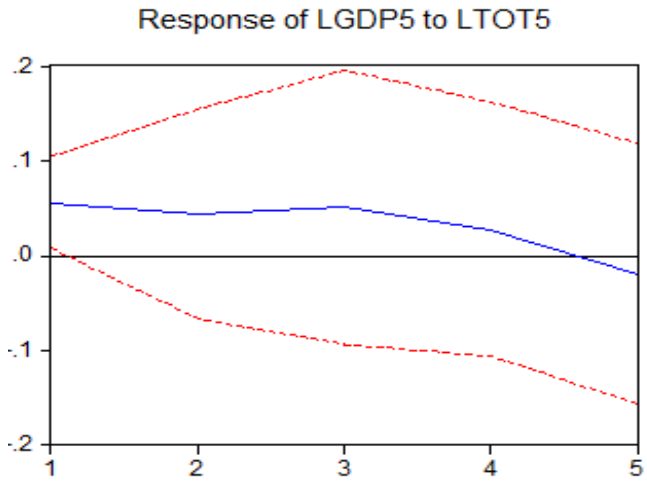

Diagram 8: Impulse response function of trade against GDP of Saudi Arabia
Source: Research findings

While the effect of commercial shocks on production for Saudi Arabia, despite the fact that it has a fixed exchange system has not have much effect. If a shock or a sudden change is occurred as much as a standard deviation in the amount of trade, how will be its effect on Saudi Arabia's gross domestic product? According to diagram (8), a sudden shock unit in the amount of trade in the first year causes an increase in GDP in amount of 0.0006 units, and after 5 years, this amount reaches 0.01, which is inconsistent with results of countries with a fixed exchange rate system.

Table 3: Impulse response function of commercial exchange relationship of Saudi Arabia and Gabon

Period	Log(gdp_a)	Log(gdp_g)
1	-0.000684	0/056056
2	0.002632	0/10002
3	0.011057	0/150870
4	0.010722	0/178770
5	0.018497	0/159669
Cholesky Ordering: log(tot) log(gdp)log(rer) log(cpi)		

Analysis of variance of forecast error

Another way to test the dynamic features of the VAR pattern is to calculate the variance analysis. The variance analysis functions are obtained from the variance-covariance matrix derived from the vector auto-regression residuals summarized, which is a function of the structural disruption (ε_t). In the forecast error variance analysis, the share of each of the shocks imposed on the different variables in the variance of forecast error of a variable is determined in the short term and in the long term. Analysis of variance shows the variation in an indigenous variable in separating disruption in other variables in the model, which, according to it, share and importance of each variable is determined in the explanation of other variables. In other words, it can calculate how many percent of the variance of forecast

error is explained by the variable and how many percent by other variables. In this section, the results of the analysis of variance of the forecast error are interpreted.

Analysis of the results of variance analysis of forecast error

The results of the analysis of variance of the forecast error for the variable of commercial exchange relationship of both countries are presented in the following tables. The standard deviation column indicates the forecast error of variable for the forecast period. The next columns show the standard deviation as percent to any of the variables. The sum of the numbers in each row is 100%. The analysis of variance contains the information in impact response. Whatever the percentage share of a standard deviation of a variable is more in a given period, the share of that variable will be higher in the volatility in the dependent variable.

Floating exchange system

The results of the analysis of variance of the commercial exchange relationship for Pakistan and Chile in Table 4 show that in the various periods (short-term and long-term), according to the expectation of the commercial exchange relationship has the lowest share in the explanation of volatility on the supply with volatility between 0.01 and 0.04%.

Table 4: Results of the analysis of variance of the commercial exchange relationship (Pakistan)

Shock supply (chile)side	standard deviation	Shock supply (pakistan)side	standard deviation	t
0.000000	0.084323	0/0000	0/054263	1
2.209369	0.087132	1/784384	0/061646	2
2.618606	0.090146	3/385032	0/7133	3
2.368281	0.096180	3/308351	0/071973	4
3.311477	0.098577	4/280285	0/075597	5

Source: Research findings

According to the following diagrams, it is observed that a shock or a sudden change is occurred as much as a standard deviation in the amount of trade. The share of trade in the explanation of volatility on the supply is minor and there is stability on the supply of the economy that is consistent with the research hypothesis.

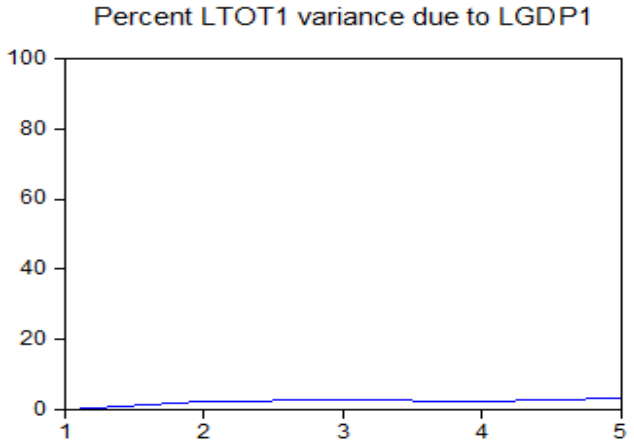

Diagram 9) Results of the analysis of the variance of the trade value for GDP of Pakistan

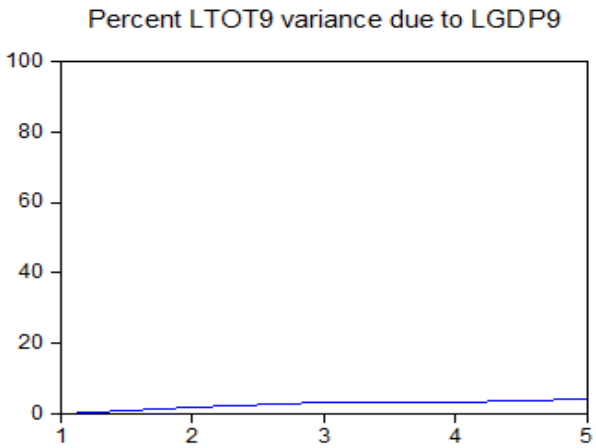

Diagram 10) Results of the analysis of the variance of trade value for Chilean GDP
Source: Research findings

17) Floating exchange system managed

The results of the analysis of variance of the commercial exchange relationship for the non-oil country of Costa Rica, Paraguay and Malaysia and Iran's oil country, which have a floating exchange system managed, are compared and examined. Table 5 shows that in different periods (short-term and long-term) according to the volatility expectation, the commercial exchange relationship has the lowest share in explaining the shock on the supply side in non-oil countries of Costa Rica, Paraguay and Malaysia with volatility between 0.001 and 0.08%.

Table 5: Results of the analysis of variance of the commercial exchange relationship between countries with a floating exchange system managed

Shock supply side (Costa Rica)	standard deviation	Shock supply side (Paraguay)	standard deviation	Shock supply side (Malaysia)	standard deviation	Shock supply side(iran)	standard deviation	t
0.000000	0.096611	0.000000	0.020655	0.003496	0.003496	0.000000	0.079472	1
3.105438	0.108822	0.000311	0.021003	0.003953	0.003953	1.111477	0.089462	2
5.295812	0.112260	0.001003	0.021115	0.004258	0.004258	19.19883	0.106591	3
9.935653	0.115386	0.005106	0.021156	0.004725	0.004725	32.62378	0.143495	4
8.197249	0.134824	0.005235	0.021186	0.005574	0.005574	54.35282	0.213121	5

The results of the analysis of variance of the commercial exchange relationship in Table 5 show that in different periods (short-term and long-term), GDP in Iran has the largest share in explaining the volatility of commercial exchange relationship.

Fixed exchange system

The results show that the supply of the economy (GDP) has the largest share in (short and long term) explanation of the variance analysis of commercial exchange that is consistent with the theoretical foundations of the research and its reason can be explained as follows, Gabon, with a fixed exchange system has the greatest impact on real economy sectors because it cannot moderate its exchange system when dealing with commercial shocks.

Table 5: The results of the analysis of variance of the commercial exchange relationship between Gabon and Saudi Arabia

Shock supply side Saudi Arabia	standard deviation	Shock supply side gabon	standard deviation	t
0.000000	0.011717	0.000000	0.040800	1
0.003688	0.012071	67.69359	0.089012	2
0.791742	0.012424	65.26245	0.099855	3
1.056086	0.012547	59.14682	0.104907	4
1.088066	0.012574	61.09541	0.112671	5

Source: Research findings

In comparison, it is observed despite the fact that Saudi Arabia has a fixed exchange system, in explaining the analysis of the variance of the amount of trade exchange, the gross domestic product has the lowest share in explaining the variance of the variance analysis of trade exchange, while in countries with a non-oil fixed exchange system, commercial shocks have the greatest impact on the real economy, which its reason can be the power of oil countries to use resources in encountering shocks.

CONCLUSION

The results of the research indicate that in the short term and in the long term, the existence of a positive commercial shock in the floating exchange rate system of non-oil countries causes a slight increase in GDP, the amount of this effect cannot divert the economy from its real path and there is stability in the supply of these countries when occurring shock. Also, in the fixed exchange system (non-oil countries) causes a significant increase in GDP but this effect will decrease in the long term. These effects are to an extent that can divert the production of these countries from their real path and create major changes in the supply of the economy. This result is not consistent with oil countries. In tests conducted for oil countries such as Iran, Saudi Arabia, Kuwait, there is no reason to accept the Friedman hypothesis.

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