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ASYMMETRIC EFFECTS OF MONETARY AND FISCAL POLICIES ON THE ECONOMIC ACTIVITY: EMPIRICAL EVIDENCE FROM TURKEY¹

Abstract. *In this study, it is aimed to compare the efficiency of monetary and fiscal policy as well as to compare the expansionary-contractionary policy by investigating the asymmetric effects of monetary and fiscal policies with positive-negative shock asymmetry. In addition, it is aimed to contribute to the literature by testing the asymmetric effects of price and exchange rate shocks on output other than monetary and fiscal policies. The analysis was carried out with monthly data covering the period 2005:12-2019:08. Monetary policy variables used in the analysis are M2 money supply and policy interest rate. Moreover, used fiscal policy variables are government revenues (taxes) and non-interest government expenditures. The NARDL method is used in the analysis. The results show that both fiscal and monetary policy are effective in dealing with recession and stimulating economic activity, and the interest rate, which is one of the monetary policy tools, is the most effective policy tool.*

Key words: *Monetary policy, fiscal policy, time series analysis, asymmetric effects, NARDL.*

JEL Classifications: E52; E62; C32

1. Introduction

Although the effectiveness of monetary and fiscal policy practices on real variables is a controversial issue in traditional economic theory, policymakers of both developed and developing countries have tried to achieve the goal of stimulating or slowing down the economic activity with monetary and fiscal policy practices. When we look back on how successful these practices were, an important point about policy implementations drew attention, and it was seen that the effects of monetary and fiscal policies could be asymmetrical rather than symmetrical.

Asymmetric effect means that the effect of expansionary policies is more than the effect of contractionary policies or, on the contrary, the effect of

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contractionary policies is more than that of expansionary policies. The fact that the expansionary monetary policy implemented especially after the Great Depression was insufficient to stimulate economic activity revealed the view that expansionary policies may be less effective than contractionary policies. On the other hand, Friedman and Schwartz (1963) proved in their analysis that the monetary policy implemented in the early 1930s was contractionary rather than expansionary due to failing banks and the large amount of money withdrawn from the system. Then, although the belief in asymmetry weakened, asymmetric effects continued to be the subject of research in both theoretical and empirical literature.

In this study, it is aimed to compare the efficiency of monetary and fiscal policy as well as to compare the expansionary-contractionary policy by investigating the asymmetric effects of monetary and fiscal policies with positive-negative shock asymmetry. In addition, it is aimed to contribute to the literature by testing the asymmetric effects of price and exchange rate shocks on output, apart from monetary and fiscal policies. NARDL method developed by Shin, Yu, Greenwood-Nimmo (2014) is used in the analysis.

The rest of the study is organized as follows. The second section explains the theoretical and empirical literature. The third section reviews the data and methodology used. Lastly, the empirical results and conclusion of the study are presented.

2. Theoretical and Empirical Literature Review

Until the late 1920s, the effects of monetary policy were thought to be symmetrical. Policy makers thought that by increasing interest rates, the economy would be slowed down, and by lowering it, the economy would be revived. However, this confidence in expansionary policies was reversed with the Great Depression and it was concluded that only contractionary policies could be effective on macroeconomic variables. After the economy approached to collapse in the USA in 1929, short-term interest rates were reduced to less than 1% in a short time, but the crisis lasted until 1934 due to the low credit utilization capacity and insecurity in the economy. On the other hand, in their analysis, Friedman and Schwartz (1963) showed that the monetary policy implemented in the early 1930s was contractionary rather than expansionary. The results of these analyzes weakened the thesis that expansionary monetary policy is ineffective. (Morgan, 1993, p. 22). However, since at least Keynes's liquidity trap theorem it has been known that the effects of expansionary monetary policy shocks can be limited (Florio, 2004, p. 409). While the contractionary monetary policies implemented in the USA in 1988-1989 had the desired effect on macroeconomic variables, it is a known fact that the effects of the expansionary monetary policy on macroeconomic variables were not as expected in 1990. In the presence of asymmetric effects, it has been stated that monetary policy is not an appropriate tool to stimulate economic activity, especially during recession periods, and instead, fiscal policy may be a more appropriate tool (Agenor, 2001, p. 3). In theory, expansionary fiscal policy shocks stimulate aggregate demand and increase production and prices and contractionary fiscal policies will reduce aggregate demand and cause a decrease in

production and prices. However, there are studies showing that fiscal policy can also cause asymmetric effects. This result stems from the asymmetrical relationship between government expenditures and aggregate demand. A positive shock to government spending will increase the demand for loanable funds, which will cause interest rates to rise. Increasing interest rates will crowd out private investments, and the results of the expansionary fiscal policy will not be as expected. There is no evidence that interest rates decrease in contractionary policies (Kandil, 2001, p. 149). On the other hand, government expenditures financed by taxes will not have a crowding out effect, but also point to a healthier economic structure. In such a situation, expansionary spending policy may have as much effect on output as contractionary policy or even more with the confidence of the improvement in fiscal balance. In such a case, the expansionary policy may outweigh the contractionary policy. Therefore, fiscal policy may cause asymmetric effects on macroeconomic variables.

In the empirical literature McCallum (1989), Cover (1992) Morgan (1993) Rhee and Rich (1995), Florio (2004), Bodman (2006) handled the issue with positive-negative shock asymmetry and conclude that negative monetary shocks have greater impact on the economic activity than positive shocks. On the other hand, while Ravn and Sola (1996), Weise (1999) and Aragon and Portugal (2009) reached that monetary policy have symmetric effects on output, Tanrıöver and Yamak (2012) and Yılancı et al. (2016) find that while expansionary monetary shocks have statistically significant effect on output, negative shocks are not statistically significant. In terms of fiscal policy, Kandil (2001) and Berument and Doğan (2004) reached that contractionary fiscal policy have greater effect on output than expansionary fiscal policy. On the other hand, Gogas and Pragidis (2015) conclude that positive government expenditure shocks are more effective on output than contractionary shocks.

Unlike other studies, this study provides the opportunity to see the asymmetric effects of both monetary and fiscal policies at the same time, and offers the opportunity to compare the efficiency of the monetary-fiscal policy near by the expansionary-contraction policy efficiency comparison. In addition, it is aimed to contribute to the literature by providing the opportunity to test the asymmetric effects of price and exchange rate shocks on output, apart from monetary and fiscal policies.

3. Data and Methodology

In the study, it is aimed to see the asymmetric effects of monetary and fiscal policies on output. Morgan (1993, p. 21) stated that using only monetary aggregates to measure the asymmetric effects of monetary policy may produce incorrect results, therefore the interest rate should also be included in the analysis. Therefore, used monetary policy variables are M2 money supply and the policy interest rate. Fiscal policy variables were determined as taxes representing government revenues and non-interest government expenditures. To represent output, industrial production index is used. Other variables are real effective

exchange rate representing exchange rate, producer price index representing prices (as it is stated that prices are more rigid to downwards in theory and the effect of negative shocks can be seen more clearly in producer prices due to cost-based shocks, to represent prices producer price index is preferred instead of consumer price index) and unemployment.

All variables are used in logarithmic terms except interest rate. The data is taken from the datastream database. The graphs of the variables are shown below:

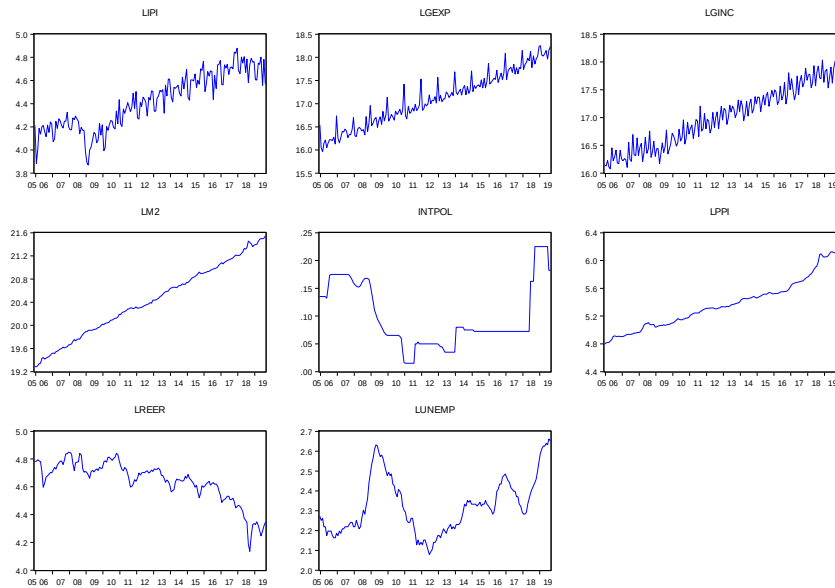


Figure 1. Time series plots of the variables

Since LIPI, LGEXP and LGINC variables were seen to contain seasonality, these variables were used after seasonally adjusted by TRAMO/SEATS method.

The ARDL model, which can test symmetrical relationships but cannot detect asymmetrical relationships, was developed by Shin, Yu, Greenwood-Nimmo (2014) and started to be used to detect asymmetrical and nonlinear relationships. The most important advantages of this method are; as in the ARDL method, the nonlinear autoregressive distributed lag model (NARDL) method can be used when the series are $I(0)$, $I(1)$, or a mixture of $I(0)$ - $I(1)$, but none of the series should be $I(2)$. In addition, it is possible to obtain effective results even in small samples (Katrakilidis & Trachanas, 2016, p. 500). The most important difference of this method from other methods investigating asymmetry is; it allows asymmetric effects to be investigated both in the short and long term together. In addition to this, NARDL also allows to reveal the "hidden cointegration" relationship, which expresses the existence of the cointegration relationship between the positive and negative components of the two non-cointegrated series, allowing for a better

understanding of the dynamic relationships (Shahzad, Nor, Ferrer, Hammoudeh, 2017, p. 215). In this method, short-term and long-term asymmetric effects are investigated by separating the negative and positive components of the series. In the models, all explanatory variables except unemployment data are divided into positive and negative shocks. Therefore, used model is partially asymmetric.

The model to be used while investigating the asymmetric effects of monetary and fiscal policies on output is as follows:

$$LPI_t = (LGEXP^+, LGEXP^-, LGINC^+, LGINC^-, LM2^+, LM2^-, INT^+, INT^-, LPPI^+, LPPI^-, LREER^+, LREER^-, LUNEMP)$$

While investigating the asymmetric cointegration relationship between the series based on NARDL, first of all, unit root test should be applied to the variables to make sure that none of the series is I(2). Then, diagnostic tests are performed by establishing an unrestricted error correction model with an appropriate lag structure. If the existence of cointegration relationship is detected in the boundary test, short and long-term asymmetry tests are applied, and in the last step, the cumulative dynamic factors are calculated and the long- and short-term asymmetric effects and adaptation processes are observed.

In this context, the unrestricted asymmetric error correction model of the NARDL method is as follows:

$$\begin{aligned} \Delta LPI_t = & c_1 + \sum_{i=1}^{n1} \alpha_{1i} \Delta LPI_{t-i} + \sum_{i=0}^{n2^+} \alpha_{2i}^+ \Delta LGINC_{t-i}^+ + \sum_{i=0}^{n2^-} \alpha_{2i}^- \Delta LGINC_{t-i}^- \\ & + \sum_{i=0}^{n3^+} \alpha_{3i}^+ \Delta LGEXP_{t-i}^+ + \sum_{i=0}^{n3^-} \alpha_{3i}^- \Delta LGEXP_{t-i}^- + \sum_{i=0}^{n4^+} \alpha_{4i}^+ \Delta LM2_{t-i}^+ \\ & + \sum_{i=0}^{n4^-} \alpha_{4i}^- \Delta LM2_{t-i}^- + \sum_{i=0}^{n5^+} \alpha_{5i}^+ \Delta INT_{t-i}^+ + \sum_{i=0}^{n5^-} \alpha_{5i}^- \Delta INT_{t-i}^- \\ & + \sum_{i=0}^{n6^+} \alpha_{6i}^+ \Delta PPPI_{t-i}^+ + \sum_{i=0}^{n6^-} \alpha_{6i}^- \Delta PPPI_{t-i}^- + \sum_{i=0}^{n7^+} \alpha_{7i}^+ \Delta LREER_{t-i}^+ \\ & + \sum_{i=0}^{n7^-} \alpha_{7i}^- \Delta LREER_{t-i}^- + \sum_{i=0}^{n8} \alpha_{8i} \Delta LUNEMP_{t-i} + \theta_{11} LPI_{t-1} \\ & + \theta_{21}^+ LGINC_{t-1}^+ + \theta_{21}^- LGINC_{t-1}^- + \theta_{31}^+ LGEXP_{t-1}^+ \\ & + \theta_{31}^- LGEXP_{t-1}^- + \theta_{41}^+ LM2_{t-1}^+ + \theta_{41}^- LM2_{t-1}^- + \theta_{51}^+ INT_{t-1}^+ \\ & + \theta_{51}^- INT_{t-1}^- + \theta_{61}^+ LPPI_{t-1}^+ + \theta_{61}^- LPPI_{t-1}^- + \theta_{71}^+ LREER_{t-1}^+ \\ & + \theta_{71}^- LREER_{t-1}^- + \theta_{81} LUNEMP_{t-1} + u_t \end{aligned} \quad (1)$$

In this notation, c_1 is drift component and u_t is white noise error term. The term with a summation sign represents the error correction dynamics and the second part of the equation corresponds to the long-run relationship. Also, the components showing the positive and negative changes of the independent variables consist of the cumulative sums of the increases and decreases in the variables and are calculated as follows:

$$LGINC_t^+ = \sum_{i=1}^t \Delta LGINC_i^+ = \sum_{i=1}^t \max(\Delta LGINC_i, 0) \quad (2)$$

$$LGINC_t^- = \sum_{i=1}^t \Delta LGINC_i^- = \sum_{i=1}^t \min(\Delta LGINC_i, 0) \quad (3)$$

$$LGEXP_t^+ = \sum_{i=1}^t \Delta LGEXP_i^+ = \sum_{i=1}^t \max(\Delta LGEXP_i, 0) \quad (4)$$

$$LGEXP_t^- = \sum_{i=1}^t \Delta LGEXP_i^- = \sum_{i=1}^t \min(\Delta LGEXP_i, 0) \quad (5)$$

$$LM2_t^+ = \sum_{i=1}^t \Delta LM2_i^+ = \sum_{i=1}^t \max(\Delta LM2_i, 0) \quad (6)$$

$$LM2_t^- = \sum_{i=1}^t \Delta LM2_i^- = \sum_{i=1}^t \min(\Delta LM2_i, 0) \quad (7)$$

$$INT_t^+ = \sum_{i=1}^t \Delta INT_i^+ = \sum_{i=1}^t \max(\Delta INT_i, 0) \quad (8)$$

$$INT_t^- = \sum_{i=1}^t \Delta INT_i^- = \sum_{i=1}^t \min(\Delta INT_i, 0) \quad (9)$$

$$LPPI_t^+ = \sum_{i=1}^t \Delta LPPI_i^+ = \sum_{i=1}^t \max(\Delta LPPI_i, 0) \quad (10)$$

$$LPPI_t^- = \sum_{i=1}^t \Delta LPPI_i^- = \sum_{i=1}^t \min(\Delta LPPI_i, 0) \quad (11)$$

$$LREER_t^+ = \sum_{i=1}^t \Delta LREER_i^+ = \sum_{i=1}^t \max(\Delta LREER_i, 0) \quad (12)$$

$$LREER_t^- = \sum_{i=1}^t \Delta LREER_i^- = \sum_{i=1}^t \min(\Delta LREER_i, 0) \quad (13)$$

In the first stage, the equation is estimated with the OLS method to test whether there is a long-term relationship (cointegration relationship) between the variables, and then the F test is performed. The calculated F statistics should be

compared with the upper bound and lower bound critical values derived by Pesaran et al. (2001). If the calculated F statistic is greater than the upper bound critical value $I(1)$, the null hypothesis will be rejected, which means that there is a cointegration relationship between the variables. On the other hand, if the F statistic is lower than the lower bound critical value $I(0)$, the null hypothesis cannot be rejected, which means that the variables are not cointegrated. If the F-statistic falls within the critical limits, Pesaran et al. (2001) recommend to perform another cointegration test. In the light of this information, the null and alternative hypotheses for the equation whether there is cointegration between the variables is as follows:

$$H_0: \theta_{11} = \theta_{21}^+ = \theta_{21}^- = \theta_{31}^+ = \theta_{31}^- = \theta_{41}^+ = \theta_{41}^- = \theta_{51}^+ = \theta_{51}^- = \theta_{61}^+ = \theta_{61}^- = \theta_{71}^+ = \theta_{71}^- = \theta_{81} = 0$$

H_1 : at least one of them is different than zero

The rejection of the H_0 hypothesis indicates that there is a long-run cointegration relationship between the variables. The long run coefficients are calculated as $\beta_{GINC}^+ = \frac{\theta_{21}^+}{\theta_{11}}$, $\beta_{GINC}^- = \frac{\theta_{21}^-}{\theta_{11}}$. After detecting the existence of the cointegration relationship, the existence of short and long run asymmetric effects is tested with the Wald test. For example, the long run effect of the interest rate, which is a monetary policy indicator, on output is tested with $\theta_{51}^+ = \theta_{51}^-$, while its short run asymmetric effects are tested with $\sum_{i=0}^{n5+} \alpha_{5i}^+ = \sum_{i=0}^{n5-} \alpha_{5i}^-$. The rejection of the null hypothesis indicates the existence of an asymmetric effect. In addition, in some studies (Fousekis et al., 2016, Ali et al., 2018) it has been stated that the asymmetry test cannot be limited to the Wald test, there are other indicators of asymmetry. Accordingly, the fact that an increase or decrease in a variable has a different size effect on the dependent variable, the effects are in different directions, and one of the shocks is statistically significant, while the other is insignificant, indicating the existence of an asymmetric effect.

In the last step, using the asymmetric error correction model, the asymmetric cumulative dynamic multiplier effects of a unit change in positive and negative shocks on the dependent variable are derived. For example, in the model, the cumulative dynamic multiplier effect of shocks in government expenditure on output is derived as follows:

$$m_h^+ = \sum_{j=0}^h \frac{\partial LIPI_{t+j}}{\partial LGEXP_t^+}, m_h^- = \sum_{j=0}^h \frac{\partial LIPI_{t+j}}{\partial LGEXP_t^-}, \quad h = 0, 1, 2, \dots \quad (14)$$

Here, $h \rightarrow \infty$, $m_h^+ \rightarrow \beta^+$, $m_h^- \rightarrow \beta^-$ (Shin et al. 2014, p. 292).

4. Empirical Results

To see the stationarity levels of the series, ADF, PP and Zivot and Andrews (2002) unit root test with break, which allows structural breaks to avoid false unit root problem, was applied. Test results are given in Table 1.

Table 1. Unit root test results

Variables	ADF		PP		ZA	
	Constant (prob.)	Constant and Trend (prob.)	Constant (prob.)	Constant and Trend (prob.)	Constant (prob.)	Constant and Trend (prob.)
LIPI	-1.0995 (0.7155)	-1.8716 (0.6647)	-0.8339 (0.8064)	-3.6948 (0.0254)	-2.6953 (0.8323)	-0.7124 (> 0.99)
ΔLIPI	-24.5995 (0.0000)*	-24.5379 (0.0000)*	-24.5663 (0.0000)*	-24.5203 (0.0000)*	-27.098 (< 0.01)*	-26.857 (< 0.01)*
LPPI	1.1819 (0.9980)	-0.6556 (0.9740)	1.2522 (0.9984)	-0.5734 (0.9790)	-1.1413 (> 0.99)	-4.3991 (0.2558)
ΔLPPI	-8.0490 (0.0000)*	-8.1818 (0.0000)*	-7.2344 (0.0000)*	-7.0416 (0.0000)*	-9.5956 (< 0.01)*	-9.3769 (< 0.01)*
LGEXP	0.0230 (0.9585)	-3.2365 (0.0811)	-0.0597 (0.9507)	-12.4318 (0.0000)*	-1.6782 (> 0.99)	-4.0926 (0.4016)
ΔLGEXP	-10.9677 (0.0000)*	-9.0969 (0.0000)*	-65.3872 (0.0000)*	-67.6206 (0.0000)*	-13.495 (< 0.01)*	-24.858 (< 0.01)*
LGINC	-0.1170 (0.9446)	-3.4122 (0.0533)	-0.2547 (0.9275)	-10.9874 (0.0000)*	-1.8503 (0.9898)	-5.4430 (0.0244)
ΔLGINC	-17.7068 (0.0000)*	-17.6544 (0.0000)*	-63.2238 (0.0000)*	-65.8362 (0.0000)*	-18.507 (< 0.01)*	-18.455 (< 0.01)*
INT	-2.1520 (0.2249)	-2.0585 (0.5645)	-1.3105 (0.6242)	-1.1083 (0.9237)	-3.8030 (0.2347)	-4.1062 (0.4522)
ΔINT	-4.4832 (0.0003)*	-4.4883 (0.0021)*	-11.5669 (0.0000)*	-11.5892 (0.0000)*	-12.033 (< 0.01)*	-13.072 (< 0.01)*
LM2	-0.3322 (0.9162)	-3.8973 (0.0142)	-0.3443 (0.9143)	-3.7987 (0.0190)	-1.2113 (> 0.99)	-5.2110 (0.0458)
ΔLM2	-13.2784 (0.0000)*	-13.2426 (0.0000)*	-14.1521 (0.0000)*	-14.1112 (0.0000)*	-15.022 (< 0.01)*	-15.333 (< 0.01)*
LUNEMP	-2.0519 (0.2646)	-2.3375 (0.4110)	-1.1658 (0.6886)	-1.5843 (0.7952)	-2.9443 (0.7156)	-4.4225 (0.2740)
ΔLUNEMP	-4.2833 (0.0007)*	-4.3125 (0.0039)*	-9.4431 (0.0000)*	-9.4935 (0.0000)*	-4.7056 (0.0241)*	-5.7120 (0.0103)*
LREER	-0.7050 (0.8414)	-2.2617 (0.4520)	-0.7931 (0.8181)	-2.5784 (0.2908)	-2.9246 (0.7262)	-5.1307 (0.0569)
ΔLREER	-10.4844 (0.0000)*	-10.4869 (0.0000)*	-9.3752 (0.0000)*	-9.3535 (0.0000)*	-13.565 (< 0.01)*	-13.541 (< 0.01)*
Test critical values at 5% level	-2.8797	-3.4379	-2.8790	-3.4374	-4.4436	-5.1757

According to the test results, the series are stationary at their first difference and none of the series is stationary at their second difference. This allows to use of the NARDL model. In order to determine the appropriate lag structure of the model, first of all, the lag length criteria were checked with the VAR method based on the Akaike Information Criteria (AIC), then appropriate lag length was determined automatically by the model and the trend determination was

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carried out using the constrained constant term. Therefore, the boundary tests used were performed with asymptotic values as suggested by Pesaran and Shin (2001). Cointegration test results are given in Table 2.

Table 2. Cointegration test results

Model	F statistic	Significance level	Bound levels		Result
			I(0)	I(1)	
$\Delta LIPI$	9.1323	%1 %5 %10	3.17 3.55 3.10	5 3.87 3.35	Cointegration

Since the variables are cointegrated, long-run coefficients are derived. Table 3 shows the long-term asymmetric effects on output. Wald statistics on the far right of the table give the long-term asymmetry test F statistic, and the values in parentheses give the probability values..

Table 3. Long run asymmetric effects

Dependent variable	Independent variables	Coefficient	t-statistics	probability	Wald statistics (prob.)
LIPI	LGEXP ⁺	0.396195*	5.152165	0.0000	4.420292 (0.0373)
	LGEXP ⁻	0.275242*	3.087455	0.0025	
	LGINC ⁺	0.314572*	4.745692	0.0000	8.171832 (0.0049)
	LGINC ⁻	0.449031*	6.709581	0.0000	
	LM2 ⁺	0.321469*	3.441366	0.0008	0.920369 (0.3391)
	LM2 ⁻	0.295137	0.428712	0.6689	
	INT ⁺	-0.063378	-0.353856	0.7240	2.882521 (0.0895)
	INT ⁻	-0.443965**	-2.232514	0.0273	
	LPPI ⁺	-0.335433*	-2.776927	0.0063	24.12113 (0.0000)
	LPPI ⁻	2.092539*	5.627602	0.0000	
	LREER ⁺	0.064271	0.394137	0.6941	0.2454 (0.6211)
	LREER ⁻	0.199893***	1.952903	0.0530	
	LUNEMP	-0.352509*	-10.736400	0.0000	-
Diagnostic tests					
	JB [prob.]	X^2_{LM} [prob.]	X^2_H [prob.]	RESET [prob.]	CUSUM CU SU MQ
	3.1210 [0.2100]	4.4447 [0.1084]	50.6103 [0.0426]	3.3543 [0.0694]	S S

Notes: *, **, *** indicates 1%, 5% and 10% significance level

Since there is a one loss of observation in decomposition to shocks, the model was estimated in the range 2006:m1-2019:m08.

Optimal lag structure of the model is (1, 2, 0, 2, 1, 1, 2, 2, 2, 0, 0, 2, 1, 2).

The dummy variables 2009m10, 2014m2, 2017m10 and 2018m11 are included in the model as constant regressors in order to take into account the structural breaks in the dependent variable.

JB indicates Jarqua-Bera normality test, X^2_{LM} indicates Breusch-Godfrey LM test, X^2_H indicates Breusch-Pagan-Godfrey heteroschodasticity test.

The white estimator was used to solve the heteroschodasticity problem.

The results show that a 1% increase in government expenditure (a positive shock in government expenditure) increases output by 0.39%. On the other hand, a 1% decrease in government expenditure decreases output by 0.27%. Therefore expansionary effect of government expenditure on output is larger than contractionary effect. Wald statistics also show that positive and negative shocks have asymmetric effect on 5% significance level. This result supports the Keynesian view that claims increasing government expenditure increases output and growth.

In terms of government revenue, a 1% increase in government revenues increases output by 0.31%, while a 1% decrease causes a 0.44% decrease in output. The asymmetry test also shows that positive and negative shocks have an asymmetric effect on output. These results support the expansionary fiscal contraction hypothesis which states that increase in tax revenues, and realization of a decrease in interest rates give the cue of a stable economic outlook by ensuring the budget balance and increases positive expectations which finally affect growth and output positively by increasing consumption and investment expenditures. Moreover, in terms of negative shock, Gale and Samwick (2016) stated that unless there is a decrease in government expenditures with tax cuts, the increase in the budget deficit will have a negative effect on savings and interest rates in the long run, and its effect on output may also be negative. Our results also support this view.

In terms of monetary policy shocks, a 1% increase in money supply increases output by 0.32% in the long run, it is seen that the effect of money on output is not neutral in the long run as contrary to what the Classical claim. Negative shock's coefficient is not statistically significant and Wald test show that money supply's long run effects on output is symmetric.

While the effect of the increase in interest rates is not statistically significant, it is seen that a 1% decrease in interest causes an increase of 0.44% on output, and the Wald test proves that the effect of shocks is asymmetric. Therefore, contrary to the McKinnon (1973) and Shaw (1973) thesis which claims that low interest rates will cause a decrease in savings and this means a decrease in loanable funds, which means that negative interest rate shocks will cause a decrease in investments and slow down growth, the results confirms the Keynesian thesis that states via transmission mechanism of money, low level of interest rates stimulates economic activity and increase output.

Among the other variables in the model, a 1% increase in producer prices reduces output by 0.33%, while a 1% decrease causes a 2.09% decrease. Since a positive shock in producer prices will mean an increase in costs, findings in terms of positive shock support expected result. On the other hand, a negative shock to producer prices may also result from cost reductions, as well as indicative of a deflationary environment that heralds a recession, and in this case, a positive effect on production may not occur. For example, the decreases in oil prices, which have a large share in producer costs, may herald a global recession by showing that the

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demand for oil and energy has decreased, despite the decrease in producer costs. The fact that the countries are faced with recession may cause a decrease in production by shrinking the foreign trade market.

Finally, a 1% decrease in the real effective exchange rate (depreciation of the domestic currency) causes output to contract by 0.19% and a 1% increase in unemployment causes a 0.35% decrease in output. Decrease in output due to the depreciation of the domestic currency is an expected result in this country, whose industry is dependent on imported inputs and intermediate goods, and where the private sector has a high foreign loan debt ratio.

The diagnostic test results show that there is no autocorrelation problem and model-building error in the model, and the error terms are normally distributed. Since it seems that there may be a problem of heteroschodasticity at the 5% significance level in the model, estimation was carried out with using the White estimator. Since the results of CUSUM and CUSUMQ stability tests are within the limits of 5% significance level for both tests, the coefficients in the analysis are interpreted as stable. The graphs of the tests are given below:

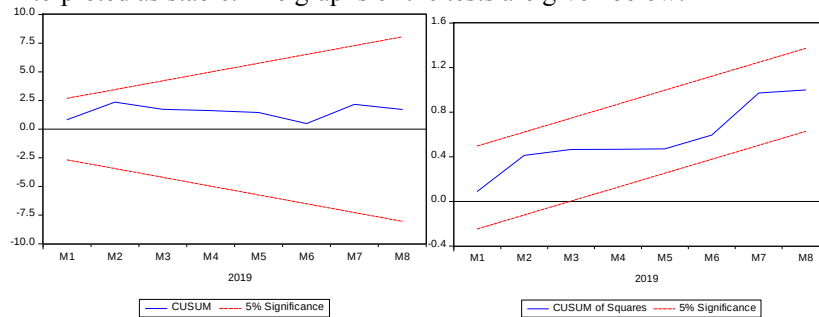


Figure 2. CUSUM-CUSUMQ graphs

Lastly, the cumulative multiplier effects are derived to see better asymmetric effects. These multipliers show the dynamic cumulative responses of the dependent variable after a negative or positive unit shock in each of the explanatory variables and the adjustment process to the new long-run equilibrium. Continuous black lines show the dynamic cumulative response at the output against one unit of positive shock in the independent variables, and the black dashed lines show the cumulative response at the output against one unit of negative shock in the independent variables. The asymmetry curve (dashed thick red line) reflects the difference between positive and negative shocks of explanatory variable. The dashed thin red lines above and below the asymmetry curve represent the 95% confidence interval. If the zero line is between these dashed lower and upper bands, the asymmetric effects of the questioned explanatory variable are not significant at the 5% significance level (Shahzad et al., 2017, p.226).

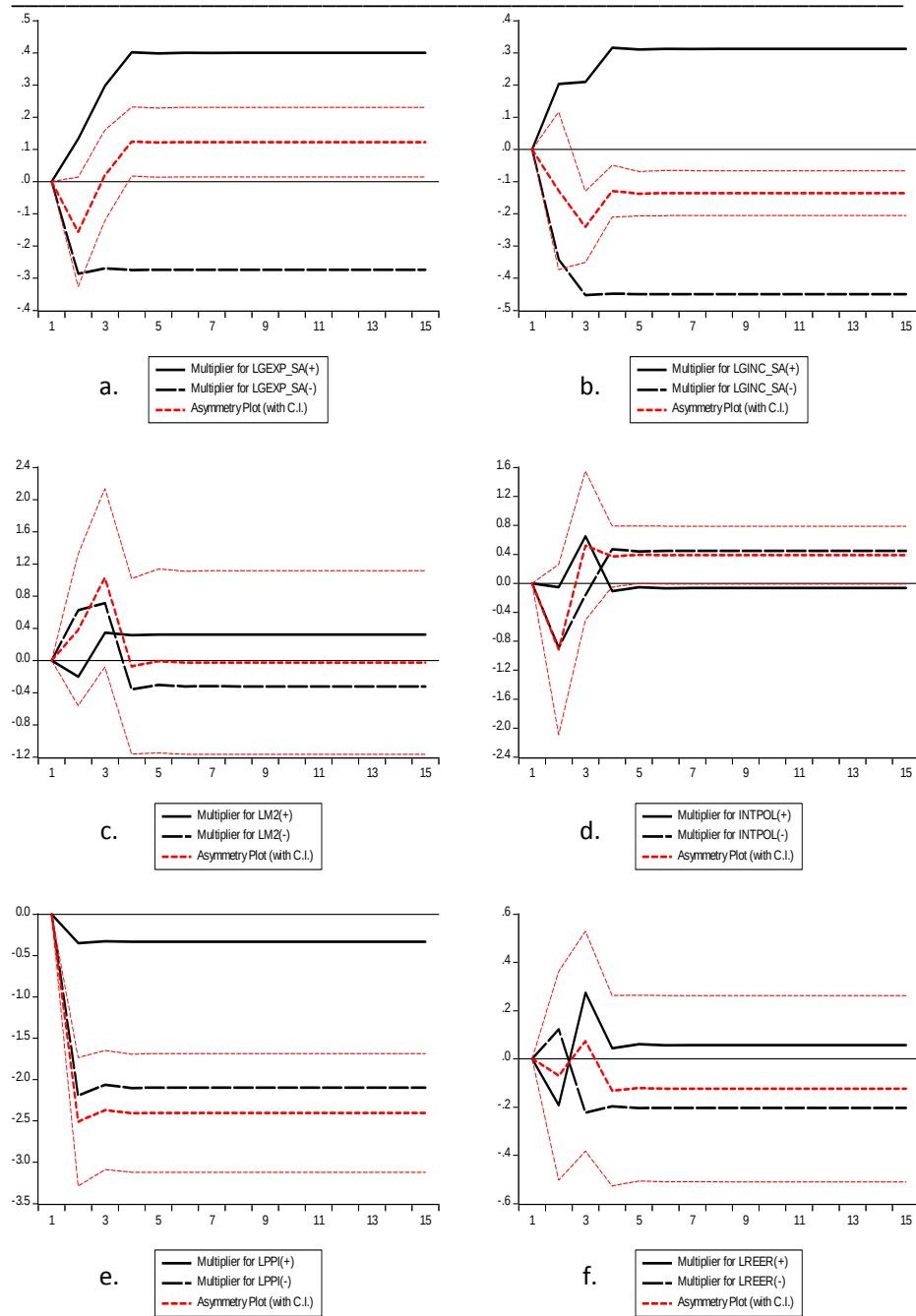


Figure 3. Dynamic multipliers for the output model

Figure 3.a shows the asymmetric responses in output in the face of a unit positive and negative shock in government expenditures and the dynamic convergence process to the long-run equilibrium. Accordingly, while negative shocks are more effective on output in the short run, positive shocks are more effective in the long run, that is, contractionary policies have a greater impact on output in the short run, while expansionary policies have a greater impact on output in the long run.

Figure 3.b, which shows the adjustments in output against one unit of positive and negative shocks in government revenues, reveals that output responds asymmetrically and non-linearly to positive and negative shocks in government revenues. The effect of negative government revenue shock on output is 2 times more dominant in the short run and 1.5 times more dominant in the long run than the positive government revenue shock. It is also understood from the confidence interval that the asymmetric effects are statistically significant in the long run.

According to the dynamic multiplier graph which shows the effect of money supply shocks on output (Figure 3.c), negative money supply shocks have a positive effect on output in the short term, while this effect turns negative in the long term. Although the asymmetric effect of shocks is evident in the short term, since the asymmetry line is above zero on the horizontal axis in the long term, one of the shocks is not dominant over the other, that is, the effect of positive and negative shocks on output in the long term is symmetrical..

Figure 3.d presents dynamic multiplier plot for the interest rate and shows that negative shocks are more effective on output in the both short and long run. In the long run, the cumulative response of output to one unit of positive interest rate shock stabilizes at -0.07 units after the eighth period, while its response to one unit of negative interest rate shock stabilizes at 0.45 units after the sixth period.

Figure 3.e, which is a multiplier graph for prices, shows that positive and negative shocks in producer prices have a reducing effect on output in both the short and long term, and the negative shock is more dominant. The long-run equilibrium is reached from the third period.

Finally, Figure 3.f shows that the effect of a positive shock in the real effective exchange rate on output is negative in the short run but positive in the long run, while the effect of a negative shock is positive in the short run but negative in the long run, and the effect of the negative shock is more dominant than the positive shock. However, since the confidence interval covers the zero line, the asymmetric effect seems statistically insignificant at the 5% significance level.

5. Conclusion

In this study, it is aimed to compare the efficiency of monetary and fiscal policy as well as to compare the expansionary-contractionary policy by investigating the asymmetric effects of monetary and fiscal policies with positive-negative shock asymmetry. NARDL model findings showed that monetary and fiscal policies have asymmetric effects on output in the period discussed in Turkey.

It is found that output level responds more strongly to negative shocks in government revenues, while it responds more strongly to positive shocks in government expenditures. In terms of government expenditures, this result proves that expansionary policies do not cause crowding out effect in the sample country. In terms of the effects of fiscal policy, similar results were obtained with Gogas and Pragidis (2014). On the other hand, expansionary effects of money supply and interest rate variables on output are statistically significant while contractionary shocks are not statistically significant. This finding is also similar with Yılcı et al. (2016) and Yamak and Tanrıöver's (2012) findings. The reason for this finding, which was obtained in the opposite direction of the asymmetric theory, may be due to reasons such as the optimistic expectations in the expansionary period being higher than the pessimistic expectations in the contractionary period, the decline in forward-looking inflationary expectations, the increase in the expected returns in securities, and the hedonic and compulsive consumption behaviors of consumers. Hedonic and compulsive consumption approach, which started especially in the West in the 1980s and has spread to developed and developing countries, can be considered as the main reason why the expansionary policies are effective while the contractionary policies do not have the expected effect. Moreover, as Yılcı et al. (2016) expressed, another reason of the effectiveness of expansionary monetary policies may stem from that wages are rigid on the upside and flexible on the downside in the sample country, which currently has a high unemployment rate. In summary, obtained findings show that both fiscal and monetary policy are effective in fighting with the recession and stimulating economic activity, and the interest rate, one of the monetary policy tools, is the most effective policy tool in stimulating economic activity.

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