AN EVALUATION OF EFFECTS OF LIBERALIZATION POLICIES IMPLEMENTED OFTEN ON FOREIGN EXCHANGE RATE

Onur Akkaya[12], Güner Polat[3]

Summary

It is well known that liberalization refers to a restriction of government interventions, usually in areas of social or economic policy. Additionally, it is used to refer to economic liberalization, especially trade liberalization or capital market liberalization. In this study, the effects of the financial liberalization on exchange rate, are explained and an evaluation of the liberalization is given by considering the effects type of liberalization.

In this study, it is related to explanation of between liberalization policies and foreign exchanges by means of empirical methods like co-integration tests. Thus, the possible effects of liberalization policy implementations over real exchange rates will also be studied by using advanced time series techniques such as Zivot and Andrews unit root test and Bounds Test. Shortly, a general evaluation of the study is given in the last part of the study.

Key Words; 1) Liberalization, 2) Financial Liberalization, 3) Liberalization of Foreign Trade, 4) Exchange Rate, 5) Turkish Economy

Özet

Liberalizasyon sözcük anlamı olarak; ürün ve faktör fiyatlarının piyasa koşulları tarafından belirlendiği, siyasi otoritenin ekonomiye müdahalesinin en aza indirildiği, yabancı ülkelerle her türlü ekonomik ilişkinin serbestçe kurulabildiği, ekonomideki hem reel hem de finansal kesimin piyasa güçlerine açıldığı faaliyetler bütünü olarak tanımlanmaktadır. Ekonomilerde gerçekleşen bu liberalleşme çalışmaları başlıca iki grup altında toplanmaktadır. Bunlardan ilki dış ticaretin liberalleşmesi iken diğeri finansal piyasalarda görüleşen liberalleşme şeklindedir. Çalışmada, lliberalizasyona yönelik politikalar ile döviz kurlarını arasındaki ilişkileri inceleyen araştırmalara yer verilmiştir. Bu bölümde ayrıca konuya ilişkin bir ampirik çalışma yapılmış ve Türkiye'de reel döviz kurları ile liberalizasyon türleri için tanımlanmış değişkenlerin zaman serileri, en uygun durağanlık ve eşbütünleşme testleriyle sınanmıştır.

Anahtar Kelimeler; 1) Liberalizasyon, 2) Finansal Liberalizasyon, 3) Dış Ticaretin Liberalizasyonu, 4) Döviz Kuru, 5) Türkiye Ekonomisi

[1] University of Surrey, UK, Department of Economics, PhD student (in behalf ;University of Kilis), onr.akkaya@gmail.com

[2] Thanks to Miss Gülsen Gökçen who helped me this paper.

[3] University of Dokuz Eylul, TR, Department of Economics, PhD student.

Introduction

Liberalization is which goods and factor prices are determined by market conditions, authority of politics' power is decreased, relationship of foreign countries are increased, both financial economy and real economy are had very power in all economy. Liberalization is describing that philosophy of liberal explains place in economy. Marketing economy of liberal system is describing that productivity, profit and efficiency explain places in enterprise. Private property is more important than public possession in liberalization. Efficiency of marketing economy is provided by price mechanism (Aktan; 2000, s.27). Modern development economy theory is believed that good trade and investment of foreign are more freedom in the past and restrictions of economy are endured by Liberalization (Kavas; 2002, ss.1-2).

Literature

Liberalization intends that movement of foreign trade is increased and price mechanism is used in economic system. Literature has had lots of articles whose subject is relation of liberalization policy and exchange rate. Generally, the articles have been examined relationship between financial or foreign trade liberalizations and exchange rate by authors. C. Varoudokıs and M. Veganzones (2003) who searched the economic structure of Argentine, examined relationship of real exchange rate and foreign trade liberalization and used the co-integration approach by writers. The result of article shows that there are inverse relations between foreign trade liberalization and real exchange rate. E.Lendero (2003), who searched the economic structure of Argentine, explains relations between export regime and liberalization policy. The result of article shows that foreign trade Liberalization and real exchange rate have inverse relations at economic structure. N.Ahmed (2000), who searched the economic structure of Bangladesh, examined relationship of real exchange rate and foreign trade liberalization. The result of article show that foreign trade liberalization and real exchange rate between inverse relations at economic structure. Also, the change of real exchange rate has deflected influence on export regime. K. Sakkat and A. Varoudokıs (2002), who searched the export of manufacture sector in South Africa, examined relationship of real exchange rate and export of manufacture sector. The result of article shows that export of manufacture sector and real exchange rate have inverse relations at economic structure. R.Glick and M. Hutchision (2004) searched the foreign portfolio investment in developing countries. The result of his article shows that deregulate or liberalization of portfolio investment in developing countries make speculation effect on

economic structure. O.C.Akçay, E.Alper and M. Karaslı searched approach of dollarization in Turkey. Some temporary dollarization periods affected highly volatility of exchange rate.

All of the articles are searched economic structure of developing countries. The articles shows that real exchange rate have inverse relations between financial liberalization and foreign trade liberalization. Different approaches were used in the articles by writers. On the other hand, all of the articles only mutual point is that there were used co-integration approaches.

Data

The data set used for the empirical analysis in this paper consists of quarter obsevations extending from 1992Q1 to 2006Q4 on RERTEFE (exchange rate of total goods price ındex), DIS (export+ımport /GNP)*100), FAİZ (Quarter Year of İnterest Rate in US Dolar), SEİH: (export of capital quantitiy / GNP) *100), SEİT: (import of capital quantitiy/GNP)*100, NETHT: (net errors and omissions/GNP) * 100) in the Turkish economy. All variables are expressed in US $. Data were obtained from TCMB(EVDS), DPT, 2002-IMF-IFS, and 2003-OECD-EDS.

Unit Root and Co-integration without Break

The first step of co-integration analysis is to test for the unit roots of the series, for which different tests are described in the literature. We employed ADF, PP and KPSS tests to check the non-stationarity assumption. Table-1 reports of various unit root tests developed by ADF (Agumented Dickey Fuller) (1979). Table-2 reports of various unit root tests developed by PP (Philips and Perron) (1988) and Table-3 reports of various unit root tests developed KPSS (Kwiatkowski, Philips, Schmidt and Shin) (1992). The results are consistent with RERTEFE, DIS and FAİZ being integrated of order one, I(1). Otherwıse, SEIT, SEIH and NETHT being integrated of order zero, I(0). This situation indicates a Difference Stationary Process (DSP). The KPSS and the results of other tests are in conflict, because the KPSS test says that integration level of series in I(0). Different unit root test results are likely to indicate us signs of structural break.

Peron (1989) admitted the possibility of structural breaks in the series and suggested that the conventional unit root test could fail to reject the unit root hypothesis of non-stationary even for series known to be trend stationary with structural break. Zivot and Andrews (1992) criticized Perron's assumption of an exogenous date of the structural breaks and permitted the date of the structural break to be endogenously determined within the model.

This paper also questions this result by using Zivot-Andrews unit root test permitting one endogenously determined break. Table 4 summarizes the result of the Zivot-Andrews test in the presence of structural break allowing for a change in the intercept and trend.

The results from the Zivot-Andrews test confirm the results of the other tests that all series are I(1). According to Table 4, break points seem to coincide with 2001Q3 for RERTEFE. Break points seem to coincide with 2001Q1 for FAİZ. These were the year that Turkish economy had a financial crisis. This period, exchange rate and interest rate were had very high volatility. Break points seem to coincide with 1994Q3 for SEİT. This was that Turkish manufacture sector was had very deep economic crisis. Break points seem to coincide with 1998Q1 for DIS. Because of that global economic crisis was had the entire world. According to Table 5, this table is summarized the result of the all unit root tests.

ARDL model specification

To empirically analyse the long-run relationship and dynamic interactions among the variables of interest, the model has been estimated by using the bounds testing (or autoregressive distributed lag (ARDL) cointegration procedure, developed by. The procedure is adopted for the following three reasons. Firstly, the bounds test procedure is simple. As opposed to other multivariate co-integration techniques such as Johansen and Juselius, it allows the co-integration relationship to be estimated by OLS once the lag order of the model is identified. Secondly, the bounds testing procedure does not require the pre-testing of the variables included in the model for unit root unlike other techniques such as the Johansen approach. It is applicable irrespective of whether the regressors in the model are purely I(0), purely I(1) or mutually co-integrated. Thirdly, the test is relatively more efficient in small or finite sample data sizes as is the case in this study. The procedure will however crash in the presence of I(2) series. We apply the bounds test procedure by modelling the long-run equation (1) as a general vector autoregressive (VAR) model of order p, in z_t :

$$z_t = c_0 + \beta t + \sum_{i=1}^{p} \phi_i z_{t-i} + \varepsilon_t, t = 1, 2, 3, ..., T \quad (1)$$

with co representing a(k+1) vector of intercepts (drift) and β denoting a (k+1) vector of trend coefficients, further derived the following vector equilibrium correction model (VECM) corresponding (2):

$$\Delta z_t = c_0 + \beta t + \Pi z_{t-1} + \sum_{i=1}^{p} \Gamma_i \Delta z_{t-i} + \varepsilon_t, t = 1, 2...., T$$

(2)

where the (k+1)x(k+1) matrices $\Pi = I_{k+1} + \sum_{i=1}^{p} \Psi_i$ and $\Gamma_i = -\sum_{j=i+1}^{p} \Psi_j, i = 1, 2, \ldots, p-1$ tain the long-run multipliers and short-run dynamic coefficients of the VECM.

z_t is the vector of variables y_t and x_t respectively. y_t is an I(1) dependent variable defined as lnY_t and x_t is a vector matrix of 'forcing' I(0) and I(1) regressors as already defined with a multivariate identically and independently distributed (*i.i.d*) zero mean error vector

$\varepsilon_t = (\varepsilon_{1t}, \varepsilon'_{2t})'$ edastic process. Further assuming that a unique long-run relationship exists among the variables, the conditional VECM (2) now becomes:

$$\Delta y_t = c_{y0} + \beta t + \delta_{yy} y_{t-1} + \delta_{xx} x_{t-1} + \sum_{i=1}^{p-1} \lambda_i \Delta y_{t-i} + \sum_{i=0}^{p-1} \xi_i \Delta x_{t-1} + \varepsilon_{yt}, \; t = 1, 2, \ldots, T \qquad (3)$$

where δ_i are the long run multipliers, c_0 s the drift and ε_t are white noise errors(Peseran, 2001, pp.4-8).

Bounds tests for cointegration: In the first step of the ARDL analysis, we tested for the presence of long-run relationships in equation (1). We used a general-to-specific modelling approach guided by the short data span and AIC respectively to select a maximum lag order of 4 for the conditional ARDLVECM. Following the procedure in, we first estimated an OLS regression for the first differences part of equation (1) and then test for the joint significance of the parameters of the lagged level variables when added to the first regression. According to," this OLS regression in first differences are of no direct interest" to the bounds cointegration test. The F-statistic tests the joint null hypothesis that the coefficients of the lagged level variables are zero (i.e.no long-run relationship exists between them). Table 6 reports the results of the calculated F-statistics when each variable is considered as a dependent variable (normalized) in the ARDL-OLS regressions.

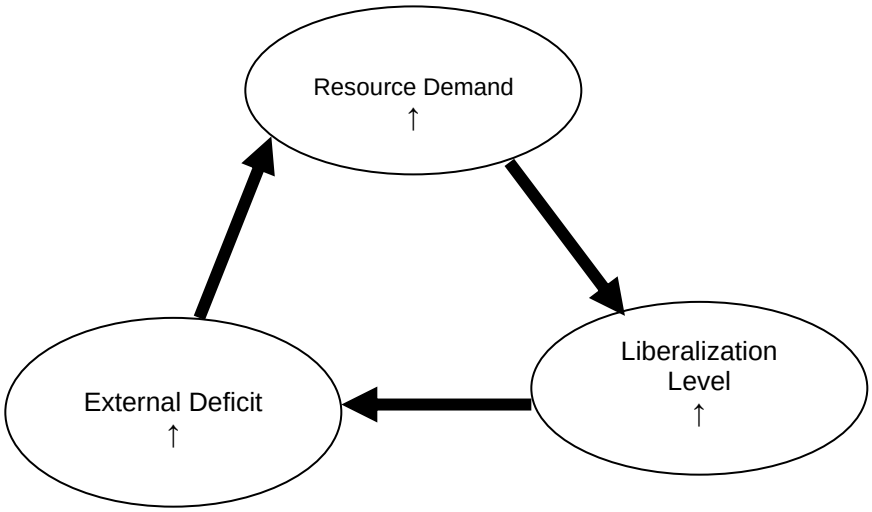
The calculated F-statistics: (RER_t I DIS_t, $FAİZ_t$,$SEİH_t$) = 12.23 is higher than the upper bound critical value -3.78 at the 5% level. (RER_t I DIS_t, $FAİZ_t$,$SEİT_t$)= 9.14 is also higher than the upper-bound critical value -3.78 at the 5% level. Also (RER_t I DIS_t, $FAİZ_t$,$NETHT_t$)= 10.55 is higher than the upper bound critical value -3.78 at the 5% level. Thus, the null hypotheses of no cointegration are rejected, implying long-run cointegration relationships amongst the variables when the regressions are normalized on both RER_t, DIS_t, $FAİZ_t$, $SEİH_t$, $SEİT_t$ and $NETHT_t$

variables (Table 6). However we used RER_t as the dependent variable. Once we established that a long-run cointegration relationship existed, equations (2) were estimated using the following ARDL (4, 4, 4, 4) specification. The results obtained by normalizing on exchange rate of total goods price index (RER_t), in the long run are reported in Table 7, Table 8 and Table 9. The estimated coefficients of the long-run relationship in Model-1 show that (export+ımport /GNP) has a very high significant impact on exchange rate of total goods price index (RER_t). A 1% increase in (export+ımport /GNP) leads to approximately 2,64 % increase in exchange rate of total goods price index (RER_t), all things being equal. The estimated coefficients of the long-run relationship in Model-2 show that (export+ımport /GNP) has a very high significant impact on exchange rate of total goods price index (RER_t). A 1% increase in (export+ımport /GNP) leads to approximately 4,75 % increase in exchange rate of total goods price index (RER_t), all things being equal. The estimated coefficients of the long-run relationship in Model-3 show that (export+ımport /GNP) has a very high significant impact on exchange rate of total goods price index (RER_t).A 1% increase in (export+ımport /GNP) leads to approximately 2,29 % increase in exchange rate of total goods price index (RER_t), all things being equal.

The results of the short-run dynamic coefficients associated with the long-run relationships obtained from the ECM equation (3) are given in Table 10, Table 11 and Table 12. The signs of the short-run dynamic impacts are maintained to the long-run. The equilibrium correction coefficient (*ecm*) in Model-1 show that, estimated -0.03 (0.00) is highly significant, has the correct sign and imply a fairly high speed of adjustment to equilibrium after a shock. Approximately 3% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year. The equilibrium correction coefficient (*ecm*) in Model-2 show that, estimated -0.12 (0.00) is highly significant, has the correct sign and imply a fairly high speed of adjustment to equilibrium after a shock. Approximately 12% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year. The equilibrium correction coefficient (*ecm*) in Model-3 show that, estimated -0.21 (0.00) is highly significant, has the correct sign and imply a fairly high speed of adjustment to equilibrium after a shock. Approximately 21% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year.

Conclusion

In this period, liberalization is assed as a factor for finding the relationship between liberalization and foreign resources. As a matter of fact, with the structural problem of economics, as a consequence of the current policies, the necessity of foreign resource is increased. Therefore, the level of the liberalization in economics is soared. The increased of liberalization level causes the rise of external deficit. This rise of the external deficit creates a new problem which is related to the new resource demand. The diagram in below illustrates that this situation repeats itself over and over again.



According to the result of analyzes as we were explaining in above, two findings are enabled. While first finding shows that the rise of the financial liberalization has a reducing effect on the exchange rate, the second indicates that liberalization of the foreign trade increases exchange rate. Former has an inverse relation; the latter has a positive relation. In addition, the other studies in the literature support our findings which are accurate.

All in all though, in the base on the assumption that the solution will be enabled from resources instead off results, some solutions will be suggested. The first one is that the perception which makes Turkey depends on foreign countries as regards input and production resources should be changed. Also the domestic production should be incresead regarding the current competition conditions and it should reach the sustainable balance level of public sector. When domestic saving increased domestic production will increase. In conclusion, this solution points out that,

the importance of adverse result of both foreign trade liberalization and financial liberalization would disappear.

References

Güneri Akalın (2002), "**Türkiye'de Ekonomi-Politik Kriz ve Piyasa Ekonomisine Geçiş**", Akçağ Publishers / 438, Economics Researchs/ 6, Ankara.

Coşkun Can Aktan (2000), "**Yeni Global Gerçekler – 21.yüzyıl. için Post Modern Manifesto**", TUGİAD Publishers.

Nilay Kavas (2002), "Türkiye'de Finansal Liberalizasyonun Bankacılık Sisteminin Fon kaynakları ve Kullanımı Üzerine Etkilerin Analizi", Social Scienes of Dokuz Eylul University.

Bela Balasa (1986), "**Gelişmekte Olan Ülkelerde Dışa Açılma ve Döviz Kuru Politikaları**", Çev: A.Nejat Çoşkun, Dışa Açık Ekonomi Üzerine Makaleler, Republic of turkey Mınıstry of Finance, Publish No: 1986/270, Ankara.

Varoudakıs, C. And M.Veganzone (2003), "Real Exchange Rate And Openness İn Emerging Economies:Argentina İn The Longrun", **Applied Economics**.

Elio Londero (1997), "Trade Lıberalızatıon Wıth A Fıxed Exchange Rate", **The Internatıonal Trade Journal**.

Ahmed, N.(2000), "Export Response To Trade Liberalizatıon Bangladesh A Coıntegratıon Analysis", **Applied Economics**.

Sekkat, K. and A. Varoudakis (2002), "The Impact of Trade And Exchange-Rate Policy Reforms on North African Manufactured Exports" , **Development Policy Review**.

Glick, R., and M. Hutchison (2005), "Capital Controls And Exchange Rate İnstability in Developing Economies", **Journal Of International Money And Finance**.

Doroodıan, K., C. Jung and A. Yucel (2002) "Estimating The Equilibrium Real Exchange Rate: The Case of Turkey", **Applied Economics**.

Aksay, O.Cevdet, C. Emre Alper, Meral Karasulu (1997) , "Currency Substitution And Exchange Rate İnstability: The Turkish Case", **European Economic Review**.

Kasman, Adnan ve others (2005), "Cari Açık Büyümenin mi Aşırı Değerli TL'nin mi Sonucudur?", Economics, Management and Finance Journal, vol. 235.

Pesaran, M.H., Shin (2001), Y. ve Smith, R.J., "Bounds Testing Approaches to the Analysis of Level Relationships". **Journal of Applied Econometrics**.

Oteng-Abayie Eric Fosu and Frimpong Joseph Magnus (2006), Bounds Testing Approach to Cointegration: An Examination of Foreign Direct Investment Trade and Growth Relationships**, American Journal of Applied Sciences**.

Appendix

Table 1: ADF Unit root Test Result

Valuables	I(0)		I(1)		Co-İntegration Level
	Constant	Constant and Trend	Constant	Constant and Trend	
RERTEFE	-1.1284 (3)	-3.2808 (3)	-7.1105** (3)	-5.6927* (3)	I(1)
DIS	-1.1712 (2)	-6.3503* (2)	-9.9833* (2)	-9.9209* (2)	I(1)
FAİZ	-1.7409 (2)	-1.7019 (2)	-5.5060* (2)	-5.5189* (2)	I(1)
SEİH	-6.7452* (2)	-6.7341* (2)			I(0)
SEİT	-1.5210 (2)	-2.0921 (2)	-7.7859* (2)	-7.8205* (2)	I(1)
NETHT	-4.6550* (3)	-4.6297* (3)			I(0)

Note: ** denotes unit root at 5% significance level; numbers in parenthesis are optimum number of lags determined according to AIC; critical values are based on MacKinnon (1996). For PP and KPSS tests, numbers in parenthesis are the truncation lag determined according to Bartlett Kernel (1992). *, **, *** shows respectively 1%, 5%, 10% level H_o hypothesis.

Table 2: PP Unit root Test Result

Valuables	**I(0)**		**I(1)**		**Co-İntegration Level**
	Constant	**Constant and Trend**	**Constant**	**Constant and Trend**	
RERTEFE	-1.3442	-2.9955	-9.3102*	-11.5750*	I(1)
DIS	-2.0285	-6.3508 **	-27.8221*	-27.5388*	I(1)
FAİZ	-1.6007	-1.5703	-4.4075*	-4.8211*	I(1)
SEİH	-8.2732 *	-8.5021 *			I(0)
SEİT	-3.3893 *	-4.3260 *			I(0)
NETHT	-6.1377 *	-6.0842 *			I(0)

Note: ** denotes unit root at 5% significance level; numbers in parenthesis are optimum number of lags determined according to AIC; critical values are based on MacKinnon (1996). For PP and KPSS tests, numbers in parenthesis are the truncation lag determined according to Bartlett Kernel (1992). *, **, *** shows respectively 1%, 5%, 10% level H_o hypothesis.

Table 3: KPPS Unit root Test Result

Valuables	**I(0)**		**I(1)**		**Co-Integration Level**
	Constant	**Constant and Trend**	**Constant**	**Constant and Trend**	
RERTEFE	0.7587 *	0.1965 **	0.3203	0.2480 *	I(1)
DIS	0.9161 *	0.0762	0.1167	0.1142 ***	I(1)
FAİZ	0.1742	0.1714 **	0.1151	0.0987	I(1)
SEİH	0.2352	0.0912			I(0)
SEİT	0.4304 ***	0.1458 ***	0.2859	0.2564 *	I(1)
NETHT	0.0953	0.0937			I(0)

Note: ** denotes unit root at 5% significance level; numbers in parenthesis are optimum number of lags determined according to AIC; critical values are based on MacKinnon (1996). For PP and KPSS tests, numbers in parenthesis are the truncation lag determined according to Bartlett Kernel (1992). *, **, *** shows respectively 1%, 5%, 10% level H_o hypothesis.

Tablo 4: Zivot-Andrews Endogenous Break Test Results

	RERTEFE	FAİZ
TB	2001:3	2001:1
(ρ-1)	0.582 (4.632)	0.551 (4.385)
δ	0.536 (0.165)	-0.396 (-0.504)
γ	-6.552 (-0.991)	0.072 (0.100)
k	3	2
	SEİT	**DİS**
TB	1994:3	1998:1
(ρ-1)	-2.963 (-1.267)	0.141 (0.978)
δ	-0.997 (-0.241)	-5.163 (-1.700)
γ	-0.997 (-0.241)	2.052 (0.498)
k	2	2

Note: Critical values at 1%, 5% and 10% significance level are –5.57, -5.08 and –4.82 respectively (Zivot and Andrews, 1992). **k** is the lag length used in the test for each series and selected criteria based on AIC. t statistics of the related coefficients are given in parenthesis.

Table 5: The Result of The All Unit Root Tests

	ADF	PP
RERTEFE	I(1)	I(1)
DİS	I(1)	I(1)
FAİZ	I(1)	I(1)
SEİT	I(1)	I(0)
SEİH	I(0)	I(0)
NETHT	I(0)	I(0)
	KPSS	**ZİVOT ve ANDREWS**
RERTEFE	I(1)	I(1)
DİS	I(1)	I(1)
FAİZ	I(1)	I(1)
SEİT	I(1)	I(1)
SEİH	I(0)	
NETHT	I(0)	

Tablo 6 Results from bounds tests on equation

F-statistic			
		I(0)	**I(1)**
$\mathbf{F_{RER}}$ $(RER_t \text{ I } DIS_t, FAİZ_t, SEİH_t)$	12.23741*	-2.86	-3.78
$\mathbf{F_{RER}}$ $(RER_t \text{ I } DIS_t, FAİZ_t, SEİT_t)$	9.14726*	-2.86	-3.78
$\mathbf{F_{RER}}$ $(RER_t \text{ I } DIS_t, FAİZ_t, NETHT_t)$	10.55140*	-2.86	-3.78

Notes: Asymptotic critical value bounds are obtained from Table F in appendix C, Case II: intercept and no trend for k=3 (Pesaran and Pesaran, 1997, p.478).
Lower bound I(0) = -2.86 and Upper bound I(1) = -3.78 at 5% significance level.

Table 7 Model-1 Estimated long run coefficients using the ARDL approach
ARDL(4,4,4,4)

Regressor	Coefficient	T-Ratio(T-Probability)
RERTEFE(1)	1.0230	6.291 (0.0000)
RERTEFE(2)	-0.3717	-1.776 (0.0834)
RERTEFE(3)	0.2340	1.129 (0.2657)
RERTEFE(4)	-0.0384	-0.240 (0.8110)
FAİZ	-1.1915	-0.913 (0.3668)
FAIZ(1)	1.6289	1.256 (0.2165)
FAIZ(2)	-3.3533	-1.524 (0.1355)
FAIZ(3)	3.2568	1.518 (0.1369)
FAIZ(4)	-1.5571	-1.244 (0.2208)
NETHT	-0.1199	-0.266 (0.7912)
NETHT(1)	0.0312	0.071 (0.9436)
NETHT(2)	0.1447	1.158 (0.2539)
NETHT(3)	0.2233	0.153 (0.8787)
NETHT(4)	0.0740	0.503 (0.6178)
DIS	-0.2416	-0.913 (0.3668)
DIS(1)	0.1854	0.840 (0.4060)
DIS(2)	0.1780	-2.136 (0.0390)
DIS(3)	0.1447	0.639 (0.5264)
DIS(4)	-0.4583	0.793 (0.4325)
C	13.834	1.305 (0.1993)

R^2 =.826632 F Değeri=11.622 DW=2.019

Estimated long run coefficients using the ARDL approach

DIS	2,641***	5,66 (0,000)
FAİZ	0,270	0,100 (0,920)
NETHT	2,008	0,583 (0,562)

***(**) denotes 1%(5%) significance level.

Table 8 Model-2 Estimated long run coefficients using the ARDL approach
ARDL(4,4,4,4)

Regressor	Coefficient	T-Ratio(T-Probability)
RERTEFE(1)	1.0635	6.573 (0.0000)
RERTEFE(2)	-0.4664	-2.073 (0.0448)
RERTEFE(3)	0.2959	1.300 (0.2011)
RERTEFE(4)	-0.0901	-0.547 (0.5875)
FAİZ	-0.9303	-0.734 (0,4673)
FAIZ(1)	1.6868	1.333 (0.1901)
FAIZ(2)	-3.2426	-1.490 (0.1441)
FAIZ(3)	2.8505	1.278 (0.2087)
FAIZ(4)	-1.3064	-0.988 (0.3292)
SEİH	-0.7645	-1.387 (0.1739)
SEIH(1)	0.0761	0.140 (0.8892)
SEIH(2)	-0.5126	-0.970 (0.3377)
SEIH(3)	0.1248	0.250 (0.8031)
SEIH(4)	-0.2920	-0.582 (0.5636)
DIS	-0.1628	-0.581 (0.5647)
DIS(1)	0.1548	0.691 (0.4935)
DIS(2)	0.1947	0.836 (0.4081)
DIS(3)	0.1457	0.642 (0.5242)
DIS(4)	-0.4117	-1.876 (0.0681)
C	17.220	1.686 (0.0998)

R^2 =0.821 F Değeri=11.234 DW=1.944

Estimated long run coefficients using the ARDL approach

DIS	4,752***	2,256 (0,029)
FAİZ	-2,121	-0,421 (0,675)
SEİH	-9,336	-1,090 (0,281)

***(**) denotes 1%(5%) significance level.

Table 9 Model-3 Estimated long run coefficients using the ARDL approach ARDL(4,4,4,4)

Regressor	Coefficient	T-Ratio(T-Probability)
RERTEFE(1)	0.8440	5.029 (0.0000)
RERTEFE(2)	-0.3862	-1.922 (0.0619)
RERTEFE(3)	0.2207	1.081 (0.2861)
RERTEFE(4)	-0.0133	-0.087 (0.9303)
FAİZ	-1.6038	-1.308 (0.1991)
FAIZ(1)	0.9145	0.728 (0.4708)
FAIZ(2)	-2.6150	-1.259 (0.2153)
FAIZ(3)	3.0028	-1.232 (0.2253)
FAIZ(4)	-1.4363	1.521 (0.1362)
SEİT	-0.0502	-0.159 (0.8742)
SEIT(1)	0.2264	0.829 (0.4118)
SEIT(2)	0.4803	1.686 (0.0998)
SEIT(3)	0.1823	0.615 (0.5416)
SEIT(4)	-0.0618	-0.213 (0.8324)
DIS	-0.2749	-1.070 (0.2916)
DIS(1)	0.0987	0.481 (0.6329)
DIS(2)	0.1857	0.877 (0.3856)
DIS(3)	0.1844	0.859 (0.3955)
DIS(4)	-0.3901	-1.878 (0.0678)
C	29.977	2.315 (0.0259)

R^2 =0.843 F Değeri=13.174 DW=1.933

Estimated long run coefficients using the ARDL approach

DIS	2,291***	4,301 (0,0000)
FAİZ	0,257	0,116 (0,907)
SEİT	-5,913	0,810 (0,520)

***(**) denotes 1%(5%) significance level.

Tablo 10 Model-1 Error correction representation for the selected ARDL model

Regressor	Coefficient	T-Ratio(T-Probability)
DFAIZ	0.6896	0.793 (0.4334)
DFAIZ(-1)	-0.1438	-0.096 (0.9235)
DFAIZ(-2)	-3.0755	-1.948 (0.0602)
DFAIZ(-3)	3.0792	2.039 (0.0497)
DFAIZ(-4)	-0.7647	-0.875 (0.3880)
DDIS	-0.1279	-0.650 (0.5200)
DDIS(-1)	0.2050	1.134 (0.2652)
DDIS(-2)	-0.0915	-0.534 (0.5964)
DDIS(-3)	-0.1029	-0.588 (0.5603)
DDIS(-4)	0.0616	0.278 (0.7828)
DNETHT	-0.4059	-1.211 (0.2344)
DNETHT(-1)	0.1220	0.355 (0.7245)
DNETHT(-2)	0.0586	0.193 (0.8480)
DNETHT(-3)	-0.0501	-0.167 (0.8681)
DNETHT(-4)	0.2336	0.789 (0.4357)
DRERTEFE(-1)	1.1025	8.282 (0.0000)
DRERTEFE(-2)	-0.0486	-0.328 (0.7447)
DRERTEFE(-3)	0.0613	0.386 (0.7014)
DRERTEFE(-4)	0.0390	0.334 (0.7399)
ECM(-1)	***-0.0323******	***-6.297 (0.0000)***
C	-12.769	-1.455 (0.1552)

R^2 =.943 F Değeri=11.622 DW=2.154

***(**) denotes 1%(5%) significance level.

Table 11 Model-2 Error correction representation for the selected ARDL model

Regressor	Coefficient	T-Ratio(T-Probability)
DFAIZ	1.4721	1.710 (0.0968)
DFAIZ(-1)	-2.0878	-1.409 (0.1685)
DFAIZ(-2)	-0.9207	-0.596 (0.5549)
DFAIZ(-3)	1.8725	1.368 (0.1806)
DFAIZ(-4)	-0.5413	-0.685 (0.4977)
DDIS	-0.1407	-0.788 (0.4360)
DDIS(-1)	0.2724	1.683 (0.1021)
DDIS(-2)	-0.0108	-0.064 (0.9488)
DDIS(-3)	-0.2031	-1.265 (0.2148)
DDIS(-4)	0.0368	0.180 (0.8583)
DSEİH	0.3719	1.068 (0.2933)
DSEİH(-1)	-0.0789	-0.236 (0.8149)
DSEİH (-2)	0.4485	1.205 (0.2367)
DSEİH (-3)	-0.2113	-0.563 (0.5769)
DSEİH (-4)	0.1668	0.451 (0.6548)
DRERTEFE(-1)	-0.1407	-0.788 (0.4360)
DRERTEFE(-2)	-0.0091	-0.060 (0.9523)
DRERTEFE(-3)	0.0461	0.308 (0.7594)
DRERTEFE(-4)	-0.0020	-0.019 (0.9848)
ECM(-1)	**-0.1261*** **	**-7.1343 (0.0000)**
C	-14.8313	-1.780 (0.0845)

R^2 =0.949 F Değeri=30.296 DW=2.327

***(**) denotes 1%(5%) significance level.

Table 12 Model-3 Error correction representation for the selected ARDL model

Regressor	Coefficient	T-Ratio(T-Probability)
DFAIZ	0.3458	0.485 (0.6308)
DFAIZ(-1)	-0.0723	-0.058 (0.9537)
DFAIZ(-2)	-2.2423	-1.746 (0.0904)
DFAIZ(-3)	2.3687	1.949 (0.0601)
DFAIZ(-4)	-0.4554	-0.611 (0.5450)
DDIS	-0.4128	-2.707 (0.0108)
DDIS(-1)	0.1468	1.063 (0.2956)
DDIS(-2)	-0.1137	-0.776 (0.4434)
DDIS(-3)	0.0332	0.244 (0.8082)
DDIS(-4)	0.3099	1.860 (0.0721)
DSEİT	-0.4131	-2.033 (0.0504)
DSEİT(-1)	-0.3888	-2.005 (0.0534)
DSEİT (-2)	0.3361	1.589 (0.1218)
DSEİT (-3)	-0.1280	-0.637 (0.5281)
DSEİT (-4)	-0.3862	-1.999 (0.0541)
DRERTEFE(-1)	1.2047	11.447 (0.0000)
DRERTEFE(-2)	-0.0574	-0.456 (0.6512)
DRERTEFE(-3)	0.1561	1.234 (0.2258)
DRERTEFE(-4)	-0.0466	-0.472 (0.6396)
ECM(-1)	***-0.2132**** **	***-8.180 (0.0000)***
C	-19.590	-1.998 (0.0542)

R^2 =0.960 F Değeri=38.915 DW=2.231

***(**) denotes 1%(5%) significance level.