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A NON-LINEAR AUTOREGGRESIVE DISTRIBUTED LAG ANALYSIS OF THE TRIPLE DEFICIT HYPOTHESIS IN THE MENA REGION

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ABSTRACT

This paper focuses on assessing the validity of the triple deficit hypothesis in fourteen Middle Eastern and Northern African (MENA) countries between 1999 and 2018, using a non-linear autoregressive distributed lag (NARDL) model. Although many studies have used different methods to address this issue, they often conclude that the relationship between the budget deficit, the current account deficit, and the saving-investment gap is a symmetric relationship. This study claims that it is possible to shed new light on this issue by introducing non-linearity into studies on the relationship between these three deficits using the recently developed NARDL technique. This paper provides evidence for the existence of a non-linear relationship between the current account deficit, budget deficit, and saving-investment gap. It also shows that the triple deficit hypothesis is valid in the long-term. On the contrary, the relationship between external and internal deficits is negative in the short-term, which means that there is a triple divergence.

Contribution/Originality: This study contributes to the existing literature by introducing non-linearity into studies of the triple deficit hypothesis. This is the first time that the NARDL model has been used in the analysis of this hypothesis.

1. INTRODUCTION

Governments often set goals to increase investment and capital formation, accumulate more savings, decrease consumption, and redistribute resources among different sectors. These objectives can be accomplished by enhancing government spending or cutting taxes. This could reduce the fiscal balance and discourage private investment, which would have a negative effect on economic growth (Bhat & Sharma, 2018).

Not only do many countries all over the world suffer from a budget deficit, they have also witnessed current account deficit as well. The external and internal positions of any country can be determined by these deficits. Countries that suffer from both long-term budget deficits and current account deficits face multiple significant and long-lasting problems that will affect their economic growth (Bayramoğlu & Öztürk, 2018).

A current account deficit may lead to a decline in a country's competitiveness, an outflow of investment to other countries, and a reduction of foreign reserves (Ahmad, Aworinde, & Martin, 2015). Economists have tried to find the relationship between the budget deficit representing adjustments in fiscal policy and the current account deficit representing the balance of the nation's foreign transactions.

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The idea of the twin deficit became popular in the United States (US) in the early 1980s during the Reagan Experiment, as a major chronic current account deficit was accompanied by an increase in the US's budget deficit. Because of this co-movement, various economists linked a large share of the decline in trade balance to the budget deficit, and the causal connection became recognized as the twin deficit hypothesis (TDH) (Barro, 1989; Sen & Kaya, 2016; Shastri, Giri, & Mohapatra, 2017).

Due to the liberalization of international markets, economists have realized the importance of a third gap, which is a saving-investment gap that affects current account balance, alongside the budget deficit. The idea of the triple deficit, which incorporates private savings and the investment gap with twin deficits, has emerged recently. In other words, the triple deficit hypothesis affirms the relationship between the budget deficit, the saving-investment deficit, and the trade deficit. The triple deficit implies a situation in which an internal imbalance is accompanied by an external imbalance (Çoban & Balikçioğlu, 2016; Sen & Kaya, 2016).

A common concern of economists and policy makers is the connection between fiscal deficits, saving-investment gap, and trade deficits. Therefore, understanding possible causal connections between these factors is a prerequisite for creating policies that help achieve development goals, such as fostering macroeconomic stability and economic growth.

In the following analysis, the triple deficit hypothesis will be examined in countries in the MENA region. To the best of our knowledge, this is the first study that tests the triple deficit hypothesis using a NARDL model. Most empirical studies are based on the assumption that the effects of the variables are symmetric and linear. However, in this study, the asymmetric and nonlinear effects will be examined. The rest of this paper has been divided into five main sections in addition to , an introduction, and a conclusion. Section one demonstrates the triple deficit in economic theory; section two provides a literature review; section three presents the description and sources of the data; section four describes the econometric model; section five summarizes the empirical findings; and the final section presents the concluding remarks.

2. TRIPLE DEFICIT HYPOTHESIS

The triple deficit hypothesis is regarded as an extension of the double deficit hypothesis that includes the saving-investment balance in the analysis. This is explained in the illustration in the same manner that the TDH is explained.

With respect to the relationship between fiscal and current account deficits, there are five different points of view that explain this relationship. The first is the TDH, which is also known as the 'Keynesian Hypothesis-Mundell-Fleming Model'. As per the Mundell-Fleming model, an increase in the fiscal deficit will put pressure on interest rates, which prompts capital inflow and increases the value of the domestic currency, thereby causing a reduction in countries' exports. Therefore, the current account balance will be negatively affected. The Keynesian view argues that an increase in fiscal deficit due to tax cuts would boost disposable income, which would mean that more goods and services can be imported from other countries, resulting in a reduction in current account deficit (Mohanty, 2019).

Second, the current account targeting hypothesis (CATH) postulated by Summers (1988) states that there is a unidirectional relationship runs from the budget deficit to the current account deficit. Governments prefer to use fiscal policy in order to reduce the current account deficit (Kalou & Paleologou, 2012; Summers, 1988).

Third, the Barro-Ricardian Equivalence Hypothesis (REH) states that a fiscal deficit will not affect consumer choices. Spending decisions will be the same, regardless of whether or not the government's budget is balanced. This implies that any adjustments to private savings and investments will be offset by an equivalent change in government savings and investments. This ensures that the current account deficit does not have an impact on the budget deficit. In other words, the REH assumes that the relationship between the two deficits is neutral (Barro, 1989; Bhat & Sharma, 2018).

Kim and Roubini introduced the fourth idea, twin divergence, which refers to an increase in fiscal deficit when the current account deficit decreases, and vice versa (Kim & Roubini, 2008). The twin divergence hypothesis states that, if a government suffers from an increased budget deficit, investors expect high taxes to be imposed in the future in order to finance this deficit. As a result, in order to avoid the negative impact of higher taxes, they will accumulate more savings, and, in turn, interest rates will increase, which will inversely affect private investment. Therefore, changes in private savings and investments will offset the changes in government expenditures (Cavallo, 2005).

Finally, the Feldstein-Horioka (FH) puzzle states that financing domestic investment depends on the degree of capital mobility. If a country is experiencing perfect capital mobility, financing investments will depend on international funds as well as domestic savings. If a country suffers from a budget deficit due to substantial government borrowing, this will affect their domestic savings and the deficit will be financed by borrowing from abroad, which, in turn, has a negative impact on the current account balance (Marinheiro, 2008).

The FH puzzle represents the idea of the triple deficit hypothesis, as it shows the interaction between the three deficits by adding the saving-investment deficit to the current account and budget deficits (Çoban & Balikçioğlu, 2016).

The triple deficit hypothesis can be represented by an open economy national income identity (Çoban & Balikçioğlu, 2016; Shastri et al., 2017):

$$Y = C + I + G + X - M \qquad (1)$$

Income received by individuals will be distributed between consumption expenditures (C), savings (S), taxes (T) and transfers (Tr).

$$Y = C + S + T + Tr \qquad (2)$$

Combining Equations 1 and 2:

$$(X - M - Tr) = (S - I) + (T - G) \qquad (3)$$

Where (X–M–Tr) represents current account balance, (S-I) represents the saving–investment gap and (T-G) represents the budget balance. Equation 3 presents that external balance being financed by the domestic balance, which has been distributed between the fiscal and saving-investment balance.

3. LITERATURE REVIEW

Khalid and Guan (1999) used cointegration and Granger causality techniques to analyze the direction of the fiscal deficit and the country's external debt using annual data from a number of developing and developed countries. The study only found evidence of a long-term relationship between current account and fiscal deficit in the cases of developing countries.

Eldemerdash, Metcalf, and Maioli (2014) examined both the twin deficit and the REH in the cases of both oil-producing and non-oil producing Arab countries. The results indicated that, in oil-producing countries, there is a positive relationship between fiscal and external balances. In non-oil producing countries, the REH is supported.

Bluedorn and Leigh (2011) studied the impact of fiscal policy changes on current account balances in 17 OECD countries between 1978–2009. They assessed contemporary fiscal policy actions that responded to the desire to reduce the budget deficit. The results revealed that a 1% change in fiscal consolidation would cause a corresponding 0.6% change in current account balance. It can therefore be concluded that the findings of this study present strong evidence to support the TDH.

Bolat, Değirmen, and Şengönül (2014) tested the triple deficit hypothesis in 15 European countries using quarterly data from the period between 2002 and 2013. The empirical results revealed that, for some countries, the TDH is valid. However, based on the results of a causality test conducted between current account balance, budget balance and saving-investment balance, the triple deficit hypothesis only exists in four countries.

Using several econometric techniques, Forte and Magazzino (2015) examined the TDH and the REH for European countries between 1970 and 2010. This paper employed traditional panel data estimators, pooled ordinary least squares, generalized least squares, and fixed effects and random effects. The analysis did not present any convincing proof of either the TDH or the REH.

Çoban and Balikçioğlu (2016) tested the validity of the triple deficit hypothesis using a least squares method on a sample of 24 transition economies between 2002 and 2013. The study found that there was not a significant relationship between the current account deficit and saving-investment deficit. It was also concluded that the budget deficit and current account deficit are inversely related to each other. The study did not find evidence for the validity of the triple deficit hypothesis.

Using the Granger causality technique, Sen and Kaya (2016) tested the relevance of both the twin and the triple hypotheses on a sample of six post-communist countries during the period between 1994 and 2012. They did not find any proof to support the twin or triple hypothesis in the countries under consideration. This finding suggests that neither budget deficits nor private saving-investment deficits cause trade deficits. On the basis of these observations, it can be concluded that, for these six countries, the REH is valid in triple and TDH cases.

Magazzino (2017) investigated the nexus between trade balance and fiscal deficits in the Asia-Pacific Economic Cooperation (APEC) between 1980 and 2013 using a VAR model. The results of both the VAR model and the Granger causality test indicate a bi-directional long-term causality between trade balance and budget balance in all APEC member countries.

Shastri et al. (2017) studied the triple deficit hypothesis in five South Asian countries between 1985 and 2015. Based on cointegration tests, a long-term relationship between the three types of deficits was uncovered. The long-term coefficients were estimated using mean group dynamic ordinary least squares, and it was found that both the budget deficit and the saving–investment gap have a positive impact on current account balance, which confirms the triple deficit hypothesis.

Bhat and Sharma (2018) investigated the nonlinear relationship between current account deficit, budget deficit, trade openness, and output growth in India using a NARDL model. The study proved the validity of the TDH in India. It also presented the fact that output growth and trade openness can help to achieve economic stability in the country.

Turan and Karakas (2018) examined the TDH using a NARDL model in six Eastern European countries. The results indicated that, in the long-term, the TDH is valid in only three nations: the Czech Republic, Hungary, and Slovakia. Conversely, the twin divergence hypothesis was valid in the short-term in the same countries.

Bayramoğlu and Öztürk (2018) examined the validity of the twin and triple deficit hypotheses in 15 developing countries using a panel causality approach. The study found that the TDH was valid in the countries under consideration. With regard to the triple deficit hypothesis, the analysis indicated that domestic savings and current account balances are highly correlated. In contrast, the causality between investments and current account balance could not be verified. In conclusion, the triple deficit hypothesis is somewhat valid in the countries under consideration.

The link between Indian budget deficits and current account deficits between 1970–1971 and 2013–2014 was empirically examined by Mohanty (2019). The twin deficits hypothesis, both in the long-term and short-term, was tested using an ARDL model. The results indicated that the TDH was valid in both the short-term and the

long-term. The impact of GDP growth rate on current account deficit was positive in the long-term; however, in the short-term, the impact of the lagged GDP growth rate on the current account deficit was negative.

Kusairi, Maulina, and Margaretha (2019) indirectly investigated the REH in a number of Asian Pacific countries between 1990 and 2017. The main findings of the study indicated that the REH is valid in both the short- and long-term. The study also reveals a long-term co-integrated relationship between public debt and private consumption.

Raji (2019) examined the validity of the triple deficit hypothesis in Nigeria between 2008 and 2017 using an ARDL model. The study also assessed the causal relationship between the current account deficit, financial deficit and fiscal deficit. It found a bi-directional relationship between the variables under consideration in the long-term. However, it was found that fiscal deficit does not cause current account deficit in the short-term.

Reed, Najarzadeh, and Sadati (2019) tested the relationship between budget deficit, current account deficit and government debt sustainability in Iran between 1974 and 2015 using a vector autoregression model, IRF, and variance decomposition. The results suggested a positive long-term interaction between the variables under consideration. Therefore, if the government wanted to control fiscal and trade deficits, debt sustainability must be improved.

Magoti, Africa, Training, Mabula, and Sende (2020) explored the validity of the triple deficit hypothesis in a number of East African countries between 2004 and 2018, focusing predominantly on an assessment of the dynamics between the saving-investment deficit, the fiscal balance and the current account balance. A panel ARDL model and Dumitrescu-Hurlin Granger causality test were applied. The results of the analysis showed that, in the long-term, both the budget deficit and saving-investment deficit had positive significant effects on the current account balances of East African countries. On the other hand, in the short-term, the fiscal deficit and saving-investment deficit had no impact on current account balance. This means that the triple deficit hypothesis was not valid in the countries under consideration.

4. DATA

This study tests the validity of the triple deficit hypothesis between 1999 and 2018 in fourteen countries in the MENA region: Algeria, Bahrain, Djibouti, Egypt, the Islamic Republic of Iran, Israel, Jordan, Kuwait, Malta, Morocco, Oman, Saudi Arabia, Tunisia, and the United Arab Emirates. The variables included are budget balance, current account balance, and the saving-investment gap. The saving-investment gap is measured as the gross national savings minus total investments. The data for all variables under consideration were collected from the World Bank database. All variables were calculated as a percentage of GDP.

5. MODEL

A NARDL model is used to analyze the relationship between external balance, represented by current account balance, and the internal balance, represented by fiscal balance and saving-investment balance. In the case of a linear ARDL model, both negative and positive changes are thought to have an equal impact on the dependent variable. Recently, it has been found that negative changes may have a greater impact than positive changes on current account balance. Consequently, due to such asymmetries, non-linear models are thought to be more appropriate (Turan & Karakas, 2018). A NARDL model was developed by Shin, Yu, and Greenwood-Nimmo (2014) as an extension to the ARDL model presented by Pesaran (1997). The main objective of the NARDL model is to take into consideration both the short- and long-term asymmetries in the variables of interest while maintaining all the advantages of the ARDL approach (Cheah, Yiew, & Ng, 2017).

The main difference between the standard ARDL and NARDL is that the former assumes linearity and the symmetric effects of variables, whereas the NARDL assumes non-linearity, which means that the effects of the variables may vary. For example, a 10% rise in Z in a standard ARDL model would correspond to a decrease of

5% in X and vice versa. The non-linear model allows for the delineation of asymmetric effects into positive and negative shocks in cases where the partial sums of these shifts are unbalanced. In the case of the NARDL model, positive changes can have a different effect on the dependent variable than negative changes (Cheah et al., 2017; Ghodsi, 2017).

The general form of the NARDL model can be represented as follows:

$$CA_t = \beta_0 + \beta_1 BB_t^+ + \beta_2 BB_t^- + \beta_3 SI_t^+ + \beta_4 SI_t^- + e_t \quad (4)$$

Where:

CA stands for current account balance, BB stands for budget balance and SI stands for saving-investment balance, which is calculated as the difference between domestic savings and investment. BB_t^+ and BB_t^-, in equations 5 and 6 respectively, are the partial sums of the positive and negative changes in a government's budget balance. They are calculated as follows (Dhaoui & Bacha, 2017):

$$BB_t^+ = \sum_{i=1}^{t} \Delta BB_t^+ = \sum_{i=1}^{t} \max(\Delta BB_i, 0) \quad (5)$$

And

$$BB_t^- = \sum_{i=1}^{t} \Delta BB_t^- = \sum_{i=1}^{t} \min(\Delta BB_i, 0) \quad (6)$$

Using the same method, SI_t^+ and SI_t^-, in equations 7 and 8 respectively, are the partial sums of the positive and negative changes in the saving-investment balance. They are estimated as follows:

$$SI_t^+ = \sum_{i=1}^{t} \Delta SI_t^+ = \sum_{i=1}^{t} \max(\Delta SI_i, 0) \quad (7)$$

And

$$SI_t^- = \sum_{i=1}^{t} \Delta SI_t^- = \sum_{i=1}^{t} \min(\Delta SI_i, 0) \quad (8)$$

Equation 5 can be written as:

$$\Delta CA_t = \beta_0 + \beta_1 BB_{t-1}^+ + \beta_2 BB_{t-1}^- + \beta_3 SI_{t-1}^+ + \beta_4 SI_{t-1}^- + \sum_{i=1}^{p} \emptyset \Delta CA_{t-1} + \sum_{i=0}^{q} (\gamma_i^+ \Delta BB_{t-1}^+ + \gamma_i^- \Delta BB_{t-1}^-) + \sum_{i=0}^{s} (\emptyset_i^+ \Delta SI_{t-1}^+ + \emptyset_i^- \Delta SI_{t-1}^-) + U_t \quad (9)$$

Where $\sum_{i=1}^{p} \emptyset \Delta CA_{t-1}$ measures the short-term impacts of the changes to the current account balance,

$\sum_{i=0}^{q} (\gamma_i^+ \Delta BB_{t-1}^+ + \gamma_i^- \Delta BB_{t-1}^-)$ measures the short-term impacts of budget balance on the current account,

and $\sum_{i=0}^{s} (\emptyset_i^+ \Delta SI_{t-1}^+ + \emptyset_i^- \Delta SI_{t-1}^-)$ measures the short-term impacts of the saving-investment gap on the current account.

6. ESTIMATION RESULTS AND DISCUSSION

6.1. Diagnostic Tests

A variety of diagnostic tests should be conducted before the results of the model can be interpreted. These tests include testing the stationarity of the variables using the Levin, Lin & Chu t (LLC) unit root test, testing the normality of the errors using the Jarque-Bera test, testing the linearity of the model in the long- and short-

term using the Wald test, and testing the parameters and variance stability using CUSUM and CUSUMSQ plots.

First, in order to prevent spurious regression issues, one of the main requirements of the ARDL is that there are no I (2) variables involved in the model. Therefore, a panel unit root test, namely the LLC test, should be carried out. The LLC test is one of the first unit root tests developed for panel data and it has been widely used in the literature (Buscemi & Alem, 2012).

Table 1. Levin, Lin & Chu t unit root test

Variable	Level	1st Difference
Current account balance	–3.43077	–7.97204
Budget balance	1.06417	–8.06919
Saving-investment balance	2.38736	–1.97233

As shown in Table 1, the results of the unit root test indicate that the current account balance is stationary at level, whereas the budget balance and saving-investment balance are stationary at the first difference. These results fulfill the requirements of the ARDL.

Table 2. Diagnostic tests

Test	Value	Prob
WLR	13.53	0.0003
WSR	20.6	0.0000
Breusch-Pagan LM	95.00350	0.3663
Jarque-Bera	4097.497	0.0000

After performing the unit root test, a Wald test has been conducted in order to test the linearity of the model. The null hypothesis of this test states that $\alpha_1^+ = \alpha_1^-$, which means there is a symmetric relationship with the variable (Bayar & Karamelikli, 2017; Turan & Karakas, 2018). As illustrated in Table 2, the null hypothesis of symmetric fluctuations in the variables under consideration are rejected in both short-term cases (WSR) and long-term cases (WLR), which means that there are asymmetric fluctuations in both the short- and long-term. Heteroscedasticity has also been tested using the Breusch-Pagan LM test. The null hypothesis of this test, as shown in the following equation, $H_0: Cov(U_{it}, U_{jt}) = 0$, would indicate homoscedasticity (Bölükbaş, Topal, & Hotunluoğlu, 2018). As per the results of the Breusch-Pagan LM test, it was found that there is no heteroscedasticity in this study. In addition, a Jarque-Bera test was conducted to test the normality of the errors (Bhat & Sharma, 2018). It can be concluded that the errors are normally distributed.

Finally, the structural stability of the estimated model was examined using the CUSUM and CUSUMSQ tests. These tests are applied to the residual elements of the model and, if the graph lies within the 0.05 interval, this signifies that the model is stable (Akalpler & Panshak, 2019). As shown in Figure 1 and Figure 2, the results show that the parameters are stable. This was confirmed by the CUSUM, as the plots remained within the critical bounds . With regard to the CUSUMSQ, the hypothesis for the stability of parameters were rejected as the plots crossed the critical bounds .
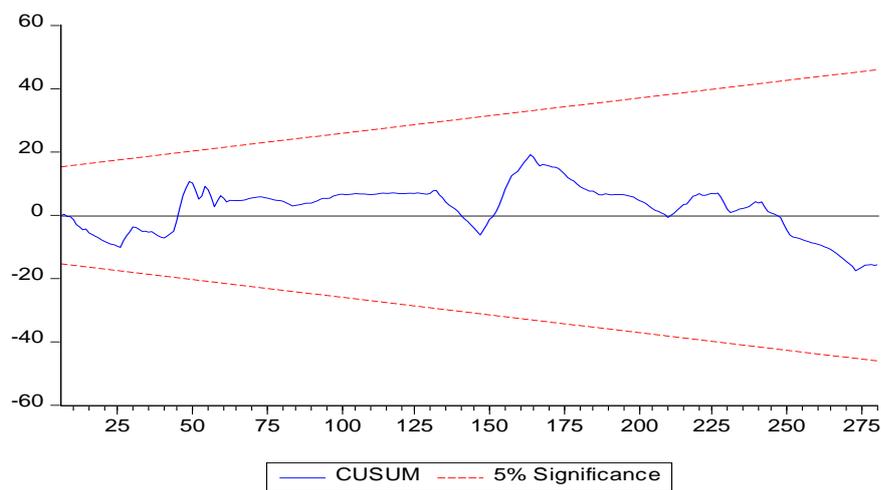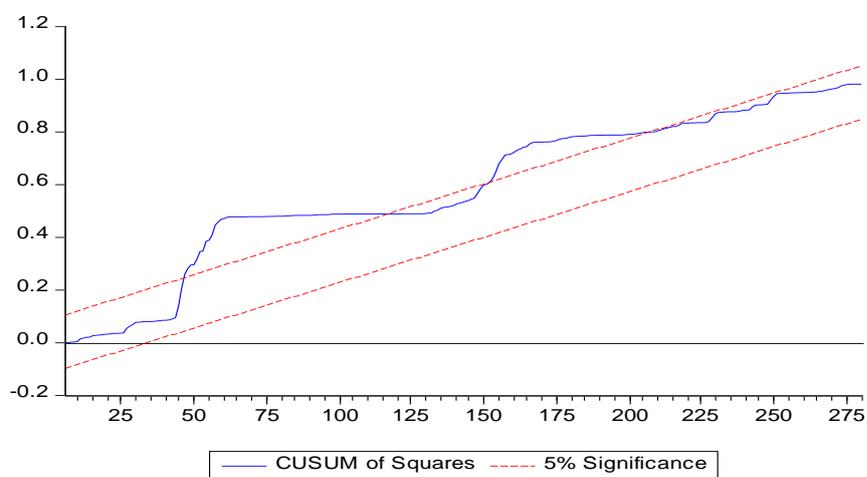
Figure 1. Cumulative sum (CUSUM) test

Figure 2. CUSUMSQ test

6.2. NARDL Results

After carrying out the necessary tests, the model was estimated. The results of the estimation for the NARDL model are summarized in Table 3. It can be seen that, in the long-term, there is a positive significant relationship between budget balance and current account balance; a one-unit increase in budget balance will cause a 0.597-unit increase in current account balance. Moreover, an increase in the saving-investment gap in the long-term by one unit leads to a 0.525-unit increase in the current account.

Table 3. NARDL estimation results

Variable	Coefficient	T-Statistic
Long Run		
BD+	0.597150	17.77865
BD-	0.430437	11.08614
SI+	0.524591	16.72470
SI-	0.694694	22.33.658
Short Run		
Cointegration	-0.836643	-20.48700
D(BD+)	-0.321331	-2.945123
D(BD-)	-0.003083	0.016035*
D(SI+)	-0.611900	-10.72396
D(SI-)	-0.515815	-4.011764
C	7.991674	2.614312

With respect to negative shocks, a decline in budget balance has a positive and significant impact on the current account, which indicates that a one-unit reduction in budget balance will cause a 0.43-unit reduction in current account balance. Furthermore, a reduction in the saving-investment deficit by one unit reduces the current account balance by 0.695.

In the short-term, it can be noted that both positive and negative effects on the budget deficit and saving-investment deficit (apart from negative budget deficit effects) have significant negative impacts on the current account balance. A positive shock to the budget balance will cause a reduction of the current account by 0.32 units. A decline in the budget balance by one unit will cause an increase in the current account balance by 0.0031 units. An increase in the saving-investment balance by one unit will cause a reduction in the current account by 0.61 units. A reduction of the saving-investment balance by one unit will cause an increase in the current account by 0.52 units.

7. CONCLUSION

This paper has tested the validity of the triple deficit hypothesis using a NARDL approach to panel data from 14 countries in the MENA region between 1999 and 2018. The study confirms that there is a long-term relationship between the following three balances: current account balance, budget balance, and saving-investment balance. Both positive and negative shocks to the budget balance and saving-investment balance will have a positive impact on the current account balance. This indicates that the triple deficit hypothesis is valid in the long run. On the other hand, it can be argued that, in the short-term, both positive and negative shocks to the budget balance and saving-investment balance results in a worsening current account balance.

It can be concluded that, in the long-term, reducing the budget deficit and encouraging domestic savings would help to solve the problem of triple deficits. Thus, an improvement in the budget balance and the saving-investment balance would positively affect the current account balance. The study has shown that the short and long-term results differ. Therefore, a distinction should be made by policy makers in terms of correcting actions in the short- and long-term.

REFERENCES

Ahmad, A. H., Aworinde, O. B., & Martin, C. (2015). Threshold cointegration and the short-run dynamics of twin deficit hypothesis in African countries. *Journal of Economic Asymmetries, 12*(2), 80–91.Available at: https://doi.org/10.1016/j.jeca.2015.03.001.

Akalpler, E., & Panshak, Y. (2019). Dynamic relationship between budget deficit and current account deficit in the light of Nigerian empirical application. *Evolutionary and Institutional Economics Review, 16*(1), 159–179.Available at: https://doi.org/10.1007/s40844-019-00122-8.

Barro, R. J. (1989). The Ricardian approach to budget deficits. *Journal of Economic Perspectives, 3*(2), 37–54.Available at: https://doi.org/10.1257/jep.3.2.37.

Bayar, Y., & Karamelikli, H. (2017). Financial development and tax revenues in Turkey: A non-linear cointegration analysis. *The European Journal of Applied Economics, 14*(2), 31–42.Available at: https://doi.org/10.5937/ejae14-14838.

Bayramoğlu, A. T., & Öztürk, Z. (2018). Assessing the twin and triple deficit hypotheses in developing economies: A panel causality analysis. In: Dincer H., Hacioglu Ü., Yüksel S. (Eds.), Global Approaches in Financial Economics, Banking, and Finance. Contributions to Economics. Cham: Springer.

Bhat, J. A., & Sharma, N. K. (2018). The twin-deficit hypothesis: Revisiting Indian economy in a nonlinear framework. *Journal of Financial Economic Policy, 10*(3), 386–405.Available at: https://doi.org/10.1108/JFEP-09-2017-0082.

Bluedorn, J., & Leigh, D. (2011). Revisiting the twin deficits hypothesis: The effect of fiscal consolidation on the current account. *IMF Economic Review, 59*(4), 582–602.Available at: https://doi.org/10.1057/imfer.2011.21.

Bolat, S., Değirmen, S., & Şengönül, A. (2014). Does triple deficits have (Un) stable causality for the EU members? Evidence from bootstrap-corrected causality tests. *Procedia Economics and Finance, 16*(May), 603–612.Available at: https://doi.org/10.1016/s2212-5671(14)00847-8.

Bölükbaş, M., Topal, M. H., & Hotunluoğlu, H. (2018). Testing twin deficits hypothesis for Eu-27 and Turkey: A panel granger causality approach under cross-sectional dependence. *Journal for Economic Forecasting, 21*(4), 101-119.

Buscemi, A., & Alem, Y. H. (2012). Fiscal deficit, national saving and sustainability of economic growth in emerging economies: A dynamic GMM panel data approach. *International Journal of Economics and Financial Issues, 2*(2), 126-140.

Cavallo, M. (2005). Understanding the twin deficits: New approaches, new results. FRBSF Economic Letter, 2002–2005. Retrieved from: http://ideas.repec.org/a/fip/fedfel/y2005ijul22n2005-16.html.

Cheah, S.-P., Yiew, T.-H., & Ng, C.-F. (2017). A nonlinear ARDL analysis on the relation between stock price and exchange rate in Malaysia. *Economics Bulletin, 37*(1), 336-346.

Çoban, H., & Balikçioğlu, E. (2016). Triple deficit or twin divergence: A dynamic panel analysis. *International Journal of Economic & Social Research, 12*(1), 271–280.

Dhaoui, A., & Bacha, S. (2017). Investor emotional biases and trading volume's asymmetric response: A non-linear ARDL approach tested in S&P500 stock market. *Cogent Economics & Finance, 5*(1), 1–13.Available at: https://doi.org/10.1080/23322039.2016.1274225.

Eldemerdash, H., Metcalf, H., & Maioli, S. (2014). Twin deficits: New evidence from a developing (oil vs. non-oil) countries' perspective. *Empirical Economics, 47*(3), 825–851.Available at: https://doi.org/10.1007/s00181-013-0771-9.

Forte, F., & Magazzino, C. (2015). Ricardian equivalence and twin deficits hypotheses in the euro area. *Journal of Social and Economic Development, 17*(2), 148–166.Available at: https://doi.org/10.1007/s40847-015-0013-4.

Ghodsi, S. H. (2017). Nonlinear ARDL approach and the housing market in the U.S. (The University of Wisconsin-Milwaukee UWM Digital Commons). Retrieved from: https://dc.uwm.edu/etd/1622.

Kalou, S., & Paleologou, S. M. (2012). The twin deficits hypothesis: Revisiting an EMU country. *Journal of Policy Modeling, 34*(2), 230–241.Available at: https://doi.org/10.1016/j.jpolmod.2011.06.002.

Khalid, A. M., & Guan, T. W. (1999). Causality tests of budget and current account deficits: Cross-country comparisons. *Empirical Economics, 24*(3), 389–402.Available at: https://doi.org/10.1007/s001810050062.

Kim, S., & Roubini, N. (2008). Twin deficit or twin divergence? Fiscal policy, current account, and real exchange rate in the U.S. *Journal of International Economics, 74*(2), 362–383.Available at: https://doi.org/10.1016/j.jinteco.2007.05.012.

Kusairi, S., Maulina, V., & Margaretha, F. (2019). Public debt and private consumption in Asia pacific countries: Is there evidence for Ricardian equivalence? *Journal of International Studies, 12*(1), 50–64.Available at: https://doi.org/10.14254/2071-8330.2019/12-1/3.

Magazzino, C. (2017). Twin deficits or Ricardian equivalence? Empirical evidence in the APEC countries. *Asian Economic and Financial Review, 7*(10), 959–971.Available at: https://doi.org/10.18488/journal.aefr.2017.710.959.971.

Magoti, E., Africa, E., Training, S., Mabula, S., & Sende, N. (2020). Triple deficit hypothesis : A panel ARDL and dumitrescuhurlin panel causality forEast African countries. *African Journal of Economic Review, 8*(January), 144–161.

Marinheiro, C. F. (2008). Ricardian equivalence, twin deficits, and the Feldstein-Horioka puzzle in Egypt. *Journal of Policy Modeling, 30*(6), 1041–1056.Available at: https://doi.org/10.1016/j.jpolmod.2007.12.001.

Mohanty, R. K. (2019). An empirical investigation of twin deficits hypothesis: Evidence from India. *Journal of Quantitative Economics, 17*(3), 579-601.Available at: https://doi.org/10.1007/s40953-018-0136-5.

Pesaran, M. H. (1997). An autoregressive distributed lag modelling approach to cointegration analysis. *Econometric Society Monograph, 31*, 371–413.

Raji, R. O. (2019). Testing the validity of the triple deficit hypothesis for Nigeria. *Econometric Research in Finance, 4*(2), 89–109.Available at: https://doi.org/10.33119/erfin.2019.4.2.2.

Reed, M., Najarzadeh, R., & Sadati, S. Z. (2019). Analyzing the relationship between budget deficit, current account deficit, and government debt sustainability. *Journal of WEI Business and Economics, 8*(1), 20-31.Available at: https://doi.org/10.36739/jweibe.2019.v8.i1.15.

Sen, H., & Kaya, A. (2016). *Are the twin or triple deficits hypotheses applicable to post-communist countries ?* Institute for Economies in Transition. Available at: https://doi.org/10.13140/RG.2.1.2539.7524.

Shastri, S., Giri, A., & Mohapatra, G. (2017). Assessing the triple deficit hypothesis for major South Asian countries: A panel data analysis. *International Journal of Economics and Financial Issues, 7*(4), 292-299.

Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In W. Horrace & R. Sickles (Eds.), The Festschrift in Honor of Peter Schmidt: Econometric Methods and Applications (pp. 281–314). New York (NY): Springer Science & Business Media.

Summers, L. H. (1988). Tax policy and international competitiveness. In International Aspects of Fiscal Policies (pp. 349–386). Chicaho, IL: University of Chicago Press.

Turan, T., & Karakas, M. (2018). Asymmetries in twin deficit hypothesis: Evidence from CEE countries. *Journal of Economics, 66*(6), 580–597.