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TURKEY FOREIGN TRADE INTERACTION WITH CROSS EXCHANGE RATES: BENEATH THE CURRENCY WARS

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Abstract:
In recent years, due to global crisis and economic slowdown, major countries have been pushed to make economic actions. Currency wars have been debated and summoned again as before used in economic history to deal with economic slowdown by developed and emerging countries such as US, China, EU and Japan. Their actions on exchange rate policies would affect their bilateral trade balance as mentioned previous literature. Previous literatures have investigated bilateral country trade balance. This study, differs from previous ones, has investigated whether these countries' cross exchange rates have an interaction with Turkey foreign trade. Data started from 2012:01 to 2019:09 which was one of milestone of currency wars. By help of ARDL econometric model, different level of stationary series have been used in same model to understand the long run and short run relationships among variables. It seems that, in long run EU, US and China economic actions on currency policies might be affected Turkey's trade volume, externally. EUR/CNY currency has statistically insignificant results for two analyzed trade market.

Keywords:
Foreign Trade, Exchange rates, Currency wars, ARDL

1. Introduction
As many country faced, Turkey foreign trade performance has interacted in many aspect of global and local economic and political issues. Compared to previous years, from 2002 to 2012, in recent years Turkey's export figures slightly have increased and import figures have steadily continued on horizontal zone. Turkey's potential growth lead this tremendous performance in previous year however global and political matters weighted more in recent. Looking at the aspect of recent global matters, it seems that the global economic slowdown and trade balances getting bigger between developed and emerging countries. As known -political too- a real devaluation in the domestic currency may push economic growth and eliminating the deficit in the trade balance, (Halıcıoğlu, 2008). The trade and currency wars have come up among these countries, especially US, China, Japan, EU. Instead of Japan, three of these big economies are Turkey's leading trade partners. Turkey under conditions of the global economy, both exports and imports through the movement of goods, as well as the rest of the world is linked to the direction of capital flows. Many previous literatures have investigated that Turkey's total foreign trade deficit effected or not effected by real effective exchange rates. Other literatures have said that bilateral trade of two countries has been affected by opposed real exchange rates of these two ones. This study aimed to observe further. It has inquired that whether Turkey's regional foreign trade is affected by cross exchange rates of two countries which are major actors of currency wars, out of Turkey.
The falling demand after the global crisis has revived the discussion of competitive exchange rate policies. The weak growth in the global economy is expected to push the economies towards exchange wars in order to compete with each other (Ertürk, 2017) . Countries that started to stagnate with the global financial crisis blamed each other's external deficits and surpluses in order to get rid of the recession and mutually opposed each other. These leading countries have been the US, EU, Japan and China. The reason why the exchange war took place among these four actors is that they are both the world's largest economies and each other's biggest foreign trade partners (Bircan, 2016)

2012 was one of milestone of currency wars because of economic activities and changing leaders of major countries. Thus data has started from 2012 year. Turkey's EU Export market and China import market have been analyzed. EU is the top export market of Turkey, last seven years average is 45% of total export (Table 1). China is second goods import market; it has 10% contribute in Turkey's import on average. These data has been used as dependent variables. Real cross exchange rates are independent variables in models. By help of ARDL econometric model, different level of stationary series have been used in same model to understand the long run and short run relationships among variables. In long run, bilateral exchange rates of turkey and target trade country have an interaction with trade. Beside, cross exchange rates included USD, also has an interaction with trade volume. EUR/CNY currency is insignificant for two investigated trade market, since EU has not been a leading actor on currency war as respect of US and China.

Table 1: Between 2012-2019 Monthly Foreign Trade of Turkey on Average (USD)

Total Export	Export to EU	Total Import	Import from China
12,891,626	5,839,272	18,725,927	1,919,567

2. Theory and Literature

The concept of "Currency War" is not a new concept. In order to explain the similar situation in the 1930s, economist Robinson (1937) described the current policies as "beggar-thy-neighbor" concept, is said to have been inspired by a card game. According to this game, if there is a winner, there is surely a loser. "Beggar-thy-neighbor" policy in economic terms; It is a policy implemented by a country against the countries in which it implies import restrictions and exchange rate policies in order to solve the problems such as inflation, balance of payments and unemployment in the economy. The main argument of this policy is the devaluation of domestic currency against foreign currency. Domestic currency, whose value is depreciated against foreign currencies, makes exports cheaper and imports expensive. In this case, while exports increase, imports decrease. Thus, there is an increase in the employment rate and income of the country implementing this policy. As a result, while the policy implementation is positive for a country, it harms other countries. Because the devaluation of the country's value of money as a result of the decline in exports of other countries. In this case, since other countries start to buy the goods that they have previously produced, at a cheaper from the country devaluated its domestic currency, they stop producing them itself and their foreign trade gives a deficit. The fact that the devaluation gives an improvement in the current trade balance depends on the Marshall-Lerner condition, that is, the sum of the elastic demand of domestic demand (M) and the elastic demand of export goods (X) are greater than one ($M + X \geq 1$). The contributions of Marshall (1923) and Lerner (1944) in elasticity approach has become popular in the literature and the commonly known Marshall-Lerner condition.

Although a close relationship between exchange rate and import-export volume has been proved in the literature readings, both theoretically and practically, the direction of causality between exchange rates and terms of trade remains controversial in the literature (Doğan & Kurt, 2016) .The economic literature states that an increase in the exchange rate makes the purchase of export goods cheaper and makes the price of imported goods more expensive. In this case, it is argued that an increase in foreign exchange rates will increase exports, while on the other hand, it will cause a decrease in imports and as a result, the trade balance will be positively affected. Here are some studies below investigating currency and trade relationships. This study differs from them that it has also investigated the third countries' cross exchange rates in the models whether they would affect the its trade, too or not.

Eren (2019) analyzed real exchange rate effects (RER) on bilateral trade in particular Turkey, China, Russia and Germany over 2004:01 to 2018:11 period monthly. Long and short term analyzes were performed by ARDL method. As a result of long-term analysis; the increase in the Turkey's real exchange rate affected the trade balance positively against China and Germany, it is determined that adversely affect the foreign trade balance that against Russia. In the short-term analysis; the increase in the real exchange rate Turkey's foreign trade balance against China and Germany still was positive, the foreign trade balance against Russia, which was found to be statistically insignificant levels. As totally, J Curve Hypothesis in the Turkey's trade balance between China, Germany and Russia were not valid.

Bozdan et al. (2018) aimed to investigate the effect of foreign exchange rates on exports and imports. The monthly data was between over 2010:01 and 2017:10. Variables that is USD/TRY was independent and Turkey export and Import data was dependent. They set up the ARDL cointegration test and perform the Granger causality analysis. It is observed that there is a long-term relationship between exchange rate and export-imports according to the ARDL cointegration test. No causality relation was found between variables according to Granger causality test.

Doğan and Kurt (2016) studied Turkey's economy for interactions of foreign exchange rates, investment goods and consumer goods empirically from period 2003:01 to 2015:10. Granger causality analysis, impact response analysis and variance decomposition methods were used in the study. As a result of the econometric analysis, a causality relationship was found between a change in exchange rates effects investment and consumption goods of imports. A foreign exchange rate change in Turkey's economy affects production and exports as an element of the cost matter. As a result, it is concluded that exchange rates affect investment and consumption goods imports.

Kızıldere et al. (2015) examined the effects of exchange rate factors particularly on the foreign trade of Turkey. Time series analyzes were used for this purpose and the series used in the study covers the years 1980 and 2010. Real exchange rates, GDP, external income and political rights were used as explanatory variables. Export and import values were taken as dependent variables. Cointegration and ECM were used to determine short and long term relationships. They concluded that impact of exchange rates does not have a significant effect on Turkey foreign trade and they observed that foreign trade structure of the Turkey transforms into exporting by increasing importing (re-exporter).

Tapşın and Karabulut (2013) have aimed to assess that whether real exchange rate in Turkey have causal relationship between the imports and exports in terms of economics. For the 1980 - 2011 years in Turkey real exchange rates (RER), Import (IMP) and Export (EXP) were studied investigating the relationships. The causality analysis developed by Toda and Yamamoto (1995) was applied to the data. As a result, there is a one-way causality relationship from import variable to export variable and from real exchange rate index to import variable.

Karaçor and Gerçeker (2012) investigated the relationship between foreign trade and Turkey in the real exchange rate. They applied VAR Model, Cointegration Analysis, ECM methods on these two dates which were examined empirically with monthly data covering 2003:01 - 2010:12 period. According to the findings, the existence of a cointegration relationship between real exchange rates and foreign trade volume was determined. On the other hand, while there is a causality relationship from real exchange rates to foreign trade volume in both short and long term, it was determined that there is a causality in foreign trade volume to exchange rates only in the short term.

Yazıcı and Islam (2011) observed long-run and short-run impact of real exchange rate fluctuates on the trade balance of Turkey with 15 European Union (EU) countries. They established the bounds testing approach to the cointegration by using the quarterly data for 1982:Q1 to 2001:Q3 period. They found that the exchange rate has no significant effect on the trade balance of Turkey with EU (15) whilst domestic income has significant negative effect on it.

Saatçioğlu and Karaca (2010) studied the dollar-euro parity how impact of the Turkey's exports within the quarterly data from 2002 - 2010 years. They used the model to find the long-term relationship between parity and exports, and the ECM to find the short-term relationship. They have concluded that the change in parity affect Turkey's exports in the short term and long term as well.

Halıcıoğlu (2008) has investigated the J-curve phenomenon of an empirical application for Turkey data. J-curve phenomenon explains that the devaluation leads the foreign trade deficit to increase in the short term and in the long term that occurs to reduce. Also he set up the direction of granger causality between reel effective exchange rates (REER) and trade balance (TB). The data was selected over beginning of the 1980 and end of the 2005 quarterly period. Turkey's trade balance was dependent variable and REER was independent. He established ARDL model for cointegration long run relationship and used ECM model for short run term. It was found that only one long run relationship existed from result of bound tests of ARDL model which the TB is the dependent variable. In the long-run, REER is Granger cause to the trade balance, in the short-run there is a feedback relationship between the REER and trade balance.

Berüment and Dincer (2008) pointed out Turkey's economy is based on imports in dollars and exports in euro, so the risen dollar-euro parity (EUR/USD) is stated that the external terms of trade rise and consequently improve the economy. To test this, monthly data covering the period 1985:01 to 2003:07 and the VAR model were used. They

found that a positive shock to the dollar-euro parity caused an increase in the trade balance and that relative income would increase in the long run, but that the real exchange rate would appreciate.
Bahmani-Oskooee and Alse (1994) examined the cointegration relationship between real exchange rate and foreign trade balance in a data set of 19 developed and 22 emerging countries. The existence of a cointegration relationship was found for 6 countries and the evidence supporting J-Curve was obtained for these countries. The authors argue that these results may not have long-term effects on the trade balance of devaluations for other countries.

3. Data

This study has investigated empirical data the date after the year 2012 which was an interim milestone of trade wars and so currency wars. The beginning of the exchange wars was based on Shinzo Abe's election as Prime Minister of Japan in December 2012 and saying that he would change economic policy (Pınar & Uzunoğlu, 2013). As of the spring of 2011, the US-China foreign exchange war was silent after rhetorical and political struggles between China and the United States on exchange rates. However, the key issues are still unresolved. The leadership changed in China in 2012 and the presidential elections hold in the US in the same year (Rickards, 2012). By 2011, China had US $ 950 billion in US bonds. This was a bilateral threat to the US and Chinese economy. The foreign trade of China which was the leader until 2012, was lost when it came to 2012 because the employment problem existed for China (Polat, 2015). In September of 2012, the Fed announced its third round of quantitative easing, QE3. This iteration involves the Fed buying an additional $40 billion in mortgage-backed securities each month until it sees improvement in the labor market (Yardeni Research, 2019). In 2011 and 2012, low-interest, high-volume loans provided by European banks were the basis for currency wars, too (Wlodarczyk, 2014). In light of these matters, year 2012 was an interim milestone for currency wars for US, China and EU area. In this research has investigated data over 2012:01 to most recent 2019:09 monthly period.
The fundamental idea of the Marshall-Lerner condition is that a change in the nominal exchange rate can affect the trade balance only by changing the 'real' exchange rate (Kenen, 1989, s. 298-300). Changes in real exchange rates affect various other macroeconomic variables, especially foreign trade (Bayar & Tokpunar, 2013). REER (Real Effective Exchange Rates) contains information about the relative price or cost development between countries and is therefore considered as one of the key macroeconomic indicators used to assess the competitiveness of economies (Saygılı, Saygılı, & Yılmaz, 2010). The result formed by eliminating the relative price effects in nominal effective exchange rate, is called real effective exchange rate (REER). Since the CBRT announced that it would take into account the REER based on the CPI for the exchange rate intervention, the most relevant calculation is the CPI-based calculation. In light of empirical and theoretical literature, in this study, nominal exchange rates have been converted into real exchange rate (RER) for this investigation of impact of exchange rates to trade volume. The RER calculation made in this study is the product of the nominal exchange rate of the currencies and the ratio of CPI between the two countries. The equation is $RER=eP^*/P$, where, e is the nominal exchange rate, say EUR/TRY; P^* is the average price of a good in the foreign country, EU CPI; and P is the average price of the good in domestic country, CPI of Turkey.
Major currency wars actors are big brothers of trade US and China, thus these countries exchange rate would affect to Turkey's trade. Moreover, still Turkey has made it's the most export to EU. Although top import area of Turkey is EU, import from China observed in this study, since it is second after EU and an important actor of currency wars with US. To conclude; Turkey's EU export and China import have been included as dependent variables; these data were retrieved from TUİK web site. The focused currencies in the investigation are EUR/TRY, EUR/USD, EUR/CNY, USD/CNY, EUR/CNY, CNY/TRY would be effected to Turkey's trade. Data was retrieved from tr.investing.com, Europan Statistic (Eurostat) and OECD web sites. Nominal exchange rates were converted into RER and then all data were filtered by Hodrick-Prescott Filter at level form to remove trending issues. Abbreviation and short definition of data are shown in table (2).

Table 2: Abbreviation and Definition of Variables

Abbreviation	Definition
HP_EUEXP (EUEXP)	Export to EU Countries (28), HP filtered.
HP_CHIMP (CHIMP)	Import from China, HP filtered.
HP_R_CNYTRY	CNY/TRY RER value, HP filtered.
HP_R_EURCNY	EUR/CNY RER value, HP filtered.
HP_R_EURTRY	EUR/TRY RER value, HP filtered.
HP_R_EURUSD	EUR/USD RER value, HP filtered.
HP_R_USDCNY	USD/CNY RER value, HP filtered.

4. Methodology

Cointegration tests are used to examine the long-term relationship between variables. Frequently used in the literature Engle-Granger (1987), Johansen (1988) stating that the level of cointegration tests that are found to be non-stationary two variables may be a stationary combination. These tests require the same degree of integration of variables. However, this constraint, which is a significant obstacle in practice, has been described by Peseran et al. (2001) and it is solved by ARDL approach which allows revealing the relationship between the integrated variables of different degrees. Several advantages of ARDL model are mentioned in the literature. One of these advantages is that the variables to be used in the model are stationary I(0) or stationary I(1) in the first difference does not interfere with the application of the boundary test. Another advantage of this model is that it uses the unrestricted error correction model so that it can give statistically more reliable results than classical cointegration tests. The most important feature of the error correction model is that it contains information about short and long term dynamics between variables. In order to investigate the relationship between variables first set the regression models like (1). Our regression model represents; in the first model Turkey's EU export (EUEXP) is dependent, exchange rates of EUR/TRY, EUR/USD, EUR/CNY are independent variables. In second model, import from China (CHIMP) is dependent, CNY/TRY, EUR/CNY and USD/CNY are independent variables:

$$Y_t = \alpha_t + K_t + L_t + M_t + \varepsilon_t \quad (1)$$

The boundary test reveals whether there is a long-term relationship between the variables. When the limit test is applied and the test statistic exceeds the upper critical limit, short and long term coefficients can be estimated. The error correction model (ECM) for the ARDL boundary test approach is shown in equation (2):

$$\Delta Y_t = \alpha_t + \sum_{i}^{p} \beta_1 \Delta K_{t-i} + \sum_{i}^{q} \beta_2 \Delta L_{t-i} + \sum_{i}^{r} \beta_3 \Delta M_{t-i} + \delta_1 \Delta K_{t-1} + \delta_2 \Delta K_{t-1} + \delta_3 \Delta K_{t-1} + \varepsilon_t \quad (2)$$

In the above equation, □ ,Δ,ε denote the fixed term, the difference operator and the error term, respectively. After estimating the regression equation in equation (2), the determination of a long-term relationship is performed with the wald test (statistic f). The hypotheses related to this test are as follows:

$$H_0: \delta_1 = \delta_2 = \delta_3 = 0 \ (No\ Cointegration)$$

$$H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq 0 \ (Cointegration\ exist)$$

The calculated F-statistic is compared with asymptotically derived significance levels in Peseran et al.'s (2001) studies. Davidescu (2015) has re-explained what ARDL F-test depends upon: "The asymptotic distributions of the F-statistics are non-standard under the null hypothesis of no cointegration relationship between the examined variables, irrespective of whether the variables are purely I(0) or I(1), or mutually co-integrated. The F test depends upon (i) whether variables included in the ARDL model are I(0) or I (1) , (ii) the number of regressors, and (iii) whether the ARDL model contains an intercept and/or a trend." If the calculated F-statistic is less than the lower limit "I(0)", then the null hypothesis cannot be rejected and it is concluded that there is no cointegration. Another case is that the calculated statistical value F is greater than the upper limit of critical values "I(1)". In this case, the hypothesis H0, which states that there is no long-term relationship between the variables, will be rejected and the hypothesis H1, which accepts the existence of a long-term relationship, will be accepted. if the calculated F statistics value falls between the upper and lower critical value, in other words, if it falls into the zone of instability, then no interpretation can be made as to whether there is cointegration. In such a case, it is recommended to use error terms for cointegration and to apply other cointegration tests according to the degree of stationarity of the variables. if a long-term relationship between variables is detected by the boundary test, the estimation of long-term coefficients is passed in the next step. When the equation (1) is taken into consideration, ARDL(p,q,r) model in equation (3) has been formed in order to estimate long term coefficients.

$$Y_t = \alpha_t + \sum_{i}^{p} \theta_1 K_{t-i} + \sum_{i}^{q} \theta_2 L_{t-i} + \sum_{i}^{r} \theta_3 M_{t-i} + \varepsilon_t \quad (3)$$

After determining the coefficients of the long-term relationship, the diagnostic tests of the model are examined and the suitability of the model is determined. CUSUM and CUSUMQ tests can also be used for the stability of the variables in the ARDL model. A short-term error correction model (4) can be used to determine the short-term relationships between variables.

$$\Delta Y_t = \alpha_t + \sum_{i}^{p} \lambda_1 \Delta K_{t-i} + \sum_{i}^{q} \lambda_2 \Delta L_{t-i} + \sum_{i}^{r} \lambda_3 \Delta M_{t-i} + \lambda_4 ECM_{t-1} + \varepsilon_t \quad (4)$$

In equation (4), the variable indicated by 〖ECM〗_(t-1) is the error correction term. This term refers to a lagged value of the residues of the model from which the long-term relationship between variables is obtained. The coefficient of the term ECM shows how much of an imbalance in the short term will improve in the long term. The term error correction is expected to be negative and significant.

5. Results

Stationary is a concept that expresses that the series approach a certain value over time, in other words, the series have a constant average, a constant variance and a covariance based on the level of delay. The Augmented Dickey Fuller (ADF) test is one of the most commonly used stationary tests. However, Perron (1989) found that the ADF test failed in cases of structural breakage in the data set. Therefore, in addition to ADF test, Philip-Perron (PP) tests were included in the study. Data have different levels of stationary Table (3). In the circumstances, ARDL allows the all classification of unit root of variables into pure I(1), pure I(0) or both in the same model. Eviews statistical computer program was used for calculations.

Table 3: Unit Root Statistical Test Results of Variables

(All Intercept)	**ADF**	**ADF**	**PP**	**PP**
	I(0) (level)	**I(1) (1st diff)**	**I(0) (level)**	**I(1) (1st diff)**
HP_EUEXP	-1.836932	-3.159088**	-8.740928***	-35.64191***
HP_CHIMP	-4.452864***	-10.81792***	-8.679812***	-22.7693***
HP_R_CNYTRY	-3.642371***	-8.382882***	-3.677788***	-8.334182***
HP_R_EURCNY	-2.645068*	-8.139148***	-2.780099**	-8.13444***
HP_R_EURTRY	-4.172148***	-8.461456***	-4.257071***	-11.64048***
HP_R_EURUSD	-2.660243*	-4.094289***	-2.275721	-7.641135***
HP_R_USDCNY	-3.682217***	-6.402249***	-2.96952**	-6.274485***

*level of significance at 10% **level of significance at 5% ***level significance at 1%

Two dependent variables has been studied, HP_EUEXP and HP_CHIMP, so two different regression models have been established (equation 5 and 6). Then after, lag length should be stated to establish an ARDL model. According to Akaike criterion (AIC) value, the best fit lags in ARDL models are ARDL (3, 4, 2, 3) for HP_EUEXP and ARDL (5, 5, 7, 4) for HP_CHIMP.

$$HP\_EUEXP_t = \alpha_t + \sum_{i=1}^{s} \theta_0 HP\_EUEXP_{t-i} \sum_{i=1}^{p} \theta_1 HP\_R\_EURTRY_{t-i} + \sum_{i}^{q} \theta_2 HP\_R\_EURUSD_{t-i} + \sum_{i}^{r} \theta_3 HP\_R\_EURCNY_{t-i} + \varepsilon_t \quad (5)$$

$$HP\_CHIMP_t = \alpha_t + \sum_{i=1}^{s} \theta_0 HP\_CHIMP_{t-i} \sum_{i=1}^{p} \theta_1 HP\_R\_CNYTRY_{t-i} + \sum_{i}^{q} \theta_2 HP\_R\_EURCNY_{t-i} + \sum_{i}^{r} \theta_3 HP\_R\_USDCNY_{t-i} + \varepsilon_t \quad (6)$$

The acceptance or rejection of the hypothesis "H0: There is no cointegration relationship between the variables can be determined according to the following process. If the F statistic is greater than the critical upper limit I(0), H0 is rejected. If the F statistic is less than the critical lower limit I(0), H0 is accepted. If the F statistic is between the critical lower and upper limits, other cointegration tests should be consulted because there is insufficient evidence to accept or reject the H0 hypothesis (Pesaran et al. 2001). Moreover, serial correlation, heteroskedasticity and normal distribution statistical values of models with ARDL limit test have resulted statistically significant (table 4).

Table 4: ARDL Bound Test and Diagnostic Stats of Models

Model	**EUEXP; ARDL(3, 4, 2, 3)**		**CHIMP; ARDL(5, 5, 7, 4)**	
Bound Test	**I(0)**	**I(1)**	**I(0)**	**I(1)**
F Stat	14.158750		9.197969	
10%	2.370000	3.200000	2.370000	3.200000
5%	2.790000	3.670000	2.790000	3.670000
1%	3.650000	4.660000	3.650000	4.660000
Diagnostics stats	**Stats.**	**Prob.**	**Stats.**	**Prob.**
R^2	0.558825		0.632815	
Adj. R^2	0.468172		0.488349	
F-Stat	6.164477	0.000000	4.380370	0.000002
Breusch-Godfrey LM	1.037185	0.595400	0.309263	0.856700
ARCH LM	0.001634	0.967800	0.076088	0.782700
Jarque-Bera Normality	0.532892	0.766097	0.519777	0.771137

According to table (4), the H0 hypothesis was rejected because the F statistical values calculated at the 1% significance level, was greater than the upper limits, thus, it was found that there was a cointegration relationship between the variables for both models. In addition, table (4) presents the diagnostic test results of the ARDL model. Accordingly, it is understood that the model does not have any autocorrelation (Breusch-Godfrey LM Test), heteroskedasticity (ARCH LM Test) problem, and the error term has a normal distribution (Jarque-Bera Normality Test). After determining the existence of a long-term equilibrium relationship between the variables, it is necessary to estimate the parameters reflecting the long-term relationship. The results of the method estimated by Least Squares (OLS) are given in tables (5) and (6).

Table 5: EUEXP and CHIMP Long-Run Statistical Results

Long-Run	**EUEXP**		
Variable	**Coefficient**	**t-Statistic**	**Prob.**
HP_R_EURCNY	61,748	0.252283	0.801500
HP_R_EURTRY	498,283	2.083544	0.040700**
HP_R_EURUSD	2,778,182	1.968862	0.052800*
C	-4,077	-0.145858	0.884400

Long-Run	**CHIMP**		
Variable	**Coefficient**	**t-Statistic**	**Prob.**
HP_R_CNYTRY	-5,923,865	-7.015447	0.000000***
HP_R_EURCNY	-64,880	-1.411658	0.163100

HP_R_USDCNY	-628,779	-6.364972	0.000000***
C	986	0.104110	0.917400

*level of significance at 10% **level of significance at 5% ***level significance at 1%

According to long run relationships in variables, in EU-Export model, R_EURTRY and R_EURUSD coefficients have been found statistically significant in levels and positive. As mentioned before in literatures, real exchange rates represented the competition magnitude of trade between bilateral countries. Appreciated R_EURTRY affected EU export volume from Turkey positively as expected. Main reason of that EU market has been the top goods market of Turkey for years. R_EURUSD also same behavior on export due to USD is one of the most used currencies in importing activities. Hereby, currency war between EU zone and US would be effected Turkey's export performance to EU. Moreover, according to coefficient of these two meaningful variables, R_EURUSD is over 5 times more than R_EURTRY, because of that importing goods are mainly USD so costs are effecting the export performance to EU. It is seen from table that the EU vs China currency wars has no effect on Turkey EU export volume statistically because of insignificant R_EURCNY statistical value. For R_CHIMP which is dependent variable in Import-from-China model, is affected negatively by exchange rate of CNY/TRY. When R_CNYTRY value increases import from China decreases in long term. This result is proper as previous literature that currencies of bilateral countries have been important role on opposed trade. Statistical values of R_USDCNY have been indicated that it is also important for CHIMP. Between US and China currency wars would be affected Turkey's Import-from-China, hereby appreciated USD over CNY would be led it negatively. In respect of coefficient magnitudes, R_CNYTRY is over 9 times more than R_USDCNY. R_EUR/CNY's statistical result is insignificant, thus means, trade war of EU and China is not material for Turkey import-from-China. One cause might be, as mentioned currency war literature, EU area has not been a leading player in currency wars, as considering US and China.
Seen in table (6), two of the model error correction coefficients are negative and significant in %1 levels, as expected and needed acceptance of short-run relations among variables. According to Narayan and Smith (2006), the error correction coefficient has a value between -1 and -2, indicating that the system fluctuates to equilibrium. The fluctuation decreases each time, instead of converging directly as monotonous while bringing the model to equilibrium and it will come to equilibrium in the long term.

Table 6: ECM Variable Statistical Values

Model (#)	Variable	Coefficient	t-Statistic	Prob.
EUEXP (eq.5)	**CointEq(-1)**	-1.380651	-8.641347	0.000000***
CHIMP (eq.6)	**CointEq(-1)**	-1.531176	-7.000398	0.000000***

*level of significance at 10% **level of significance at 5% ***level significance at 1%

Cusum and CusumQ tests which were developed by Brown et al. (1975), are used to measure the consistency of the coefficients used in the models. In case of structural change, the sum of squares of residues of the model will grow. The graph acknowledges that there is a structural break at the points that extend beyond the red boundaries. CusumQ (square) is more sensitive than Cusum, based on the calculation of successive residues. When the CUSUM and CUSUMSQ graphs are examined in figure (1), it shows that there is no structural breakage related to the variables used in the analysis, long-term coefficients calculated according to ARDL Boundary Test are stable and the model can be estimated without using any artificial variables to express the breakage.

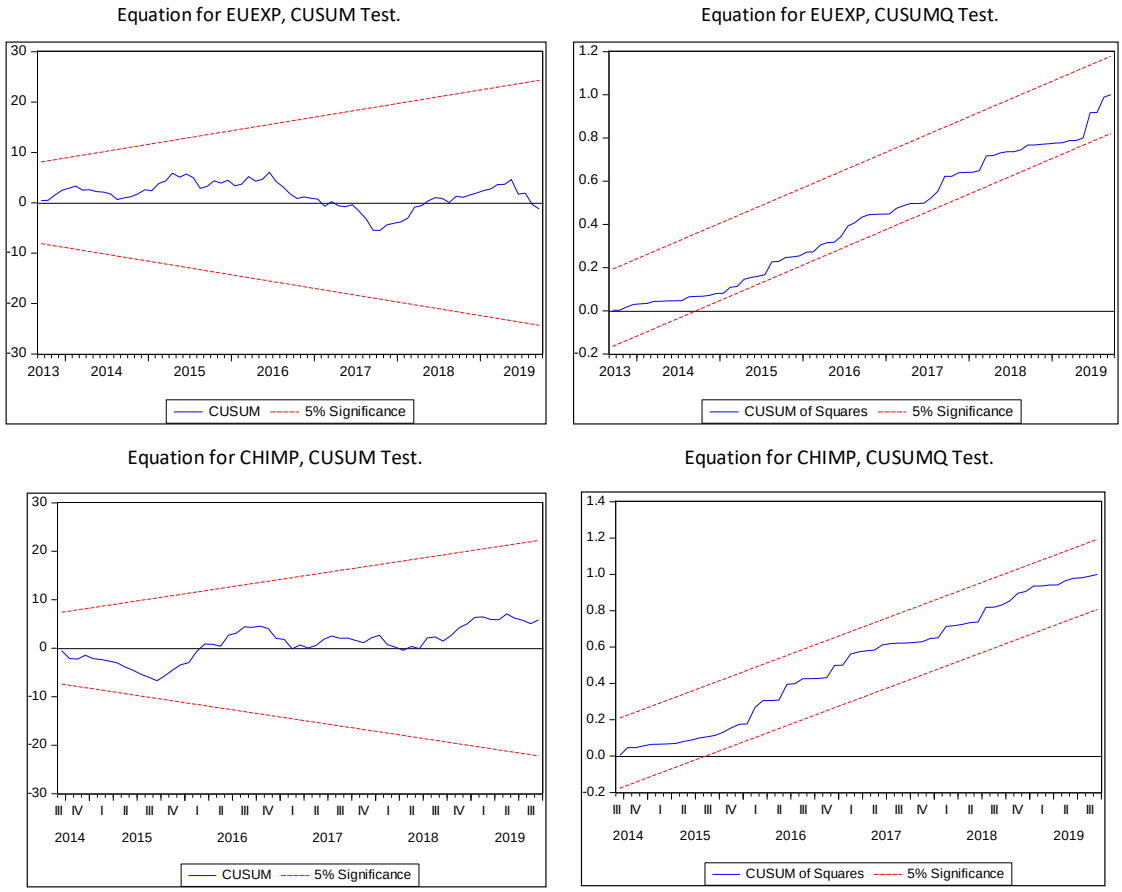

Figure 1: Cusum and CusumQ Test for Model EUEXP and CHIMP.

6. Conclusion

In recent years, because of global crisis and economic slowdown, major countries have been prompted to take economic actions. Currency wars again have been debated and summoned as before used in economic history to deal with economic slowdown by developed and emerging countries. Their actions on exchange rate policies would affect their bilateral trade balance as mentioned previous literature. Although US, China, Japan, EU etc. countries main actors of currency wars; US, China and EU have been interested in this study because of being major trade partner of Turkey. Previous literatures have investigated bilateral country trade balance. This study differs from previous ones has investigated whether these countries cross exchange rate have an interaction with Turkey foreign trade.

Data started by 2012:01 to 2019:09 which was one of milestone of currency wars. EU is the top export market of Turkey and China is second goods import market; these datas have been used as dependent variables. Real cross exchange rates are independent variables. By help of ARDL econometric model, different level of stationary series have been used in same model to understand the long run and short run relationships among variables.

According to findings, in long run, EUR/USD and CNY/TRY are significant and most effecting exchange rates trade volume export to EU positively and import from China negatively, respectively. EUR/TRY and USD/CNY have also significant values but have less impact. EU, US and China economic actions on currency policies might be affected externally Turkey's trade volume. EUR/CNY currency is insignificant for two investigated trade market, since EU has not been a leading actor on currency war in respect of US and China. For further research, investigation area might be widen by selecting more Turkey foreign market.

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