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Revisiting the Exchange Rate Pass-Through in Turkey Economy: Evidence from Structural VAR Model

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Abstract

The purpose of this article is to examine the pass-through of exchange rate fluctuations on the domestic price level in Turkey. To this effect, the interaction between exchange rate fluctuations, producer price index, and the consumer price index was analyzed using the SVAR model. The degree of exchange rate pass-through was examined with the help of cumulative ERPT elasticities based on impulse response functions. Besides, the monetary policy interest rate variable is also included in the model to make inferences about the CBRT's policy stance against the exchange rate and price fluctuations. Study findings reveal that exchange rate pass-through is incomplete in Turkey, however, there is a high degree of pass-through of exchange rate fluctuations to producer prices than there is to consumer prices. Study results also point that the CBRT's policy interest rate is not an important determinant of the exchange rate and price levels. However, Central bank policies with stable and reliable commitments are recommended.

Key words: Consumer Prices, Producer Prices, Pass-Through Elasticity, Policy Rate, Exchange Rate Fluctuations

JEL Code: C32, E31, F31

1. Introduction

Exchange rate pass-through (ERPT), defined as the effect of exchange rate fluctuations on domestic prices, is particularly important for the economic performance of import-dependent developing countries. Consequently, the degree and channels of exchange rate pass-through become relevant issues in determining the optimal exchange rate regime and the choice of appropriate monetary policy (Campa and Goldberg 2005). These contexts can be put forward as the factors that

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affect the channels of exchange rate pass-through to domestic prices and the degree of pass-through.

The transition of exchange rate fluctuation effects to domestic prices occurs directly or indirectly. Exchange rate fluctuations directly affect the overall level of domestic prices by causing fluctuations in prices of imported intermediate and final goods expressed in local currency (Billmeier and Bonato 2004, Jiang and Kim 2013). Additionally, the imported goods pricing strategy is identified as an important factor that directly affects pass-through. Exchange rate movements will not be reflected in domestic prices if goods are priced in domestic currency. Contrarily, where pricing is done in the producer currency, the effect of exchange rate movements directly be reflected in domestic prices (Jimborean 2013). The fact that imported goods become relatively more expensive causes some changes in the demand structure. With a shift in spending habits, the increase in demand for domestic goods and services results in higher domestic prices. Trade flows and changes in demand structure reveal the indirect effect of exchange rate fluctuations on domestic prices (Kim et al. 2020). However, rather than the channel through which exchange rate fluctuations affect domestic prices, the magnitude of the aforementioned effect and policy interaction is remarkable. The available empirical literature on the transition of exchange rate fluctuations to domestic prices has also focused on the degree of pass-through and the factors that affect the degree of pass-through.

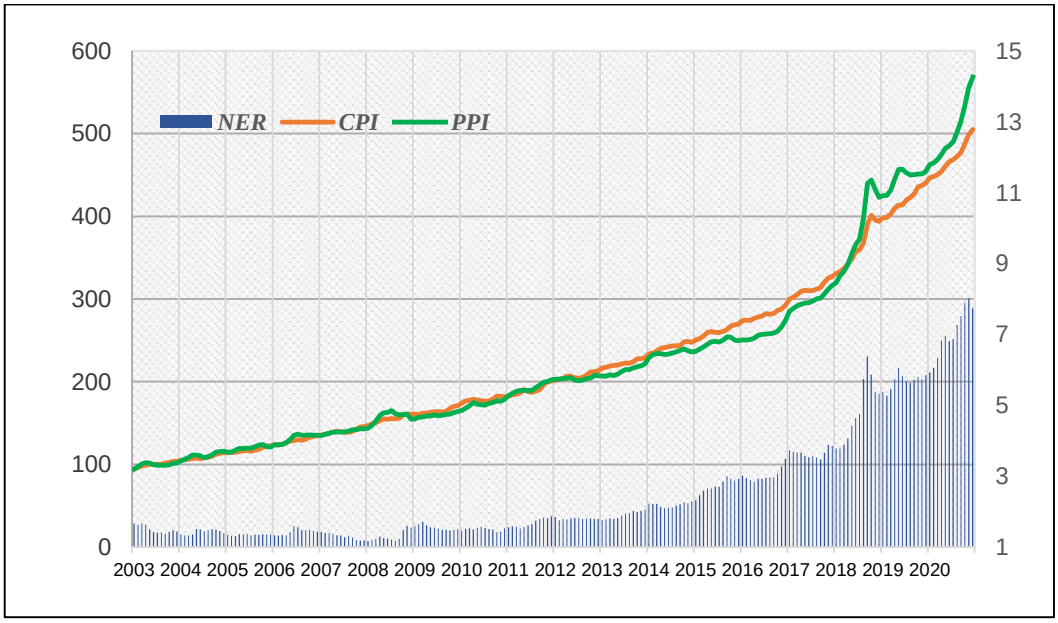
A 1% change in import prices due to a 1% change in nominal exchange rate fluctuations means full pass-through, while a change in import prices less than 1% means incomplete or partial pass-through (Kurtović et al. 2018). Partial pass-through of exchange rate fluctuations to domestic prices is supported by several studies in extant literatüre (Campa and Goldberg 2005, Jiang and Kim 2013, Amoah and Aziakpono 2018, Anh et al. 2018, Kurtović et al. 2018, Gritli 2021). Nevertheless, there is no consensus in the literature on macroeconomic factors that determine the degree of ERPT. Available empirical literature documents the level of inflation, exchange rate volatility, the state of a country's development, the central bank's exchange rate and inflation policies, and combinations of foreign traded goods as the main factors affecting the degree of ERPT.

A study by Taylor (2000), demonstrates that there is a positive relationship between the inflation rate and the continuity of inflation. Also, low inflation results in a low tendency of ERPT. Several studies in extant literature such as Choudhri & Hakura (2006); Ben Cheikh (2011); Ghosh (2013); Shintani, et al., (2013) support the hypothesis that there is a positive relationship between inflation and the degree of ERPT. Findings of some other studies that reveal that the level and stability of inflation are an important determinant of the degree of ERPT also emphasized that monetary policy, exchange rate regime, and reliable central bank policies are important for a low degree of ERPT (Gagnon and Ihrig 2004, Jiménez-Rodríguez and Morales-Zumaquero 2016, Ha et al. 2020). In a related study, Choudhri & Hakura (2006) stated that inflation dominates other macroeconomic factors that

affect pass-through. On the other hand, Aleem & Lahiani (2014), demonstrated the existence of a nonlinear relationship in which the ERPT is significant above the threshold value of inflation.

Another factor that most studies on ERPT focus on is exchange rate volatility (Campa and Goldberg 2005, Barhoumi 2006, Ozkan and Erden 2015, Miyajima 2020). Campa & Goldberg (2005), stated in their study that macroeconomic variables play a small role in the evolution of transition elasticities. They argued that changes in transition elasticities of countries are significantly affected by changes in import package composition. Moreover, economies with high exchange rate volatility tend to have higher transition flexibility. In addition to all these, it is not surprising that exchange rate pass-through is affected by the policies implemented by a country's central bank. While some studies show that inflation targeting policy is effective for lower ERPT levels (Kara and Öğünç 2008, López-Villavicencio and Pourroy 2019), some other studies show that exchange rate control and fixed exchange rate system are not good policies for mitigating ERPT (Beirne & Bijsterbosch, 2011; Billmeier & Bonato, 2004). Another issue emphasized in the review of exchange rate pass-through is the country's economic situation. A country's economic situation determines whether the ERPT decreases over time (McCarthy 2007, Mishkin 2008, Kurtović et al. 2018). Although many studies show that industrialized countries have lower transition flexibility compared to other countries, there is no consensus on whether flexibility decreases over time.

Figure 1. Nominal exchange rate (NER), Consumer price index (CPI), and Producer price index (PPI) in Turkey, 2003 to 2020 (monthly average).



Source: Central Bank of the Republic of Turkey

This study is motivated by fluctuations in the exchange rate and the level of inflation experienced in recent times in Turkey as well as the Central Bank of the

Republic of Turkey (CBRT) policy stance against this pertinent issue. As presented in Figure 1 in the last recent years, the exchange rate, consumer price index, and producer price index in Turkey have experienced a significant uptrend. Again, it can be observed that the increasing trend and direction of these variables are parallel to each other. Also, several previous studies conducted on exchange rate movements in the context of Turkey empirically confirm that fluctuations in the exchange rate are one of the most important causes of fluctuations in the domestic price (Dereli 2018, Alkan and Dağıdır 2020, Kotil 2020, Pierros et al. 2022). Some researches demonstrate that the commencement of an inflation-targeting regime in Turkey in the year 2002 resulted in a decreasing trend in the degree of ERPT (Kara and Öğünç 2008, Yüncüler 2011, Dedeoğlu and Kaya 2014). However, whether the central bank takes into account the degree of ERPT sufficiently in its inflation forecasts and policy stance is a questionable issue. Notably, in the first inflation report presented by the CBRT for 2020, the year-end inflation level for 2020 was estimated to be 8.2% (CBRT, 2020a). In the subsequent inflation report that followed, the year-end inflation forecast was updated to 7.4% after taking into consideration changing macroeconomic conditions (CBRT, 2020b). However, the Dollar-Turkish Lira exchange rate increased by 15% between the central bank's first and second report on inflation. However, the Dollar-Turkish Lira exchange rate increased by 15% between the central bank's first and second report on inflation. Consequently, the CBRT 2020 inflation forecast was updated to 8.9% in the third inflation report and 13.5% in the fourth inflation report (CBRT, 2020c; CBRT, 2020d). The observed inflation rate for 2020 was 14.60%. This situation is not different from experiences in the 2019 fiscal year. This and many other similar experiences in recent years renders it necessary to reconsider whether the pass-through of macroeconomic realities to inflation rates as forecasted in the policy stance of the CBRT was correctly evaluated.

This study aims to re-evaluate the pass-through of exchange rate fluctuations to inflation in Turkey. Thus, it is expected that the current degree of ERPT will be reintroduced and necessary policy recommendations being made accordingly. The study also intends to examine the empirically tested hypotheses documented in the economic literature in relation to ERPT within the context of Turkey.

2. Methodology and Data

In our review of previous studies on the subject matter, we found studies by Beirne & Bijsterbosch (2011), Charfi & Kadria (2016), Liu & Chen (2017), McCarthy (2000), Sims (1986), and Bernanke (1986) that discussed the disadvantages of the Vector Autoregression (VAR) model due to the associated non-theoretical constraints. To circumvent this limitation, the Structural Vector Autoregression (SVAR) model developed to eliminate the limitations associated with VAR was employed in these studies. VAR models are mostly preferred in testing the economic relations of variables in simultaneous equation models that do not require an internal-external distinction between variables and therefore avoid

problems associated with variable specifications (Gujarati 2011). Also, the Cholesky method used in the decomposition of error in the standard VAR model is sensitive to the order of variables in the covariance matrix. This has raised some concerns in the context of modeling economic theory (Brooks 2008, Enders 2014). In the SVAR model, it is preferable to put constraints based on an economic theory into the simultaneous coefficient matrix rather than decomposing the errors with the Cholesky method. This is illustrated in the subsequent paragraphs. An SVAR model can be expressed as follows;

$$Av_t = A_0 + A_1(L)v_{t-1} + \varepsilon_t \quad (1)$$

where, A, is the structural coefficient matrix; v_t, is the intrinsic variable vector; A_0, is the constant term vector; $A_1(L)$, is a coefficient matrix with lag length $L(nxn)$; v_{t-1}, lagged intrinsic variable vector and ε_t, structural shocks vector.

However, in instances where the coefficients that capture simultaneous effect in the equation take values other than zero, the error terms will be correlated with the independent variables. In this case, it is necessary to obtain the reduced form of the SVAR model to make estimations. The reduced form of the SVAR equation is expressed after multiplying Equation (1) by A^{-1} as follows;

$$v_t = \theta + \beta(L)v_{t-1} + u_t \quad (2)$$

Here, $\theta = A^{-1}A_0$, $\beta(L) = A^{-1}A_1(L)$ and $u_t = A^{-1}\varepsilon_t$. u_t, is the shock vector in a reduced form that does not suffer from serial correlation, normally distributed, and can exhibit simultaneous relationships with each other. The relationship between structural form shocks and reduced-form shocks can be demonstrated with the following equation.

$$Au_t = \varepsilon_t \quad (3)$$

It can be inferred from Equation (3) that structural shocks are a combination of reduced-form shocks. Thus, error terms with fixed variances are distributed around the zero mean with zero autocovariance. At this point, theoretical limitations to be placed on the simultaneous coefficient matrix A again importance to get the determination of structural shocks correctly. In this study, theory-based $(n^2 - n)/2$ constraints were imposed on the simultaneous coefficient matrix with Sims (1986) iterative determination method.

In this study which investigates the pass-through of fluctuations in exchange rates in domestic price prices in Turkey, producer price index and consumer price index variables are included in the model. In addition to these, following studies on the effect of monetary policy on exchange rate pass-through and inflation levels (Billmeier and Bonato 2004, Gagnon and Ihrig 2004, Ha *et al.* 2020), the monetary policy interest rate variable was included in the model. Consequently, we plan to find out the impact of exchange rate policies of CRBT on inflation and whether the CBRT responds to the exchange rate and inflation shocks. The constraints imposed on the structural coefficient matrix in this study were done following the relevant empirical literature review. The model is shown in equation (4).

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$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 \\ a_{41} & a_{42} & a_{43} & 1 \end{bmatrix} \begin{bmatrix} u_{IR_t} \\ u_{NER_t} \\ u_{PPI_t} \\ u_{CPI_t} \end{bmatrix} = \begin{bmatrix} \varepsilon_{IR_t} \\ \varepsilon_{NER_t} \\ \varepsilon_{PPI_t} \\ \varepsilon_{CPI\,t} \end{bmatrix} \quad (4)$$

In the structural coefficient matrix, the first row shows the simultaneous response of the first variable in the model to other variables, whereas the first column shows the simultaneous effect of the shocks occurring in the first variable on the other variables. Accordingly, the effects of shocks in the monetary policy variable (IR) on other variables in the model above are non-restricted, while the effect of other variables' shocks on monetary policy is restricted. Moreover, the exchange rate variable (NER) in the model responds simultaneously only to monetary policy shocks but its simultaneous effect on price index variables in the model is non-restricted. The simultaneous response of producer price index (PPI) to monetary policy and exchange rate shocks and the simultaneous response of consumer price index (CPI) to shocks from other variables in the model are non-restricted.

Structurally resolved impulse-response functions (SIRF) were estimated with the established SVAR model. Based on the results of impulse-response functions, inferences are made about the effect of exchange rate shocks on domestic prices. Consequently, based on the estimated SIRF, the magnitude of the pass-through of exchange rate fluctuations to domestic prices (degree of ERPT) and the trend of the pass-through over time is intended to be determined. Concerning this objective, following previous relevant studies, the cumulative ERPT elasticities were calculated using the equation specified below (Jiang and Kim 2013, Vo *et al.* 2019).

$$PT_{t,t+j} = \sum_{j=1}^{t} \hat{P}_{t,t+j} \Big/ \sum_{j=1}^{t} \hat{E}_{t,t+j} \quad (5)$$

Here PT ; represents the cumulative ERPT flexibility between period t and period $t+j$. The formula $\sum_{j=1}^{t} \hat{P}_{t,t+j}$ represents the response of price levels to shocks in the exchange rate and the cumulative change between periods t and $t+j$. $\sum_{j=1}^{t} \hat{E}_{t,t+j}$ also represents the cumulative change of the response of the exchange rate to its shocks for the same periods.

In this study that investigates the effect of exchange rate on inflation in the context of Turkey, data points were determined monthly for the study period. The sample period for the study is 2011M01-2020M11. The Borsa Istanbul (BIST) interbank overnight repo rate series is used to represent the monetary policy variable in the model. The variable is symbolized as IR in the estimated model. The nominal dollar rate is chosen as a proxy for the exchange rate variable. Producer

prices are represented with the producer price index in the model and data on the consumer price index is used to represent consumer prices. These variables are symbolized in the model as NER, PPI, and CPI, respectively. Apart from the monetary policy interest rate variable, natural logarithm transformations are taken for all other variables included in the estimated model. The dataset on the variables of the study was compiled from the CBRT data distribution system.

3. Empirical Results

It is very important for the series in time-series data used in analyzing the relationship between economic variables to meet the condition of stationarity. Thus, the series is said to contain unit root when the condition of stationarity is violated. This intention leads to a spurious regression problem, consequently, the results of the analysis become misleading. The series may contain unit root in their level values. In such cases, stationarity can be induced by taking the difference values of the series. In our analysis of the effect of exchange rate fluctuations on domestic prices, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests are conducted to determine whether the variables included in the estimated model meet the condition of stationarity or not. The test results are summarized in Table 1.

In both the ADF and PP unit root tests, the null hypothesis that the series contain unit root was tested against the alternative hypothesis that the series does not contain a unit root. Following tests results from models with a constant term and a constant term and a trend, the null hypothesis could not be rejected for all variables. Therefore, all variables were not stationary at the level. Further tests were conducted with models that included constant and constant and trend on the first difference values of the variables. The null hypothesis could be rejected for all variables and the variables were stationary in the first differences. Consequently, all variables were included in the model by taking their first difference values.

Table 1. Summary of the results from unit-root tests

Variable		ADF Unit Root Test		PP Unit Root Test	
		Intercept	*Trend&Intercept*	*Intercept*	*Trend&Intercept*
IR	*Level*	-2.102283	-2.713040	-1.925066	-2.349517
NER		0.796200	-2.122337	0.817081	-2.238211
PPI		1.938162	0.9629	1.879446	-0.717337
CPI		2.647222	-0.673441	2.326881	-0.610045
IR	*First difference*	-5.828562*	-5.794892*	-5.788088*	-5.753561*
NER		-8.180903*	-8.290316*	-7.197817*	-7.179175*
PPI		-6.610451*	-7.087507*	-5.901498*	-5.826563*
CPI		-6.085222*	-6.837830*	-8.077267*	-8.330405*

Note: * significant at 5% level.

The number of lags to be included in the SVAR model established to analyze the pass-through of exchange rate fluctuations to inflation was specified to be 4 following the Akaike Information Criterion (AIC), Final Prediction Error (FPE),

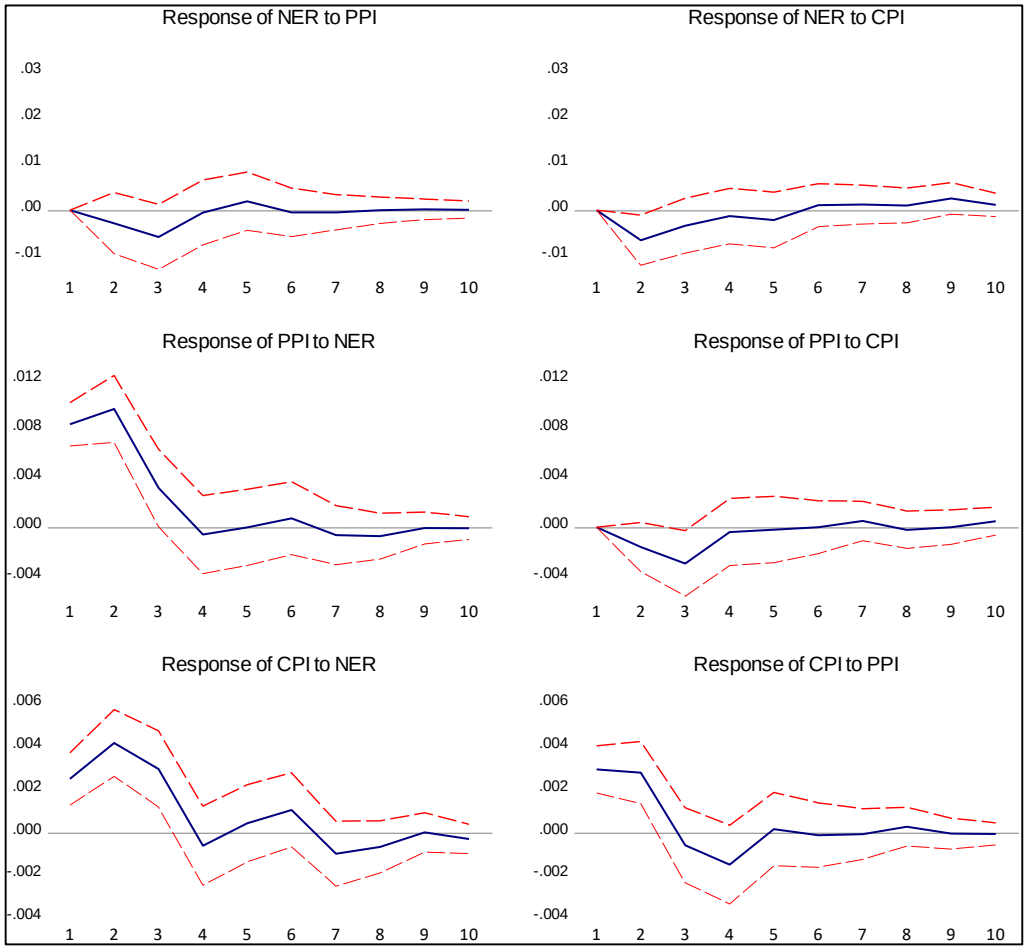
and the Likelihood Ratio (LR) statistics. The inverse roots of the characteristic polynomial of the model are in the unit circle and accordingly, the model is chosen to be stable. Heteroscedasticity and autocorrelation were checked with White and LM tests and it was concluded that the established model does not suffer from these assumptions.

Table 2. Estimation of Exchange Rate Pass-Through Elasticities

Months	PPI	CPI
1	0.277	0.083
3	0.516	0.235
6	0.624	0.310
9	0.673	0.302
12	0.654	0.295
15	0.646	0.289
18	0,653	0.290
21	0,652	0.290
24	0,651	0.290

In table 2, cumulative ERPT flexibilities obtained from the output of Equation (5) are presented. These results can be looked at in several different contexts. First of all, as seen frequently in the literature, the pass-through of the exchange rate to domestic prices is partial (ERPT elasticities <1) for both PPI and CPI. Accordingly, it can be put forward that the reflection of the fluctuations in the exchange rate on domestic prices for the periods considered is smaller than the fluctuations in the exchange rate. Second, it is observed that the ERPT elasticity was highest for 9 months for PPI and 6 months for CPI. Results also indicate that ERPT is minimal in the short term compared to the medium and long term. The aforementioned finding is similar to the theoretical reality that the reflection of fluctuations in the exchange rate on domestic prices will be very minimal in the short term. This arises from factors such as menu cost theory, price controls, and price rigidity arising from contracts. The third context in which the results presented in Table 2 is evaluated is the realization that the flexibility calculated for PPI is greater than the flexibility calculated for CPI throughout the sample period. This can be justified by situations where the PPI represents prices of imported goods or import levels of intermediate goods and raw material in a price chain where there is no price index for imported products.

Figure 2. Impulse-response functions: the relationship between exchange rate and domestic prices



To obtain an unbiased interpretation of results from the VAR models, impulse response functions and variance decomposition results are preferred instead of estimated variable coefficients. The impulse-response functions exhibit the response of other variables to a unit standard deviation shock that will occur in the error terms of the stationary endogenous variables included in the VAR model (Sevüktekin and Çınar, 2017). Shocks from standard deviation are used instead of unit shocks in considering the differences in the units of measurement of the variables in impulse response functions. Variance decomposition is used to determine how much of the changes in the variable are caused by their shocks and how much of such changes are caused by shocks from other variables (Brooks, 2008: 290-292). The impulse-response functions determine how other variables respond to shocks occurring in the endogenous variables whereas the source of shocks occurring in the variable is decomposed as a percentage by variance decomposition.

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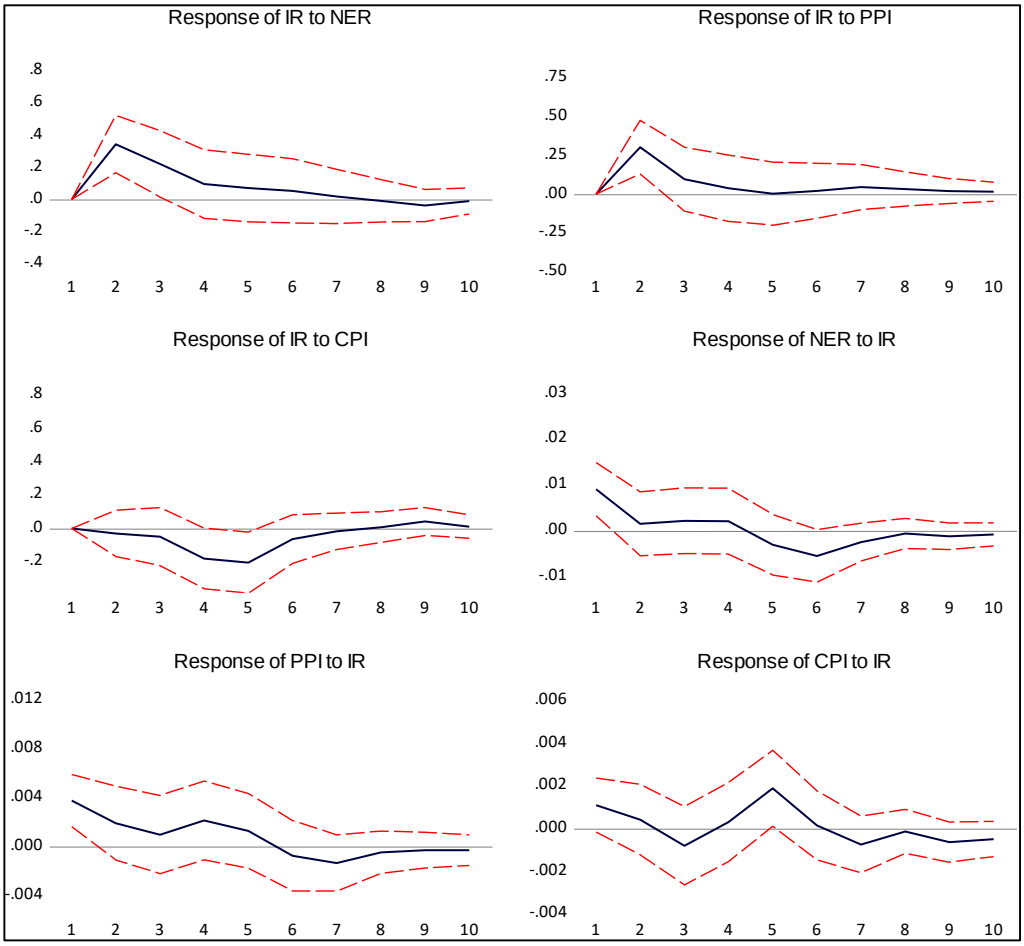
The impulse response functions of the relationship between the nominal exchange rate and domestic prices are presented in Figure 2. The response of the nominal exchange rate to shocks in domestic price is presented in the first row. Then, shocks of the nominal exchange rate and consumer price index and, the response of the consumer price index to the shocks of the nominal exchange rate and producer price index is in the third row. According to the findings, PPI reacts strongly and positively to NER shocks in the first four periods. PPI's response to CPI shocks was found to be statistically insignificant. It is found that the CPI responds strongly and positively to a standard deviation shock in the exchange rate in the first four periods. CPI's response to PPI shocks is strong and positive in the first two periods. After these periods, shocks decreased to zero and became statistically insignificant.

Figure 3. Impulse-response functions: the relationship among monetary policy, exchange rate and domestic prices



The monetary policy interest rate variable is included in the model to investigate the effect of the CBRT's monetary policy stance on the exchange rate and domestic prices. Figure 3 presents the estimated impulse response functions for the relationship among monetary policy, exchange rate, and domestic prices.

Structural Impulse Response Function (SIRF) results indicate that the monetary policy rate response to a positive exchange rate shock is statistically significant and positive in the first three periods. This finding is not surprising from reality since CBRT responds to exchange rate fluctuations with increment in interest rate. On the other hand, the exchange rate exhibits a weak but significant response to shocks in monetary, especially in the first period. Both PPI and CPI react positively to shocks from monetary policy. This finding corroborates the view that the policy rate affects inflation level. Moreover, study findings provide evidence that CBRT's response to price fluctuations is insignificant for CPI, however, positive for PPI. These reactions exhibits and increasing trend until the second period but then disappeared in the third period. This reveals that CBRT, through its policy interest, is not significantly involved in domestic price fluctuations.

Table 3. Results of variance decomposition

Variance decomposition of PPI					
Period	*S.E.*	*IR*	*NER*	*PPI*	*CPI*
1	0.011706	10.28001	51.15240	38.56759	0.000000
2	0.015647	7.226692	66.41698	25.28600	1.070336
3	0.016271	7.029924	65.26680	23.41802	4.285252
4	0.016464	8.524142	63.87989	23.35262	4.243343
5	0.016526	9.047783	63.39858	23.32834	4.225295
6	0.016561	9.224834	63.32307	23.24443	4.207664
7	0.016640	9.808768	62.87730	23.05539	4.258542
8	0.016665	9.862914	62.87826	22.99708	4.261750
9	0.016669	9.894139	62.85361	22.99229	4.259954
10	0.016679	9.915949	62.77749	22.96392	4.342643
Variance decomposition of CPI					
Period	*S.E.*	*IR*	*NER*	*PPI*	*CPI*
1	0.006831	2.600367	13.42642	18.65824	65.31497
2	0.008497	1.921568	32.88400	22.90591	42.28852
3	0.009425	2.296982	36.66260	19.01800	42.02241
4	0.009569	2.330135	35.97899	20.89325	40.79762
5	0.009892	5.833240	33.85263	19.57590	40.73822
6	0.009965	5.769800	34.48149	19.30322	40.44550
7	0.010111	6.156719	34.44909	18.75673	40.63746
8	0.010142	6.136444	34.67230	18.71351	40.47775
9	0.010163	6.508635	34.53378	18.64125	40.31634
10	0.010198	6.696539	34.38090	18.51530	40.40726

The results of the variance decomposition obtained from the SVAR model used to test the effect of exchange rate fluctuations on domestic price levels are summarized in Table 3. It can be observed from the variance decomposition output of PPI that 51% of shocks occurring in PPI in the first period and 66% in the second period are caused by shocks from NER. Approximately 64% of the shocks are due to NER in the subsequent periods. Model outputs also indicate that shocks in CPI account for approximately 4% of the shocks in PPI. According to the results of the CPI variance decomposition, shocks from NER and PPI account for 13% and 18%,

respectively, of the shocks experienced in the CPI in the first period. The share of NER shocks in CPI shocks reached 36% in the third period and thereafter started to decrease in the following periods. Additionally, 22% of the CPI shocks were explained by the PPI in the second period, however, it fell closely to 19% in the following periods.

Results from the SVAR models employed in this study to assess the transition of exchange rate fluctuations to domestic prices in the context of Turkey can be summarized in the following few points.
(a). Turkey's CPI and PPI exhibit a strong and positive response to NER shocks. This is revealed by the output from impulse response functions and variance decomposition, which is in turn confirmed by the ERPT flexibility calculated. However, no significant response was detected for NER to shocks from PPI and CPI. Additionally, a strong and positive CPI response to PPI shocks was detected.
(b). ERPT flexibility of the 24 periods considered in the context of Turkey was found to be less than 1. This means that the exchange rate pass-through is flexible or partial. Although this finding from the study is compatible with the general literature stance that ERPT is incomplete or partial to internal prices, it can be classified as being a high degree of ERPT concerning the elasticity value obtained.
(c). The ERPT flexibility for PPI is greater over the 24 periods as compared to the ERPT flexibility obtained for CPI. Again, the findings of the study indicate that ERPT elasticities for PPI and CPI exhibit an increasing trend from short-term to medium-term (from periods 1 to 6 and 9).
(d). Another aspect of the findings also demonstrates that monetary policy responded positively to exchange rate shocks and significantly for the first two periods, however, did not have a significant reaction to domestic price fluctuations. Additionally, it was found that the PPI reacted positively to a positive monetary policy shock in the first period.

4. Conclusion

It is a foreseeable reality that in countries with open market economies exchange rate fluctuations will exert different effects on various macroeconomic factors. Undoubtedly, one of the most important variables affected by exchange rate movements is the domestic price level. The economic literature is never short of discussions on ERPT: a conceptualized expression of the pass-through of movements in the exchange rate to domestic prices. The degree of pass-through, factors affecting the degree of pass-through, and its course over time are frequently discussed in the literature. This study aims to investigate ERPT for Turkey's economy. For this purpose, the SVAR model was estimated on a monthly dataset covering the period from 2011M01-2020M11.

This study is justified by the current economic outlook of Turkey and the series of debate about the country's economic status. As depicted in Figure 1, Turkey has observed a significant increase in the exchange rate in recent years. Inflation levels also increased in the same periods. Different economic perspectives

and discussions have emerged over the periods in which such changes are experienced in the country. The primary concern is whether the upward trend in the exchange rate will cause a loss of welfare. This question, of course, covers whether there is a significant pass-through of exchange rate fluctuations to domestic prices. The second is the arguments about whether the rise in inflation is due to the increase in the interest rate or the exchange rate. This question also raises the need to estimate the degree of ERPT in recent periods. The economic outlook motivated the study and therefore the necessity of including the interest rate variable in the established models. Consequently, the monetary policy interest rate, exchange rate, producer, and consumer price index are considered endogenous variables in the SVAR model. The unique feature of this study from similar studies is that by relating domestic prices directly to monetary policy interest rate and exchange rate, possible causes of shocks in price are separated.

Study findings reveal the existence of partial ERPT effect over the period considered in the context of Turkey. This result coincides with similar studies conducted for different periods and different countries (Charfi & Kadria, 2016; Doyle, 2004; Jiang & Kim, 2013; Kurtović et al., 2018; Vo et al., 2019). However, when the estimated ERPT flexibility values from the data on Turkey are compared with other similar studies in the literature, ERPT in Turkey can be classified as a high degree. Future studies on ERPT in the context of Turkey may consider whether the high degree of ERPT is a result of high exchange rate volatility (Campa and Goldberg 2005), or a high level of inflation (Taylor 2000). However, Kara & Öğünç (2008), found a contradictory result that Turkey's transition to inflation targeting regime in the 2002 fiscal year decreased the level and degree of ERPT. When studies on the importance of monetary and exchange rate policy on the degree of ERPT (Billmeier and Bonato 2004, Gagnon and Ihrig 2004, Jiménez-Rodríguez and Morales-Zumaquero 2016, Ha et al. 2020) are considered, some debate about policy mix in Turkey is required. Moreover, when studies revealing that industrialized countries will be exposed to lower ERPT (Mishkin 2008, Kurtović et al. 2018) and import-dependent countries face a higher degree of ERPT (McCarthy 2007, Jimborean 2013, Kim et al. 2020) is reviewed, questions on whether the appropriate industrialization strategy is implemented in Turkey is another issue to be discussed.

Based on the findings of this study, inflation in Turkey is affected significantly by exchange rate movements, the effect of exchange rate movements on inflation is greater than the effects from the interest rate, and policy rates are not an effective policy tool on inflation and exchange rate. We recommend, therefore, that the CBRT adopt a policy stance that will minimize exchange rate movements to achieve their objective of price stability. However, we do not suggest based on previous studies (Billmeier and Bonato 2004, Beirne and Bijsterbosch 2011, Jiang and Kim 2013) that policy stance aimed at reducing the degree of ERPT be exchange rate control or fixed exchange rate system. One of the most appropriate policy recommendations that can be put forward to reduce the degree of ERPT by evaluating the results of the study and the relevant economic literature is the CBRT structure and policies with stable and reliable commitments.

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