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THE IMPACT OF EXCHANGE RATE VOLATILITY ON EMPLOYMENT: EXPERIENCE OF TURKEY IN THE 2000s[1]

DÖVİZ KURU OYNAKLIĞININ İSTİHDAMA ETKİSİ: 2000'Lİ YILLAR TÜRKİYE DENEYİMİ

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Abstract

Resulting the February 2001 crisis, Turkey switched to floating exchange rate system in the early 2000s. In theory, it is accepted that the floating exchange rate system not only absorbs shocks but also provides freedom in monetary policies for the central bank. In recent decades, however, variations in exchange rates and volatility have been larger than that of predicted by theoretical models, especially in the developing countries. Based on autoregressive-distributed lag (ARDL) bound test method, this article investigates the impact of exchange rate changes and volatility on the level of employment in Turkey by using quarterly data for a sixteen-year period covering 2004:Q1-2020:Q1. AR (1)-TGARCH (1,1) technique was used to measure exchange rate volatility. According to ARDL bound test results, while increases in exchange rate positively affects the level of employment, the exchange rate volatility affects it negatively. In addition, rise in exports provides positive support to the growth in employment level. Lastly, there is an inverse relationship between interest rates and employment level. These results indicate that the development in economic circumstances provides positive support to the investment enthusiasm of economic decision makers and that growing business volumes increase the number of employed people.

Keywords: Exchange Rate Volatility, Employment, ARDL Bound Test, Turkey.

Öz

Türkiye'de 2000'li yılların başında ortaya çıkan Şubat 2001 krizi sonrasında esnek kur sistemine geçmiştir. Teoride, esnek döviz kuru sisteminin şokları absorbe etme yanında merkez bankasına parasal politikalarda özgür kalmayı da sağladığı kabul edilmektedir. Bununla birlikte, bilhassa gelişmekte olan ülkelerde son yıllarda döviz kurları ve döviz kuru oynaklığındaki değişimler teorik modellerin öngördüğünden daha büyük seviyede olmuştur. Bu makale, gecikmesi dağıtılmış otoregresif (ARDL) sınır testi metoduna dayalı olarak, döviz kuru değişimlerinin ve oynaklığının Türkiye'deki istihdam düzeyine etkisini, 2004: Q1-2020: Q1 aralığını kapsayan on altı yıllık dönem için üç aylık verileri kullanarak araştırmaktadır. Döviz kuru oynaklığını ölçmek için AR (1)-TGARCH (1,1) tekniği kullanılmıştır. ARDL sınır testi neticelerine göre döviz kurundaki artışlar istihdam seviyesini pozitif etkilerken, döviz kuru oynaklığı istihdam seviyesini olumsuz etkilemektedir. Ayrıca ihracattaki artış, istihdam düzeyindeki büyümeye olumlu destek sağlamaktadır. Son olarak, faiz oranları istihdam seviyesi ile ters yönlü etkileşim durumundadır. Bu sonuçlar, ekonomik koşullardaki gelişmenin ekonomik karar vericilerin yatırım arzularına olumlu katkı sağladığını ve genişleyen iş hacimlerinin istihdam yapılan birey sayısını artırdığını göstermektedir.

Anahtar Kelimeler: Döviz Kuru Oynaklığı, İstihdam, ARDL Sınır Testi, Türkiye.

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1. INTRODUCTION

Regional economic integrations have been accelerated globally after the Bretton Woods system ended. Especially, since the 1980s, a significant increase in trade and capital movements has taken place with the liberalization policies of the countries regarding the real and financial sectors (Demir, 2010). In accordance with this process, it has been observed that most of the countries preferred flexible rather than fixed exchange rate regimes. Theoretically, it has been accepted that a flexible exchange rate regime is more successful in designing policies aimed at reducing external shocks and solving internal problems. For obvious reasons exchange rates are among the most closely scrutinized variables in open economies that earn a significant portion of their income from foreign trade. This is because exchange rates have considerable effects on such variables as prices, foreign trade, indebtedness, interest, currency substitution, income and profitability.

Even though the flexibility of exchange rates in the long run may be useful for macroeconomic stability in the event of an external impact, exchange rate volatility may have indeed some undesirable consequences on the national economy. Exchange rate volatility, especially vigorous fluctuations in nominal exchange rates in the short term, have negative effects on an economy. Such fluctuations have an impact on costs as well as uncertainties (Stirbock & Buscher, 2000). In this context, it has been observed that exchange rate volatility has increased in the developing countries, especially in the periods during which floating exchange rate regimes are implemented. When faced with volatility, investment decisions of especially those companies that are dependent on foreign activities may deteriorate, hence the national income level and labor markets may be adversely affected. Conversely, in the presence of exchange rate variability, employees' tendency to demand for higher wages may also affect the level of employment negatively. In this context, this article analyzes the influence of exchange rate volatility on employment level in Turkey by using time-series data, AR(1)-TGARCH(1,1) model and ARDL bound test method.

2. THEORETICAL RELATIONSHIP BETWEEN EXCHANGE RATE VOLATILITY AND EMPLOYMENT

Exchange rate volatility is expected to affect employment level indirectly rather than directly. The uncertainty environment caused by exchange rate variability can influence employment (hence unemployment) level owing to interest rates, investments, foreign trade, labor market conditions, and speculative tendencies. In the ordinary open economy models, the motivation is on how macroeconomic policies can influence production and price level, i.e. economic growth and inflation. The production function links changes in employment and unemployment with vicissitudes in production. Therefore, the relevant variables in the standard models are passive or demand-side variables. The exchange rate is not modeled as an independent factor that usually determines the real output; it is rather anticipated that the exchange rate is associated with prices and changes in prices caused by changes in the monetary and fiscal policies. However, open economy models determining output and exchange rate, such as the Mundell-Fleming model, which depend on the supposition of flexibility of prices of goods and assets, as well as the sticky price monetary model generally support the existence of an inverse causal relationship (Hodge, 2005).

Like the closed economy models, open economy macroeconomic models can also be grouped in two categories. On one side, there are Keynesian and Post-Keynesian models assuming that the prices of goods and labor earnings are unchanging, and that the output in real terms (or unemployment) is an endogenous factor. On the other side, there are Classical and Neoclassical models, which accept that the prices and wages are supple, and therefore joblessness is an exogenous factor. In relation to the particular mix of assumptions embedded in these models, there can be quite different effects in terms of the connection between exchange rates and employment. In principle, the higher the degree of flexibility of prices and wages, and the more rational are the expectations in these models, the lower the relationship between monetary variables (e.g. exchange rate and inflation) and real variables (e.g. production and employment) we can expect (Hodge, 2005).

However, increases in the variability of exchange rate on a sectoral basis may have an undesirable influence on companies' job creation possibilities in the short run, hence adversely affecting employment. Because exchange rate volatility increases the costs incurred by a company when taking a decision whether to invest in export-oriented activities or not, whether to set up a new way of production or establish a distribution system abroad or not. On the contrary, a remarkable change may not be expected in the short term in the exports of companies that are already actively engaged in foreign trade. Another explanation for the fact that exchange rate volatility may not have a direct efficacy on trade capacity stems from the impression of "prices peculiar to market". In other words, in the face of major exchange rate variations, the exporting company does not change its prices in the export market. Keeping prices unchanged means that external sales should respond very slight to the exchange rates. In this case, while there is no change in the production and cost levels of companies, their earnings vary with respect to the local currency. Therefore, exchange rate changeability can definitely affect the changeability of profit, although trade volume changes little. Companies can react to increasing variations in exchange rates (and therefore profitability) in the first case by cutting investments down and employment in trade related activities. This may have an adverse consequence on their future trade volumes (Belke & Kaas, 2002).

Fluctuations in the exchange rate make it difficult for the exporters to estimate their export revenues, hence creating problems in the marketing, efficient planning and setting up the export policy. Due to the unreliability of the new exchange rates and risks caused by the fluctuation, long-term planning becomes difficult, hence reducing export activities or bringing them even to a halt. On the other hand, these fluctuations increase the tendency towards speculative demand for foreign exchange and may endanger the regular functioning of the market. Moreover, this situation may cause relaxation in the planning of importing goods and services through exports. If there are no structural obstacles to the increase in exports and if the profitability of the exports increases, ceteris paribus, the export volume is expected to increase. However, fluctuations in exchange rates create unpredictable changes in the prices of imported and exported goods and pose an obstacle in the country's foreign trade. These fluctuations may structurally affect foreign trade or cause short-term effects and may lead to substantial jolts in the delivery of exports (Salatin & Hami, 2015).

Strong and stable exchange rates, on the other hand, encourage the companies to innovation-oriented investments, enabling them to become more competitive in the market in terms of prices and other abilities. A company would be able to move towards the most valuable part of the market thanks to its technology-based employment and competitiveness achieved. This is reflected by the fact that the developed countries with leading technologies such as USA, UK, Germany and Japan have achieved long term stable exchange rates as well (Ayhan, 2016).

Exchange rate fluctuations can increase the level of uncertainties of future earnings, hence pushing up "alternative cost of waiting." When firms create a business, they are exposed to high costs like recruitment costs and job-specific capital finding costs. In addition, labor payments increase as restrictions and employment contracts do not allow firms to lay off workers quickly. In the presence of structural rigidities, in case of changing market conditions in the economy, labor recruitment creates to some extent what is called the sunk costs. If the exchange rate is uncertain, companies are worried about undesirable overvaluation in the local currency. In this context, in the presence of vagueness and compulsory employment agreements, companies may choose to postponement creating new business, which may happen even if they are independent of the risk (Belke & Kaas, 2002).

Exchange rate volatility may also have an effect on investments via increasing interest rates. Representing the monetary policy transmission channel, increasing interest rates in the presence of a current account deficit may signal a restrictive monetary policy that attracts capital flows and struggles against inflation. As a result, rising interest rates following a risk premium caused by exchange rate volatility affect employment adversely. Because rising risk causes an increase in borrowing costs, hence decreasing in all kinds of investments including recruitment of new employees (Mpofu & Nikolaidou, 2018). In addition, increasing interest rates cause people having the funds to direct their resources to riskless assets such as government bonds and treasury bills, causing expenditures on risky investments fall below expectations.

Economics literature offers other mechanisms through which uncertainty can adversely affect employment. For instance, in unionized labor markets where wages are predetermined, the uncertainty in labor demand due to productivity or uncertainty in the exchange rate may reason labor unions to ask for higher wages than expected. Consequently, uncertainty turns into a risk premium in wages and thus results in higher unemployment (Belke & Kaas, 2002).

It is generally observed that the impacts of exchange rate fluctuations on employment are higher on the developing economies. More open developing countries make foreign trade transactions and borrowing from foreign markets predominantly in US Dollars and Euros. Therefore, increasing volatility in exchange rates causes instability on borrowing in the local currency and foreign trade values. Besides, high reply of domestic prices to exchange rate shocks in these countries designates that exchange rate volatility is a substantial factor on price stability. In addition, capital markets in these countries are not deep and the volume of futures transactions is low. Therefore, the effect of speculative transactions in these markets is high and the protection of firms against exchange rate risks is weaker. Hence, the level of tolerance in developing countries to exchange rate fluctuations remains low, a phenomenon called the fear of fluctuation of the developing countries (Calvo & Reinhard, 2000).

3. LITERATURE REVIEW

In the literature, researches on employment and exchange rate volatility have been carried out by taking macro variables or sectoral structures into consideration. For instance, Burgess et al. (1996) examined the reaction of employment at industrial level to exchange rate shocks for G-7 countries based on annual datum for the period of 1960-1989 by using nonlinear least squares estimation method. Results show that exchange rate shocks do not have as a big efficacy on employment as expected. These results are in harmony with the view that the level of employment is not affected by exchange rate shocks and many other factors in the European industries, especially for those in France and Germany. However, the long-term adjustment speed of these countries is slower in comparison to those of the United States, Japan, Canada, England, and Italy. Adjustment speeds may also vary depending on the market organization and the labor market regulations in the respective countries.

Belke & Kaas (2002) analyzed the effects of exchange rate volatility on labor market performance of the European Union and the USA both theoretically and empirically by using annual data for the period of 1973-2001. A simple Dixit/Pindyck model was used in the study where they displayed that there is a negative interaction between work construction and exchange rate variability. The fundamental opinion was to show that the uncertainty of future earnings has a negative impact on creating employment. They found that higher minimum wages, better bargaining positions and higher business making costs reinforce the negative influence of uncertainty on employment. Accordingly, it was concluded that the connection between exchange rate variability and employment is sturdier in most European countries than the USA.

Belke & Kaas (2004) examined the influence of exchange rate volatility on the labor markets by using monthly datum and panel data analysis approach for the period of 1992-2001 for 10 central and eastern European countries. They found that fluctuations against Euro significantly reduced the employment growth. Based on their findings, they proposed that the elimination of exchange rate volatility in the related countries can be considered as an alternative to the employment protection legislations.

Demir (2010) have inspected the inspiration of exchange rate volatility on employment growth for Turkish economy by using panel data on the basis of 691 private enterprises which explanation for 26% of the total value added for the period of 1983-2005. The results display that exchange rate volatility has a statistically and economically considerable efficacy on falling employment growth in manufacturing companies. The consequences obtained by using point estimates show that a single standard deviation rise in real exchange rate volatility for an average firm decreases employment growth in the range of 1.1-2.1%.

Chang (2011) assessed the relation between exchange rate volatility and joblessness in South Korea and Taiwan by using 1984:01-2004:03 data. Using vector autoregressive (VAR) model to obtain an effective estimate, he determined that the long-term equilibrium connection between exchange rate vagueness and joblessness is valid for both Taiwan and South Korea. Besides, there is a short-term effect of exchange rate uncertainty on unemployment. The same results are obtained in all uncertainty estimations conducted in different ways.

Mensah et al. (2013) intended at defining how work in the manufacturing sector of Ghana was influenced by the floating exchange rate. Ordinary least squares regression method and data for the period of 1990-2010 were used. The study showed that exchange rate fluctuation takes indeed an impact on employment growth of the manufacturing sector in Ghana where a reduction in the local currency against the US dollar considerably decelerates the employment growth in the manufacturing sector. Likewise, there is an inverse interaction between the rate of interest and employment growth for the manufacturing industry in Ghana. Besides, there is an optimistic association between GDP and employment growth.

Nyahokwe & Ncwadi (2013) investigated real exchange rate volatility on employment by using quarterly datum for South Africa for the period 2000-2010. Using cointegration and VAR methods, they also addressed adjustment dynamics in the unemployment rate after the shock. The results indicated that exchange rate volatility has both economically and statistically important impact on employment. Among the variables that had a long run association with unemployment are real exchange rate, exports, real interest rates, and GDP. These results supported the previous studies, and real exchange rate had the biggest explanatory power on the changes in the unemployment rate.

Yokoyama et al. (2015) researched the effects of the fluctuations in Japanese Yen on regular and irregular employment of the Japanese firms with panel data analysis for the period 2001-2012. The effect of the upsurge in exchange rate risk is found to be five times higher for non-regular employees compared to the regular employees. However, according to the Beverage and Nelson separation, the response of regular employment to permanent exchange rate shocks was higher than the one for irregular employment. Estimation results showed that there is an important distinction in regulation costs between regular and irregular employment in the segmented Japanese labor market.

Salatin & Hami (2015) explored the impact of real exchange rates and exchange rate volatility on employment by using the OLS method for the period of 1981-2011 for the Iranian economy. They found that the employment rate fell due to the shrinking demand after a rise in export prices and a reduction in import prices caused by a decline in the real exchange rates.

Dhasmana (2015) inspected the interaction level between real exchange rate volatility and employment levels by using panel data method based on data collected from 900 firms for the period 2004-2008. The key finding of the study was that commercial risk -measured by the difference between the export-import shares in total revenue of a company and the input costs- was a noteworthy factor of the company's reaction to high exchange rate volatility. Increasing risk also increases the severity of the reaction to exchange rate volatilities. Companies engaged in foreign trade were found to be extra delicate to exchange rate volatility and therefore employment rates were affected from this fact. In addition, it has been observed that, compared to domestic ones, companies with foreign capital benefited more from positivities while they were less affected by the negativities vis-a-vis real exchange rate volatilities.

Mpofu (2015) examined the effects of real exchange rate volatility on manufacturing industry employment in South Africa by using quarterly time series data for the period of 1995-2010. The results of Autoregressive Distributed Lag (ARDL) model show that real exchange rate volatility has an important contractionary result in employment. The research also offers some information that exchange rates, output, wages and interest rates significantly affect manufacturing employment growth. He concluded that the government may decrease the negative effects of the fluctuations in exchange rates by adopting macroeconomic policies that minimize exchange rate volatility and policies encouraging employment construction.

Ayhan (2016) analyzed the influence of the real exchange rate volatility on employment in the Turkish economy by using monthly data for the period 2005:01-2014:02. The results presented that exchange rate volatility has an undesirable effect on employment, though the model is not statistically noteworthy.

Mpofu & Nikolaidou (2018) investigated the effect of exchange rate volatility on employment increase for the period 1995:03-2015:02 in South Africa, a country characterized by high joblessness rate and comparatively high exchange rate volatility. The results of the research conducted by using ARDL co-integration method showed that real exchange rate volatility has an important slowdown effect on manufacturing employment increase. Additionally, the conclusions emphasized that real effective exchange rates and long-term interest rates as well as production, wages and exports significantly affect growth in manufacturing employment.

To summarize, the findings of empirical studies generally indicate that exchange rate volatility has an adverse impact on the level of employment. Besides, the degree of openness of the country to foreign markets, indebtedness, interest rates, labor market conditions, and the level of dependency on exports are observed to be decisive in determining the magnitude of the impact. Only a few studies investigated the case for Turkey, leaving room for new empirical analysis. In this context, the model, data and method used for investigative the influence of exchange rate volatility on employment in the case of Turkey is introduced in the next section.

4. MODEL, DATA SET AND METHOD

The employment function is modelled as follows:

$$EMT_t = \beta_0 + \beta_1 GDP_t + \beta_3 EX_t + \beta_4 INT_t + \beta_4 VT_t + \beta_5 BER_t + \varepsilon_t \quad (1)$$

where,

EMT: Number of people employed,

GDP: Gross domestic product (income level) measured from expenditures side,

EX: Export value in US dollars at current prices,

INT: Compound interest rate on government bonds with quarterly averages on annual basis,

VT: Volatility in the exchange rate (estimated by using the AR (1)-TGARCH (1,1) method over the created basket exchange rates).

BER: Basket Exchange Rate [(0.5*$)+(0.5*€)] created as a combination of US Dollars and Euros.

We used quarterly data for a period of the last 16 years (2004:Q1-2020:Q1) obtained from the Ministry of Treasury and Finance of Turkey, the Central Bank of the Republic of Turkey and the OECD. Employment, real exports and GDP variables have been adjusted first for seasonality, and then the relevant variables have been included in the analysis in their logarithmic forms.

Rather than a normal distribution, volatilities in the exchange rates show a skewed distribution that is not parallel to each other (Engle 1982). In this case, volatilities can be estimated by using such models as ARCH, GARCH, TGARCH and EGARCH. Akaike and Schwarz information criteria are used to determine which model is more suitable for the period under review. Based on the relevant criteria, we found that it is more appropriate to determine the exchange rate fluctuations by the TGARCH (1,1) model developed by Zakoian in 1994, the TGARCH model shows properties that react against asymmetric effects. Here, a leverage variable is added to GARCH model (Yoloğlu, 2020). The AR (k) TGARCH (p, q) model can be depicted as the mean and variance equations as shown below (Griffiths et al. 2008):

Mean equation: $$y_t = \beta_0 + \emptyset r_{t-1} + \cdots + \emptyset_{t-k} + e_t \quad (2)$$

Variance equation: $$h_t = \mu + \alpha_1 e_{t-1}^2 + \lambda d_{t-1} e_{t-1}^2 + \beta_1 h_{t-1} \quad (3)$$

$$d_t = \begin{cases} 1 & e_t < 0 \ (bad\ news) \\ 0 & e_t \geq 0 \ (good\ news) \end{cases}$$

In the above equations, y_t denotes the return on assets at any given time, while h_t denotes the conditional variance. In equation (3) above the λ coefficient is known as asymmetry, or the leverage term. When λ=0, the model becomes standard GARCH model. When the shock is positive (good news) its effect on volatility is equal to α. On the contrary, when the shock is negative (bad news), the effect on volatility will be α + λ. Therefore, as long as λ is statistically significant and positive, the negative shocks will have a greater effect on h_t than the positive shocks (Griffiths et al. 2008). Since the leverage effect is quadratic in the TGARCH model and exponential in the EGARCH model, the conditional variance may take relatively higher values in the EGARCH model (Öztürk, 2010).

As is known, stationarity is an important issue in the time series analysis. Probability theories are acceptable only for the stationary time series, while non-stationary situations emerge in the form of deviation from the mean and heteroscedasticity. In stationary series, zero mean and homoscedastic (constant variance) error terms are obtained. Stationarity of a series can be achieved by taking their lag or logarithmic values (Işık et al. 2004).

Stationarity of the variables can be checked by using such standard methods as Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), Dickey-Fuller GLS (DF-GLS), Ng-Perron and Elliott-Rothenberg-Stock Point-Optimal (ERS) tests. Here the null hypothesis means that there is unit-root in the series, i.e. the series is not stationary, while the alternative hypothesis means there is no unit-root, hence the series is stationary.

The presence of co-integration between the variables in the model can be investigated only after the unit-root test provided they show the same level of stationarity. Co-integration tests are carried out by Engle-Granger or Johansen co-integration methods. One should state that in practice the Johansen co-integration method is more widely used primarily because Engle-Granger test does not provide satisfactory data related to asymptotic distribution and is based on only one main integrated vector rather than all possible co-integrated vectors (Kavaz & Özbuğday, 2016).

Typically, if the level of integration between the variables is not the same, it is not possible to establish a long-term relationship between them (Fatukasi et al. 2015). However, ARDL (autoregressive distributed lag) method allows to investigate the presence of short and long-term contacts between variables even when the level of integration is not the same. ARDL method can be used not only in the case where the regressors (i.e. independent variables) are co-integrated either completely I(0) or completely I(1), but also when they are partly I(0) and partly I(1) (Pesaran et al. 2001). Since the unrestricted error correction model is adopted in the ARDL approach, it gives statistically more reliable results compared to classical co-integration tests (Akel & Gazel, 2014). In light of this, the unconstrained ARDL model can be expressed as follows.

$$\Delta EMT_t = \gamma_0 + \sum_{i=1}^{m} \delta_{1i}\Delta EMT_{t-i} + \sum_{i=0}^{m} \delta_{2i}\Delta GDP_{t-i} + \sum_{i=0}^{m} \delta_{3i}\,\Delta EX_{t-i} + \sum_{i=0}^{m} \delta_{4i}\,\Delta INT_{t-i} + \sum_{i=0}^{m} \delta_{5i}\,\Delta VT_{t-i} + \sum_{i=0}^{m} \delta_{6i}\,\Delta BER_{t-i} + \theta_1 EMT_{t-1} + \theta_2 GDP_{t-1} + \theta_3 EX_{t-1} + \theta_4 INT_{t-1} + \theta_5 VT_{t-1} + \theta_6 BER_{t-1} + u_t \tag{4}$$

In Equation 4, Δ is the first difference operator, γ_0 is the constant coefficient, and u is the usual white noise residuals. The left hand side term denotes the amount of individuals employed. On the right hand side, "θ_1–θ_5" correspond to the long-term relationship. The "δ_1–δ_5" parameters with sigma signify the short-term dynamics of the model (Dritsakis, 2011). When implementing the bound test, the length of time lag represented by m in the above equation must be determined. For this purpose, such information criteria as AIC, SC, FPE and HQ can be used. One should pick the lag length with the lowest level where there is no autocorrelation between the residuals. Then the being of co-integration between the variables is determined by applying the Wald test (F test) to the first lag coefficients of dependent and independent variables (Altıntaş, 2013).

The null and the alternative hypotheses in testing the long run relationship between the variables can be depicted as below (Onoja et al. 2017).

$$H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = 0 \quad \text{(no long-run relationship)} \tag{5}$$

$$H_1: \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq \theta_6 \neq 0 \quad \text{(a long-run relationship exists)} \tag{6}$$

Since there is no standard F statistic available, the critical values provided by Pesaran et al. (2001) are utilized. The first of these critical values supposes that all variables are I(1), while the second one supposes all variables to be I(0). In this case, there arises a band between these values (Süslü & Bekmez, 2010). If the calculated F-statistic is smaller than the lower bound value, the null hypothesis is accepted, concluding that there is no long-term relationship between the dependent variable and the explanatory variables. On the contrary, if calculated F-statistic is greater than the upper bound, it means that there is a long-term relationship between the dependent variable and its regressors. On the other hand, when the F-statistic drops between lower and upper bound values, it means the results are not sufficient for a certain interpretation (Onoja et al. 2017). Since the F-statistic is above the critical values in our study, we conclude that there is a long-term relationship between the variables. Accordingly, the ARDL model designed to estimate the long-term coefficients is depicted as below.

$$EMT_t = \gamma_0 + \sum_{i=1}^{m} \delta_{1i} EMT_{t-i} + \sum_{i=0}^{n} \delta_{2i} GDP_{t-i} + \sum_{i=0}^{r} \delta_{3i}\, EX_{t-i} + \sum_{i=0}^{p} \delta_{4i}\, INT_{t-i} + \sum_{i=0}^{q} \delta_{5i}\, VT_{t-i} + \sum_{i=0}^{r} \delta_{6i} BER_{t-i} + u_t \tag{7}$$

Depending on the estimated unconstrained error correction model, long term elasticities are acquired by dividing the parameters of the lagged independent variables (multiplied by minus one) by the coefficient of the one-lagged dependent variable (Şimşek & Kadılar, 2004). After determining the long term parameters of the variables, the suitability of the model is investigated by checking with the diagnostic tests of the model. Lastly, an error correction model based on ARDL is adopted when determining the short term relationships between the variables. The relevant model is depicted by equation (8) below.

$$\Delta EMT_t = \gamma_0 + \sum_{i=1}^{m} \delta_{1i} \Delta EMT_{t-i} + \sum_{i=0}^{n} \delta_{2i} \Delta GDP_{t-i} + \sum_{i=0}^{r} \delta_{3i}\, \Delta EX_{t-i} + \sum_{i=0}^{p} \delta_{4i}\, \Delta INT_{t-i} + \sum_{i=0}^{q} \delta_{5i}\, \Delta VT_{t-i} \sum_{i=0}^{r} \delta_{6i} \Delta BER_{t-i} + \lambda ECM_{t-1} + u_t \tag{8}$$

In Equation 8, ECMt-1, the error correction coefficient, denotes one-time lagged value of the residuals of the model in which the long-term relationship between the variables is established. The coefficient of the error correction term is anticipated to be negative and statistically significant. The error correction coefficient indicates what level of correction in the long run will be achieved by the divergences from the equilibrium in the short run (Akel & Gazel, 2014).

5. TEST RESULTS AND FINDINGS

In order to estimate the AR (1)-TGARCH(1,1) model, first it was tested whether there was an ARCH effect related to the basket exchange rate variable.

Table 1. ARCH Effect Estimation Results

Variable	Coefficient	St. Error	t Statistic	Probability
Constant	0.084	0.035	2.353	0.021
AR(1)	-0.156	0.128	-1.217	0.228
AIC	0.361		**Value**	**Probability**
SC	0.395	$\mathbf{X^2}$	10.505	0.001

The chi-square coefficient value in the table above indicates that there is an ARCH effect in the basket exchange rate variable. This means that the series is suitable for the formation of AR (1)-TGARCH (1,1) model. Below are the results of AR (1)- TGARCH (1,1) model.

Table 2. TGARCH (1,1) Model Results

Variance Equation Parameters							
	Variable	**Coefficient**		**St. Error**	**Z Statistic**	**Probability**	
Mean Equation	β_0	0.053		0.022	2.361	0.018	
	$\emptyset$	0.287		0.117	2.458	0.014	
Variance Equation	μ	0.005		0.001	4.083	0.000	
	α_1	1.168		0.403	2.898	0.003	
	λ	-1.773		0.366	-4.839	0.000	
	β_1	0.550		0.163	3.363	0.000	
AIC	-0.602	LB Q -3-	1.065 [0.587]	LB Q^2 -3-	1.170 [0.760]	ARCH LM (X^2) -1-	0.620 [0.430]
SC	-0.397	LB Q -6-	1.602 [0.901]	LBQ^2 -6-	2.894 [0.822]	ARCH LM (X^2) -3-	1.310 [0.726]
DW	2.688	LB Q -16-	12.540 [0.638]	LBQ^2 -16-	10.134 [0.860]	ARCH LM (X^2) -6-	2.465 [0.872]

Values in square brackets indicate the probability p

Looking at AR (1)-TGARCH (1,1) model outcomes, coefficients have meaningful values. Besides, λ coefficient representing asymmetry has a negative and significant value. This situation appears to be inconsistent with the one mentioned above where we discussed the methodology. In fact, it is related to how you look at the positive and negative news. In other words, a positive news for Turkey might mean a negative shock in terms of the series of exchange rate returns, positive news lead to positive returns on exchange rates. In light of this, contrary to normal cases, asymmetry coefficient taking negative value here indicates asymmetry in the series of returns on exchange rates (Öztürk, 2010).

Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test consequences for the unit root test are given in Table 3. As can be seen in detail in Table 3, the stationarity test outcomes show that the volatility variable becomes stationary at the I(0), while other variables at the I(1) level.

Table 3. Unit Root Test Results

Variable	Test Level	Type of Equation	Test Statistics		Type of Equation	Test Statistics		Result
			Cons.	Cons.& Trend		Cons.	Cons.& Trend	
EMT	Level	ADF	-0.402	-1.872	PP	-0.639	-2.489	I(1)
	1st Diff.	ADF	-5.690	-5.643	PP	-5.819	-5.739	
GDP	Level	ADF	-0.985	-2.070	PP	-0.964	-2.080	I(1)
	1st Diff.	ADF	-7.965	-7.931	PP	-7.973	-7.931	
INT	Level	ADF	-2.417	-2.198	PP	-2.224	-2.388	I(1)
	1st Diff.	ADF	-6.325	-6.367	PP	-6.351	-6.397	
EX	Level	ADF	-2.641	-2.369	PP	-2.604	-2.476	I(1)
	1st Diff.	ADF	-7.623	-7.846	PP	-7.660	-7.846	
BER	Level	ADF	1.759	-0.366	PP	1.664	-0.481	I(1)
	1st Diff.	ADF	-8.933	-9.901	PP	-8.899	-9.809	
VT	Level	ADF	-4.947	-6.032	PP	-5.144	-6.159	I(0)

Mac Kinnon (1996) one-sided critical p values; $\tau_{c\ 0,05}$= -2.907 $\tau_{c\,t,\,0,05}$= -3.481

It means that we can examine whether or not there are short and long term relationships between the relevant variables. Akaike Information Criteria were used to determine the ideal lag length in the ARDL boundary test. ARDL(6,6,2,4,6,6) model proposed by the relevant information criteria has been used in the analysis. Estimation results for the ARDL(6,6,2,4,6,6) model are given in Table 4.

Table 4. ARDL(6,6,2,4,6,6) Model Estimation Results

Dependent Variable = *EMT*				
Variable	**Coeff.**	**Std. Error**	**t-Statistic**	**Probability**
EMT(-1)	0.4846	0.1366	3.5461	0.0019
EMT(-2)	0.0261	0.1649	0.1586	0.8754
EMT(-3)	-0.0119	0.1545	-0.0770	0.9393
EMT(-4)	-0.3364	0.1608	-2.0914	0.0488
EMT(-5)	0.1299	0.0960	1.3526	0.1906
EMT(-6)	-0.1568	0.0745	-2.1030	0.0477
GDP	0.0647	0.0565	1.1442	0.2654
GDP(-1)	0.0176	0.0631	0.2794	0.7826
GDP(-2)	-0.0289	0.0692	-0.4172	0.6808
GDP(-3)	-0.0767	0.0724	-1.0599	0.3012
GDP(-4)	0.0902	0.0655	1.3761	0.1833
GDP(-5)	0.0361	0.0554	0.6521	0.5214
GDP(-6)	0.1099	0.0480	2.2894	0.0325
EX	0.0585	0.0210	2.7775	0.0113
EX(-1)	0.0594	0.0235	2.5197	0.0199
EX(-2)	-0.0750	0.0202	-3.7014	0.0013
INT	-0.0043	0.0009	-4.8145	0.0001
INT(-1)	0.0019	0.0008	2.2169	0.0378
INT(-2)	-0.0020	0.0008	-2.3990	0.0258
INT(-3)	0.0004	0.0008	0.4879	0.6307
INT(-4)	-0.0023	0.0007	-3.0870	0.0056
VT	-0.0081	0.0378	-0.2144	0.8323
VT(-1)	-0.0427	0.0412	-1.0349	0.3125
VT(-2)	-0.0484	0.0414	-1.1677	0.2560
VT(-3)	0.0159	0.0470	0.3398	0.7374
VT(-4)	-0.1452	0.0460	-3.1561	0.0048
VT(-5)	-0.0420	0.0254	-1.6554	0.1127
VT(-6)	-0.0385	0.0189	-2.0293	0.0553
BER	0.0225	0.0068	3.2856	0.0035
BER(-1)	-0.0048	0.0275	-0.1769	0.8612
BER(-2)	0.0131	0.0376	0.3504	0.7295
BER(-3)	0.0242	0.0370	0.6540	0.5202
BER(-4)	-0.0443	0.0385	-1.1506	0.2628
BER(-5)	0.1047	0.0420	2.4937	0.0211
BER(-6)	-0.0581	0.0244	-2.3784	0.0270
C	5.5675	0.8781	6.3398	0.0000

Diagnostic Tests		
	Value	**Probability**
R-squared	0.999	
F-statistic	874.460	0.000
Normality Test (J-B)	4.599	0.568
LM Test (B-G) (F-statistic)	1.045	0.100
Heteroskedasticity Test: (B-P-G) (F-statistic)	0.641	0.879
Ramsey Rest Test (F-statistic)	0.036	0.97

The diagnostic test results for the established model are shown in Table 4. As can be observed, the residues in the model exhibit normal distribution, at the same time there are no autocorrelation, heteroscedasticity, and specification (model setting) error in the model. Therefore, we conclude that there is no structural break in the model.

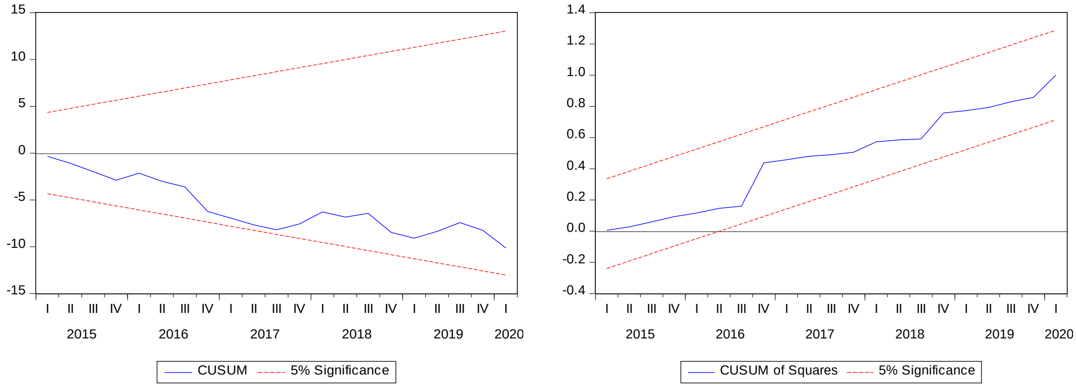

Chart 1. CUSUM and CUSUMSQ Graphics

Bound test values that analyze the existence of co-integration relationship among the variables used in the model are presented in Table 5.

Table 5. ARDL Boundary Test Results

	Critical Value	Lower Bound I(0)	Upper Bound I(1)
F Statistic 9.812	10%	2.385	3.565
	5%	2.817	4.097
	1%	3.783	5.338
t Statistic -8.537	**Critical Value**	**Lower Bound I(0)**	**Upper Bound I(1)**
	10%	-2.57	-3.86
	5%	-2.86	-4.19
	1%	-3.43	-4.79

As can be seen from Table 5, F and t statistics are higher than the upper limit values. Therefore, the coefficient of the EMT_{t-1} variable is found to be important, implying that there is a co-integration connection between the variables. In this direction, long-term estimation values are shown in Table 6.

Table 6. Long Term Estimation Results

Dependent Variable = EMT				
Variable	**Coeff.**	**Standard Err.**	**t Statistic**	**Probability**
GDP	0.2464	0.0576	4.2779	0.0003
EX	0.0496	0.0144	3.4223	0.0026
INT	-0.0073	0.0073	-12.151	0.0000
VT	-0.3575	0.0611	-3.0336	0.0063
BER	0.0663	0.0113	5.5963	0.0017

As one can see in Table 6, there is an opposite relationship between interest rates, exchange rate volatility and employment level. Accordingly, a unit rise in exchange rate volatility reasons a 0.357% decrease in employment level, while one unit increase in interest rates decreases employment level by 0.007%. On the contrary, the parameters of gross domestic product, exports and exchange rates make a positive contribution to the employment level. Accordingly, a 1% increase in income level causes an upsurge in the employment by 0.246%. A 1% improvement in exports makes a positive contribution of 0.049% to the employment level. One unit of an upward change in the basket exchange rate performs an improvement by 0.066% in the employment value. These results obtained for long-term conditions of the Turkish economy are compatible with the theoretical expectations.

After determining the existence of co-integration, an error correction model was generated to determine the short-term behavior of the variables. The error correction model estimation results are given in Table 7.

Table 7. Error Correction Model Estimation Results

Dependent Variable = D(EMT)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Probability**
C	5.5675	0.6513	8.5480	0.0000
D(EMT(-1))	0.3491	0.0989	3.5268	0.0020
D(EMT(-2))	0.3752	0.0968	3.8738	0.0009
D(EMT(-3))	0.3633	0.1075	3.3783	0.0028
D(EMT(-4))	0.0269	0.0561	0.4800	0.6362
D(EMT(-5))	0.1568	0.0540	2.9051	0.0085
D(GDP)	0.0647	0.0432	1.4964	0.1494
D(GDP(-1))	-0.1307	0.0496	-2.6348	0.0155
D(GDP(-2))	-0.1596	0.0519	-3.0709	0.0058
D(GDP(-3))	-0.2363	0.0510	-4.6321	0.0001
D(GDP(-4))	-0.1461	0.0429	-3.4055	0.0027
D(GDP(-5))	-0.1099	0.0388	-2.8279	0.0101
D(EX)	0.0585	0.0157	3.7101	0.0013
D(EX(-1))	0.0750	0.0155	4.8298	0.0001
D(INT)	-0.0043	0.0007	-5.6149	0.0000
D(INT(-1))	0.0039	0.0006	6.0386	0.0000
D(INT(-2))	0.0019	0.0006	3.0184	0.0065
D(INT(-3))	0.0023	0.0005	3.8866	0.0009
D(VT)	-0.0081	0.0272	-0.2978	0.7688
D(VT(-1))	0.2582	0.0364	7.0896	0.0000
D(VT(-2))	0.2098	0.0348	6.0212	0.0000
D(VT(-3))	0.2258	0.0392	5.7563	0.0000
DVT(-4))	0.0805	0.0225	3.5789	0.0018
D(VT(-5))	0.0385	0.0155	2.4804	0.0217
D(BER)	0.0225	0.0049	4.5627	0.0002
D(BER(-1))	-0.0396	0.0193	-2.0501	0.0530
D(BER(-2))	-0.0264	0.0194	-1.3633	0.1872
D(BER(-3))	-0.0022	0.0186	-0.1216	0.9044
D(BER(-4))	-0.0465	0.0209	-2.2244	0.0372
D(BER(-5))	0.0581	0.0182	3.1839	0.0045
CointEq(-1)	-0.8645	0.1012	-8.5376	0.0000
R-squared	**0.920197**			

The error correction model estimation consequences show that the error correction coefficient sign is negative and statistically important. In this case, 86.4% of the deviations from the equilibrium occurring in the short run disappear until the end of the first three months, hence converging to the long run equilibrium. Moreover, it is seen that the variables of export, interest rates and exchange rates have statistically significant values in the short term. Increase in exports and exchange rates seem to be improving the level of employment. Besides, an upsurge in the interest rates has a negative effect on the employment level.

6. CONCLUSION

In today's world, as we witness that the volume of international economic relations, trade and investments expand gradually and continuously, the level and especially the volatility of exchange rates have become quite critical variables. This is because exchange rates can directly or indirectly influence the variables that play a determining role on economic stability. In the open economies, after switching from fixed to floating exchange rate regimes with the idea that it strengthens the economy against external shocks and gives more flexibility to monetary policy applications, significant differences have been observed between developed and developing countries in terms of exchange rate volatility. While the degree of the volatility recorded in the developed countries was lower, it was relatively much higher in the developing countries.

Under these circumstances, although the developing countries legally implement fluctuating exchange rate regimes, from time to time they still need to intervene in the level of exchange rates. This is described as "the fear of fluctuation" in the literature. The level of uncertainty caused by the exchange rate volatility may adversely affect investment or innovative investment desires at national level and tendency to access new markets in foreign countries. Moreover, exchange rate volatility creates significant turbulences in the indebtedness level of the enterprises borrowing in foreign currencies, especially in the developing countries. The demand for higher wages by the labor unions in such an environment can also create a negative pressure on the level of employment. In addition, exchange rate volatility paves the way for increasing the level of *currency substitution* at the national level, and the rising interest rates in the atmosphere of uncertainty increases the financing costs of the enterprises for the investments that would potentially create employment. Uncertainty also causes the existing funds to turn towards the risk-free assets such as treasury bills and bonds. This, in turn, naturally hinders the desired improvement in the number of workers employed.

After the February 2001 economic crisis, which has been the biggest of this kind in her recent history, Turkey had to switch to the floating exchange rate regime. It has been observed that the degree of fluctuations in the exchange rates since then was beyond the theoretical expectations. In this context, we investigated in this study the effect of fluctuations in the exchange rate on employment level as a critical macroeconomic variable. Analysis was performed using the ARDL bound test approach and quarterly data over the period 2004Q1 to 2020Q1.

According to the results of ARDL bound test, while an increase in the exchange rate contributes positively to employment, the exchange rate fluctuations affect the employment level negatively. The results also indicate that increasing exports followed by an increase in foreign demand for export-oriented products, which gain competitive advantage in terms of prices after an increase in the exchange rates, supports the increase in employment. In addition, there is an inverse relationship between interest rates and employment level. Namely, as being one of the most important factors affecting the production costs, an increase in the interest rates triggered by uncertainty adversely affects the investment demand, redirect the financial resources to risk-free instruments, hence has a negative impact on employment level. The sign of error correction coefficient is negative and statistically significant. The effect of exports, interest rates and exchange rate variables on employment, which has statistically significant results in the short term, is in line with the long-term results.

REFERENCES

Akel, V. & Gazel, S., (2014). Döviz Kurları ile BIST Sanayi Endeksi Arasındaki Eşbütünleşme İlişkisi: Bir ARDL Sınır Testi Yaklaşımı, *Erciyes University Journal of Faculty of Economic and Administrative Sciences*, 44, 23-42.

Altıntaş, H. (2013). Türkiye'de Petrol Fiyatları, İhracat ve Reel Döviz Kuru İlişkisi: ARDL Sınır Testi Yaklaşımı ve Dinamik Nedensellik Analizi**,** *International Journal of Management Economics and Business,* 9(19), 1-30.

Ayhan, F. (2016). Döviz Kuru Oynaklığı, Dış Ticaret ve İstihdam İlişkisi: Türkiye Uygulaması, *PhD Thesis*, Konya: Selcuk University.

Belke, A. & Kaas, L.(2002). The Impact of Exchange Rate Volatility on Labor Markets: Europe versus United States, *Diskussionspapiere aus dem Institut für Volkswirtschaftslehre der Universität Hohenheim* 201/2002, Department of Economics, Hohenheim: University of Hohenheim.

Belke, A. & Kaas, L. (2004). Exchange Rate Movements and Employment Growth: An OCA Assessment of the CEE Economies, *Empirica*, 31(2-3), 247-280.

Burgess, S. & Knetter M. M. (1996). An International Comparison of Employment Adjustment to Exchange Rate Fluctuations," *NBER Working Paper No: 5861*, Available at: https://www.nber.org/papers/w5861.pdf, (Accessed 24 July 2019).

Calvo, G. A & Reinhart, C. M. (2000). Fear of Floating, *NBER Working Paper No: 7993*, Available at: https://www.nber.org/papers/w7993.pdf, (Accessed 24 August 2019).

Chang, S-C. (2011). The Interrelationship between Exchange-Rate Uncertainty and Unemployment for South Korea and Taiwan: Evidence from a Vector Autoregressive Approach, *International Economics*, 125, 65-82.

Demir, F. (2010). Exchange Rate Volatility and Employment Growth in Developing Countries: Evidence from Turkey, *MPRA Paper No. 24477*, Available at: https://mpra.ub.uni-muenchen.de/24477/1/MPRA_paper_24477.pdf, (Accessed in 21 July 2019).

Dhasmana, A. (2015). Real Exchange Rate Volatility and Employment: Role of External Sector Exposure, *IIM Bangalore Working Paper No. 479*, Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2562387, (Accessed 22 July 2019).

Dritsakis, N. (2011). Demand for Money in Hungary: An ARDL Approach, *Review of Economics & Finance*, 1, 01-16.

Engle, R. F. (1982). Autoregressive Conditional Heteroscedasticity with Estimates of the Variance of United Kingdom Inflation, *Econometrica*, 50(4), 987-1007.

Fatukasi, B., Olorunleke, G. K., Olajide, G. F. & Alimi, R. S. (2015). Bounds Testing Approaches to the Analysis of Macroeconomic Relationships in Nigeria, *European Journal of Business and Management*, 7(8), 26-34.

Hodge, D. (2005). The Effect of Exchange Rate Volatility on Trade and Employment: A Brief Review of The Literature, *Employment Growth & Development Initiative Human Sciences Research Council*, Available at: http://www.hsrc.ac.za/en/research-data/ktree-doc/1308, (Accessed 14 July 2019).

Işık, N., Acar, M. & Işık, B. (2004). Enflasyon ve Döviz Kuru İlişkisi: Bir Eşbütünleşme Analizi*, Süleyman Demirel University IIBF Journal*, 9(2), 325-340.

Kavaz, I. & Özbuğday F. C. (2016). Enerjide Dışa Bağımlılık ve Enerji Verimliliği Arasındaki Nedensellik İlişkisi: Türkiye Örneği, *Journal of Academic Social Research*, 27, 331-349.

Mensah, M., Awunyo-Vitor D., & Asare-Menako, H. (2013). Exchange Rate Volatility and Employment Growth in Ghana's Manufacturing Sector, *International Journal of Business and Social Science*, 4(4), 225-232.

Mpofu, T. R. & Nikolaidou, E. (2018). Real Exchange Rate Volatility and Employment Growth in South Africa: The Case of Manufacturing, *ERSA working paper 737*, Available at: https://www.econrsa.org/system/files/publications/working_papers/working_paper_737.pdf, (Accessed 21 May 2019).

Mpofu, T. R. (2015). Exchange Rate Volatility, Employment and Macroeconomic Dynamics in South Africa, *PhD Thesis*, Cape Town: University of Cape Town.

Nyahokwe, O & Ncwadi, R. (2013). Impact of Exchange Rate Volatility on Unemployment in South Africa," *Mediterranean Journal of Social Sciences*, 4(3), pp. 109-120.

OECD (2020). Database, Available at: https://stats.oecd.org/, (Accessed 26 August 2020).

Onoja, A. O., Achike, A. I. & Ajibade, T. (2017). Econometric Analysis of Short-Run and Long-Run Determinants of Agricultural Value Addition in Africa, *Agrosearch*, 17(1), 26-43.

Öztürk, K. (2010). Döviz Kuru Oynaklığı ve Döviz Kuru Oynaklığının Faiz Oranı Oynaklığı ile Olan İlişkisi: Türkiye Örneği, *Specialization Qualification Thesis*, Ankara: The Central Bank of the Republic of Turkey.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bound Testing Approaches to the Analysis of Level Relationship, *Journal of Applied Econometrics*, 16, 289-326.

Salatin, P. & Hami, M. (2015). The Relationship between the Exchange Rate and Employment in Iran, *International Research Journal of Applied and Basic Sciences*, 9(7), 1194-1203.

Şimşek, M. & Kadılar, C. (2004). Türkiye'nin İthalat Talebi Fonksiyonunun Sınır Testi Yaklaşımı ile Eşbütünleme Analizi: 1970-2002", *Journal of Doğuş University*, 5(1), 27-34.

Stirbock, C. & Buscher H. S. (2000). Exchange Rate Volatility Effects on Labour Markets, *Intereconomics*, 35 (1), 9-22.

Süslü, B & Bekmez, S. (2010). Türkiye'de Zaman Tutarsızlığının ARDL Yöntemi ile İncelenmesi", *Journal of BRSA Banking and Financial Markets*, 4(2), 85-110.

The Central Bank of the Republic of Turkey, (2020). Electronic Data Distribution System, Available at: https://evds2.tcmb.gov.tr/, (Accessed 26 August 2020).

Turkish Ministry of Treasury and Finance (2020). Economic Indicators, Available at: https://www.hazine.gov.tr/ekonomik-gostergeler (26 August 2020).

Yokoyama, I., Higa, K. & Kawaguchi, D. (2015). The Effect of Exchange Rate Fluctuations on Employment in a Segmented Labor Market, *RIETI Discussion Paper Series 15-E-139*, Available at: https://www.rieti.go.jp/jp/publications/dp/15e139.pdf, (Accessed 26 July 2019).

Yoloğlu, Z. (2020). Volatility Spillover between Stock Relationship with Exchange Rate and Interest Rate: An Application with Multivariate Garch Models, *Master Thesis*, Mersin: Çağ University.