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ADVANCES IN GLOBAL SERVICES AND RETAIL MANAGEMENT

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Relationship Between Business Confidence Index and Non-Financial Firms Foreign Exchange Assets and Liabilities: Evidence From ARDL Bound Approach

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Abstract

The effects of confidence indices on macroeconomic factors and stock returns are widespread in the literature. This study, unlike previous studies, examines the effect of the confidence index on foreign exchange positions of non-financial firms. Are the non-financial firms' managers considering the business confidence index when they manage their foreign exchange position? According to the findings, while there is no significant relationship between non-financial firms' foreign currency assets and business confidence index; there is a significant relationship between the foreign currency liabilities and the business confidence index in both the long-run and the short-run. Although the coefficient is low, as the business confidence index increases, the total foreign currency liabilities of non-financial firms also increase. With this study, it is revealed that the perception of confidence is an important factor in the formation of firms' foreign exchange policies. Confidence perceptions due to economic policies also affect firms' foreign exchange amounts.

Keywords: business confidence index, foreign exchange assets, foreign exchange liabilities, ARDL bound test, Turkey

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Introduction

While investors make an investment decision in financial markets and managers determine the financing policies of businesses, they do not consider only macroeconomic and firm-specific financial indicators. In their decisions, confidence indexes that reflect the intentions and expectations regarding the future are also important guides. Trust is about consumers' and producers' optimism or pessimism about the economy. Economic indicators that measure the feelings of consumers and producers in the economy are called consumer/business confidence index. Rapid transformations in technology and consumer behavior in the current century directly affect the business confidence of managers and directs their short-medium and long-term plans. An index that reflects the expectations of managers in Turkey has been created for this purpose.

The Central Bank of the Republic of Turkey is preparing the Business Tendency Statistics. With these statistics, the assessments of the senior executives of the companies operating in the

manufacturing industry about the recent past and the current situation and their future expectations are monitored. Moreover, using these statistics, indicators are produced to reflect the short-term trends of the manufacturing industry. The business confidence index, which is one of these indicators, is created based on the questionnaire applied to the specified business managers in the manufacturing sector sub-sectors coded 10-33 in NACE Rev 2. Sector classification.

This index shows the confidence level of real sector representatives covered by the survey regarding economic activities. If the index is equal to 100 points, it indicates that economic activities are perceived as stable according to the evaluations made by real sector representatives covered by the survey. The fact that the index is greater than 100 means that the real sector representatives' confidence in economic activities has increased (optimistic) view, and that it is less than 100 means that the real sector representatives covered by the survey have less confidence (pessimistic). Business confidence index is calculated as a function of the responses of real sector representatives to the questions regarding the production volume, total order quantity, domestic market order quantity, export order quantity, total employment, average unit cost, and sales price in the economic orientation survey. This index provides preliminary information about the periods of growth and contraction in economic activity. It is used to define the economic situation in the country and to predict the changes in economic activity.

In the literature, the effects of confidence indices on macroeconomic factors and stock returns are analyzed. This study, unlike previous studies, examines the effect of the confidence index on foreign exchange positions of firms that can be described as micro factors. The relationship between the index, which reflects the expectations of business executives regarding the real sector, and the foreign currency positions under the control of business executives, has not been the subject of any empirical study as far as the author knows.

Taking part in international trade is very important for firms to survive in an increasingly competitive environment. Turkey is also a country that has taken place in the international trade as both exporters and importers. Turkey is a big importer of raw materials because of the economic structure of the country. Therefore, the largest foreign exchange liability stems from the import volumes of firms. With this point of view, it is investigated whether the foreign currency liabilities move in parallel with the increase in the real sector index. When the firms believe that the economy will improve more, do they tend to import or export more?

Literature Review

Pinho & Madaleno (2011) investigate whether business confidence indicators are useful to explain share prices and industrial production in short-run horizon by using VAR model. US, Japan, France, Germany, Italy, Portugal, Spain, and UK are the eight countries of sample. The quarterly data for the period of 1985- 2009 is used. In their study, it is concluded that business confidence assumes a responsibility in stock market evolution but it reflects expectations weakly. Besides, the share pieces are less sensitive to expectation indices within the financially efficient markets.

Ekşi (2011) investigates the relationship between business confidence and bank credits of firms. The data of total bank credits of Turkish non-financial firms and business confidence index in Turkey for the period of 2000:1-2008:12 is used. A cointegration and causality between bank credits and business confidence index is revealed. Arısoy (2012) examines the relationship

between consumer confidence index, business confidence index, and macroeconomic indicators. In the study, which used monthly data from 2005 to 2012, it is determined that the business confidence index affects the industrial production and stock market index, while the consumer confidence index directly affects the consumption expenditures.

Çevik, Korkmaz, and Atukeren (2012) investigate the relationship between business confidence index and stock returns using a time-varying Markov regime-switching model in USA. They reveal that the increase in the manufacturing index increases regime switching probabilities in both bull and bear stock market periods. Besides, according to their findings, expectational shifts within the manufacturing confidence index have a separate influence on stock market regimes over the actual industrial production developments. Ayuningtyas & Koesrindartoto (2014) investigate the relationship between consumer confidence index and the change in business confidence index and stock market returns in Indonesia. They apply linear regression analysis using quarterly data for the period 2000-2013. As a result, they find that there is a significant and positive relationship between JCI, LQ45, JII indices and all sector indices with the change in business confidence index. In contrast, there is no significant relationship between the change in consumer confidence index and none of the other indices except agriculture and trade indices. Köse & Akkaya (2016) investigate the effect of the business confidence index and its sub-indices on BIST 100 stock returns. A significant and bidirectional Granger causality relationship is found between the BIST 100 return index and the general trend employment and order indices, which are sub-indices of the real sector confidence index.

Albayrak (2018) empirically analyzes the effect of the real sector confidence index on the producer price index. For the 2007-2017 period, it is investigated whether there is a long-term cointegration between the capacity utilization rate in the manufacturing industry and the real sector confidence index in Turkey. According to the findings, it has been determined that the real sector confidence index has a positive effect on the capacity utilization rates of firms.

Eyüpoğlu & Eyüpoğlu (2018) investigate short and long-term relationship between Borsa Istanbul sector indices and business confidence index by ARDL Bound test. The findings show that there is both long-run and short-run relationship between all sector indices and if the business confidence index increases most of the sectors' stock returns in short-term. It is concluded that psychological factors are one of the most important factors that affect changes in stock returns. Khan & Upadhayaya (2019) examines the relationship between business confidence and growth of investments. Their research question is whether confidence predicts business investment, investment downturns and the direction of investment growth. They use the business confidence index of the USA, real gross domestic product, business investment, and cash flow for the period of 1955Q1-2016Q4. They conclude that business confidence affects the growth of US business investments by one quarter and structures by two quarters. Besides, by controlling output, user cost, cash flows, and stock prices the business confidence is able to predict investment growth.

Durgun Kaygısız (2019) examines the relationship between business confidence index and industrial production index, benchmark interest rate, employment rate in Turkey. A data of 108 monthly observations for the period of 2010:01-2018:12 is used. It is revealed that there is a bidirectional causality between the business confidence index and the industrial production index.

Data and Methods

The data of this paper consist of three time-series. These are business confidence index (BCI), nonfinancial firms' total foreign exchange assets (TFEA) and nonfinancial firms' total foreign exchange liabilities (TFEL). The relationship between business confidence index and nonfinancial firms' foreign exchange assets and liabilities is examined for the period of 2007: Q1- 2020: Q1 in Turkey. The data used in this study are obtained from electronic data distribution system of the Central Bank of the Republic of Turkey. All variables are expressed in logarithmic form to eliminate the effect of any heteroscedasticity problem in time series data. To be consistent with timing of the foreign exchange positions, the monthly frequency of business confidence index is converted to quarterly frequency. The regression equations are;

$$\text{Ln(TFEA)}_t = \beta_0 + \beta_1 \text{Ln(BCI)}_t + \mu_t$$

$$\text{Ln(TFEL)}_t = \beta_0 + \beta_1 \text{Ln(BCI)}_t + \mu_t$$

ARDL boundary test approach is a model developed to test whether there is a long-term cointegration between variables and a typical ARDL model is expressed as follows (Pesaran et al., 2001). ARDL bound approach is commonly used model for detecting short and long-run relationships (Citak & Duffy, 2019; Varlık, 2019).

$$\Delta \text{Ln}Y_t = c + \sum_{i=1}^{k_1} \alpha_1 \Delta \text{Ln}Y_{t-1} + \sum_{i=1}^{k_2} \alpha_2 \Delta \text{Ln}X_{t-1} + \sum_{i=1}^{k_3} \alpha_3 \Delta \text{Ln}Z_{t-1} + \alpha_4 \text{Ln}Y_{t-1} + \alpha_5 \text{Ln}X_{t-1} + \alpha_6 \text{Ln}Z_{t-1} + \mu_t$$

In the model, c is referred to as the drag term, Δ , as the first difference actuator, μ , the term white noise error. All series are in their natural logarithmic form. Bound Test is based on the F-Test used to test the existence of a long-term relationship. The F-Test is an empty hypothesis test. H_0 is shown as follows;

$$H_0: \alpha_4 = \alpha_5 = \alpha_6 = 0$$

$$H_{alt}: \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq 0$$

If H_0 is rejected, there is a cointegration between variables. If a cointegration is detected between the variables, it is also possible to determine the long and short-term relationship between these variables with the ARDL model. Thirdly, the long and short term coefficients of variables can be calculated with the ARDL model and the ECM model. The long-term ARDL model is expressed as follows:

$$\Delta \text{Ln}Y_t = c + \sum_{i=1}^{k_1} \alpha_1 \Delta \text{Ln}Y_{t-1} + \sum_{i=1}^{k_2} \alpha_2 \Delta \text{Ln}X_{t-1} + \sum_{i=1}^{k_3} \alpha_3 \Delta \text{Ln}Z_{t-1} + \mu_t$$

In the above model, α_1 , α_2 and α_3 indicate the long-term coefficients of the ARDL model. Short-term coefficients are calculated with the error correction model as follows;

$$\Delta \ln Y_t = c + \sum_{i=1}^{k_1} \alpha_1 \Delta \ln Y_{t-1} + \sum_{i=1}^{k_2} \alpha_2 \Delta \ln X_{t-1} + \sum_{i=1}^{k_3} \alpha_3 \Delta \ln Z_{t-1} + \alpha_4 ECM_{t-1} \mu_t$$

In the above model, α_1 , α_2 and α_3 indicate short-term coefficients of the ARDL model, ECM error correction term and α_4 correction rate parameter.

Findings

Descriptive statistics of the variables included in the study are given in Table 1. The kurtosis value of the lnBCI series shows a fat-tailed behavior due to being greater than 3. Besides, lnTFEA and lnTFEL series are normally distributed according to Jarque-Bera test statistics. In terms of volatility, it is seen that the series with the highest volatility in the lnBCI series is the series with the lowest volatility in the lnTFEA series. The highest value (116.73) of the business confidence index in Turkey is in the second quarter of 2011, the lowest value (58.73) is in the fourth quarter of 2008.

Table 1. Descriptive Statistics

	LNBCI	LNTFEA	LNTFEL
Mean	4.633424	25.26239	26.13390
Median	4.656180	25.23960	26.27210
Maximum	4.759892	25.55302	26.54303
Minimum	4.073007	24.89510	25.33053
Std. Dev.	0.118051	0.166458	0.344975
Skewness	-3.129438	-0.061014	-0.617520
Kurtosis	14.58543	2.215679	2.092974
Jarque-Bera	382.9155	1.391361***	5.185217***

In order to avoid spurious regression problem between the series, the stationarity of the series is tested first. Time series should be stationary in finance research.

Figure 1. The Business Confidence Index

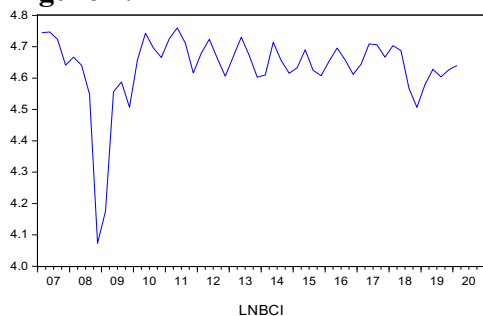
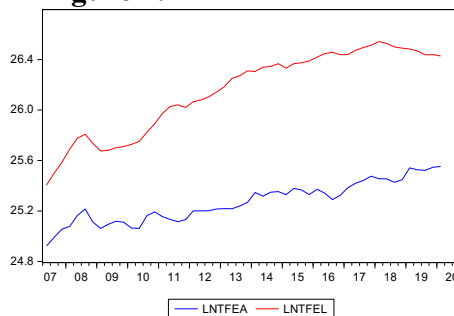


Figure 2. Total FX Assets and Liabilities



Looking at the line&symbol graphics of the series (Figure 1 and Figure 2), it is seen that there are breaks. For this reason, root unit tests with structural break are used. In the ADF-type Zivot Andrews (1992) unit root test, models with Model A allow single breakage at the level and Model C with both trend and level breakage. The rejection of the H_0 in this test shows that the series is stationary. Hypothesis testing is done by comparing T-statistic values with critical table values. Lee & Strazicich, (2003) focuses on the smallest LM unit root test that determines a structural break in level and trend. It allows breaking at the level with Model A, both at the level and trend with Model C. The rejection of the H_0 of this test shows that the series is stationary. LM type Lee & Strazicich (2003) unit root test is a unit root test that allows one and two breaks. It allows

breaking at the level with Model A, both at the level and trend with Model C. Like the other tests the rejection of the H_0 of this test shows that the series is stationary. Narayan & Popp (2010) test is a unit root test that takes into account ADF type double breakage in series. It allows the determination of stationarity of trending series at the level and in cases where both the trend and the level of double breakage occur. According to the findings in Table 2, it is determined that the series of LnBCI variable is stationary at 1% significance level at both level and level&trend in all unit root tests. The series of LnTFEA and LnTFEL variables are found to be stable at both level and level&trend only in Narayan & Popp (2010) test. Therefore, these two variables are tested again by taking the first differences. It is determined that the series of DLnTFEA and DLnTFEL variables are stationary at 1% significance level at both level and slope according to all unit root tests. Consequently, it is revealed that while LnBCI is stationary in Level I(0), LnTFEA and LnTFEL series are stationary in first difference I(1).

Table 2. Unit Root Tests and Results

		Zivot Andrews 1992		Lee & Strazicich, 2013		Narayan & Popp, 2010		Lee & Strazicich, 2003	
		Level	Level&Trend	Level	Level&Trend	Level	Level&Trend	Level	Level&Trend
LnBCI	t-statistics	-8.747	-12.351	-3.842	-6.595	-9.877	-16.176	-4.992	-6.923
	Break dates	2010 Q1	2011 Q2	2010 Q1	2010 Q1	2010 Q1	2011 Q2	2009 Q2	2010 Q1
						2011 Q1	2016 Q4	2010 Q4	2017 Q2
LnTFEA	Lag	3	3	2	2	3	3	2	2
	t-statistics	-5.480	-5.344	-3.548	-5.387	-6.202	-7.304	-3.678	-5.827
	Break dates	2009 Q1	2011 Q3	2018 Q4	2009 Q1	2009 Q1	2010 Q3	2014 Q4	2008 Q4
					2015 Q4	2015 Q4	2018 Q4	2015 Q4	
LnTFEL	Lag	5	5	1	1	5	5	5	0
	t-statistics	-3.143	-3.983	-2.169	-4.258	-4.190	-6.488	-2.465	-4.876
	Break dates	2017 Q4	2015 Q1	2011 Q4	2015 Q2	2011 Q3	2012 Q4	2011 Q4	2009 Q2
					2017 Q4	2017 Q4	2015 Q1	2014 Q4	
DLnTFEA	Lag	1	1	1	1	1	1	1	1
	t-statistics	-6.330	-6.226	-6.809	-7.021	-6.772	-7.643	-6.994	-7.758
	Break dates	2014 Q4	2014 Q4	2016 Q3	2008 Q4	2014 Q4	2008 Q4	2011 Q1	2013 Q3
					2016 Q2	2016 Q3	2016 Q3	2015 Q3	
DLnTFEL	Lag	4	4	0	4	4	4	0	1
	t-statistics	-7.229	-6.120	-6.360	-4.131	-7.396	-6.312	-6.533	-7.463
	Break dates	2009 Q4	2011 Q1	2008 Q4	2017 Q3	2009 Q4	2011 Q1	2008 Q4	2009 Q4
					2015 Q2	2013 Q2	2009 Q4	2018 Q3	
Critic Value	Lag	0	5	0	0	5	5	0	0
	%1	-5.34	-5.57	-4.239	-5.07	-4.958	-5.576	-4.545	-6.33
	%5	-4.80	-5.08	-3.566	-4.47	-4.316	-4.937	-3.842	-5.71
	%10	-4.58	-4.58	-3.211	-4.20	-3.980	-4.596	-3.504	-5.33

In the second stage the optimal lag length ARDL model is selected by considering the Akaike, Schwarz and Hannan-Quinn information criterions with the help of VAR approach. In this study quarterly data is used, therefore 5 lag length are estimated. Among 5 ARDL models, ARDL (2,0) for Model 1 and ARDL (1,4) for Model 2 are selected for long-run specification due to having the lowest values and satisfies the condition of the tests of normality, serial correlation and heteroscedasticity. The findings of ARDL models are shown in Table 3.

In the third stage, boundary test was applied to determine whether there is a cointegration between the variables in Model 1 and Model 2. Since Bound Test F-statistics values are greater than both the lower limit (I_0) value and the upper limit value (I_1) in both models at 5 percent significant level, it has been determined that there is a cointegration relationship between the variables. Bound test results are reported in Table 4.

Given the existence of cointegration between business confidence index and total foreign exchange assets and liabilities, the long-run relationship among variables are estimated by ARDL model.

Table 5 reports the findings. In Model 2, BCI is found to have positive, significant effect on total foreign exchange liabilities of non-financial firms. Thus, the results obtained can be interpreted as follows: 1 percent increase in business confidence index leads to an increase in total foreign exchange liabilities by 0.003 per cent. However, in Model 1 the coefficient BCI is insignificant. It means the long-run positive relationship between business confidence index and total foreign exchange assets of non-financial firms is insignificant.

Table 3. ARDL Lag Length Selection Based on Information Criteria

Model 1 : $TFEAt = \beta_0 + \beta_1 BCI_t$							
Lag Length	Selected Model	AIC	SIC	HQC	Normality(prob)	Serial Correlation	Heteroscedasticity
1	(1,0)	-3.524	-3.411	-3.481	0.52	0.859	0.706
2	(2,0)	-3.611	-3.458	-3.552	0.46	0.702	0.759
3	(2,0)	-3.611	-3.458	-3.552	0.46	0.797	0.759
4	(2,0)	-3.611	-3.458	-3.552	0.46	0.623	0.759
5	(2,0)	-3.611	-3.458	-3.552	0.46	0.710	0.759
Model 2 : $TFELt = \beta_0 + \beta_1 BCI_t$							
Lag Length	Selected Model	AIC	SIC	HQC	Normality (prob)	Serial Correlation	Heteroscedasticity
1	(1,1)	-4.544	-4.392	-4.486	0.88	0.512	0.369
2	(2,1)	-4.618	-4.426	-4.545	0.92	0.990	0.661
3	(2,3)	-4.605	-4.337	-4.503	0.77	0.674	0.908
4	(1,4)	-4.678	-4.407	-4.575	0.62	0.915	0.880
5	(1,4)	-4.678	-4.407	-4.575	0.62	0.944	0.880

Table 4. Bound Test Results

Model 1 (2,0) : $TFEAt = \beta_0 + \beta_1 BCI_t$						Model 2 (1,4) : $TFELt = \beta_0 + \beta_1 BCI_t$					
k	F-statistics	Lower limit (I ₀)		Upper limit (I ₁)		k	F-statistics	Lower limit (I ₀)		Upper limit (I ₁)	
1	23.97136	%10 4.04	%5 4.94	%10 4.78	%5 5.73	1	6.462021	%10 4.04	%5 4.94	%10 4.78	%5 5.73

Table 5. Long-Run Coefficients of Model 1 and Model 2

Model 1 (2,0) : $TFEAt = \beta_0 + \beta_1 BCI_t$				
Variable	Coefficient	Std. Error	t-Value	Prob.
BCI	0.000721	0.000453	1.593355	0.1179
C	-0.062681	0.046786	-1.339737	0.1869
Model 2 (1,4) : $TFELt = \beta_0 + \beta_1 BCI_t$				
Variable	Coefficient	Std. Error	t-Value	Prob.
BCI	0.003054	0.001154	2.645627	0.0114
C	-0.300276	0.119668	-2.509247	0.0160

Subsequently ARDL error correction model (ECM) is estimated. ECM is used to test the short-run relationship between variables. The short-run coefficients related to Model 1 (2,0) and Model 2 (1,4) are shown in Table 6. The coefficient of error correction term is insignificant in Model 1 and significant at 5 percent significant level in Model 2. That means 47 percent of the disequilibrium in total foreign exchange liabilities of non-financial firms from the previous period's shock will converge to the long-run equilibrium.

The diagnostic tests' results are shown in the Table 7. For detecting serial correlation, heteroscedasticity and normality, Breusch-Pagan Lagrange Multiplier (BGLM) test, Breusch-Pagan Godfrey (BPG) test and Jarque-Bera test are used respectively. According to the results of BGLM and BPG tests, it is concluded that there is no serial correlation and heteroscedasticity. The Jarque-Bera test results imply that when Model 2 is normally distributed, Model 1 isn't normally distributed. Moreover, most of the Model 1 tests aren't significant. The overall stability of the

ARDL models are determined by Ramsey test. The outcomes of both two models show that the models' functional forms are good.

Table 6. Short-Run Coefficients of Model 1 and Model 2

Model 1 (2,0) : DLNDVt= β0 + β1 RKGEt				
Değişkenler	Katsayılar	Stand. Hata	t-Değeri	Olasılık
C	-0.109067	0.057481	-1.897435	0.0638
RKGE	0.001178	0.000555	2.122311	0.0390
ECT(-1)	0.076952	0.144011	0.534350	0.5956
Model 2 (1,4) : DLNDYt= β0 + β1 RKGEt				
Değişkenler	Katsayılar	Stand. Hata	t-Değeri	Olasılık
C	-0.128241**	0.059879	-2.141660	0.0379
RKGE(-1)	0.001810***	0.000642	2.821019	0.0072
RKGE(-2)	-0.000842	0.000855	-0.984214	0.3305
RKGE(-3)	0.000559	0.000863	0.648045	0.5204
RKGE(-4)	-0.000109	0.000632	-0.172376	0.8640
ECT(-1)	0.473872***	0.158188	2.995627	0.0045

Table 7. Diagnostic Tests and Results

Test	Serial Correlation Breush-Godfrey LM Test	Heteroscedasticity Breush- Pagan- Godfrey Test	Normality Jarque-Bera	Goodness of fit of Models Ramsey Test
MODEL 1	Prob.: 0.7020	F-İst: 0.7591	Prob.: 0.46	Prob.: 0.07
MODEL 2	Prob.: 0.9157	F-İst: 0.8801	Prob.: 0.62	Prob.: 0.06

Finally, following Pesaran and Pesaran (1997), the Cumulative Sum (CUSUM) and Cumulative Sum Squares (CUSUMQ) stability tests are used to assess the stability of the relationship. These stability tests are proposed by Brown, Durbin and Evans (1975) for AIC based error correction models. According to Figure 4,5,6, and 7 all the plots of CUSUM and CUSUMQ statistics stay within the 5 percent level of significance except Model 1 's plot of CUSUM. It is concluded that the parameters of Model 2 are stable over the period.

Figure 4. Model 1- Plot of (CUSUM)

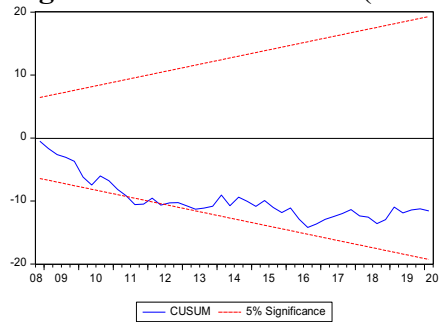


Figure 5. Model 1- Plot of (CUSUMQ)

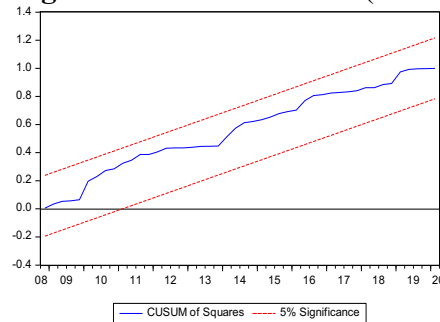


Figure 6. Model 2- Plot of (CUSUM)

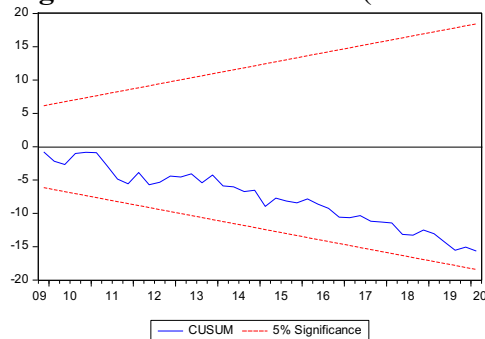
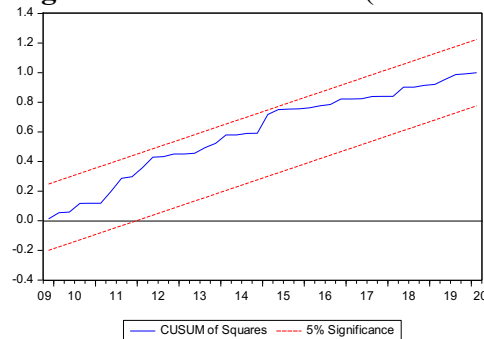


Figure 7. Model 2- Plot of (CUSUMQ)



Conclusion

Business confidence index is an index that shows investors' expectations for the future. Besides, it reflects the confidence level of the real sector representatives in the economic activities of the country, who answered the questionnaire for the establishment of this index. Therefore, it's characterized as an early warning system to forecast upwards and downwards of the economy. The research question is emerged from this point. Are the non-financial firms' managers considering the business confidence index when they manage their foreign exchange position? According to the findings, while there is no significant relationship between non-financial firms' foreign currency assets and business confidence index; there is a significant relationship between the foreign currency liabilities and the business confidence index in both the long-run and the short-run. Although the coefficient is low, as the business confidence index increases, the total foreign currency liabilities of non-financial firms also increase.

The development of companies, which are the smallest building blocks of the economy, is very important for the growth of the country's economies. The development of firms is also related to the ability to provide financial resources and trade in international markets. With this study, it is revealed that the perception of confidence is an important factor in the formation of firms' foreign exchange policies. Confidence perceptions due to economic policies also affect firms' foreign exchange amounts.

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