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Testing the J-Curve Dynamics in Turkey

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ABSTRACT

The aim of this paper is to analyze J-Curve dynamics in Turkey. Traditional way of analyzing the effects of devaluation on trade balance is to estimate the demand elasticities of export and import by using aggregate trade data and then check whether Marshall-Lerner condition holds. However using aggregate trade data gives rise to a bias problem such that a positive impact of devaluation on a country might disappear because of a negative impact on another one. In order to reduce the problem of bias in aggregation, it is convenient to test the existence of J-Curve phenomenon in bilateral basis. Employing panel cointegraion techniques, it is found that effect of a devaluation of Turkish currency on trade balance is country specific and there is J-Curve effect only in trade with Japan.

Keywords: Trade balance, J-Curve, Marshall-Lerner, exchange rate, panel cointegration.

JEL: C22, F14, F31

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1. Introduction

Understanding the relationship between trade balance and terms of trade is vital for conducting trade policies. Common literature point out that under certain conditions the deprecation of domestic currency improves the trade balance of that country. The well-known Marshall Lerner condition states that the currency depreciation improve the trade balances, without taking into account the national income level, if the sum of absolute value of import and export elasticities exceeds unity. However, there is a lag in time consumer and producer adjustment. The respond of export on currency depreciation takes more time than respond of import and this initially leads to trade balance deteriorate. After a while, volume of export started to increase and volume of import decreases and hence trade balances improve. This is called the J-curve phenomenon.

It is argued that the existence of J-curve phenomenon can be attributed to the fact that at the time an exchange occurs, goods, which are already in transit and under contract, have been purchased, and the completion of those transactions dominates the short-term change in the trade balance (Kruger, 1983). Arndt and Dorrance (1987) indicate that this so-called J-curve effect can also occur if the domestic currency prices of exports are sticky.

In the literature there have been numerous studies that analyze the relationship between terms of trade and trade balance. Traditional way of analyzing the effects of devaluation on trade balance is to estimate the demand elasticities of export and import by using aggregate trade data and then check whether Marshall-Lerner condition holds. Very initially Magee (1973), tried to explain the effects of US trade balance deterioration in 1970's, by emphasizing the adjustment lags and labeled the unfavorable short-run effect of devaluation on the trade balance as the J-curve[1].

Himarios (1985), shows that devaluations do affect the trade balance in the traditionally predicted direction however, Bahmani-Oskooee (1985) tested the J-Curve phenomenon in four countries, and found that even if ML condition met, the trade balance can contine to deteriorate. Flemingham (1988), Meade (1988), Rosensweig and Koch (1988), Bahmani-Oskooee (1989), Brissimis and Leventankis (1989), Wassink and Carbaugh (1989), Bahmani-Oskooee and Malixi (1992), Mahdavi and Sohrabian (1993), Bahmani-Oskooee and Alse (1994), Hoque (1995), Demirden and Pastine (1995), Senhadji (1998), Lal and Lowinger (2002) are all investigate the relationship between terms of trade and trade balance with using aggregate trade data. However the findings are mixed and.there exist no any common results for that relationship.

Using aggregate trade data gives rise to a bias problem such that a positive impact of devaluation on a country might disappear because of a negative impact on another one. In order to reduce the problem of bias in aggregation, it is convenient to investigate corresponding relationship in bilateral basis (Bahmani-Oskooee and Brooks 1999). Firstly Rose and Yellen (1989) analyze the existence of J-Curve in bilateral basis. They argue that it is convenient to use bilateral trade data because it does not require to construct a proxy for income of rest of the world and help reduce to aggregation bias and found that for all lag length there is no significant exchange rate effect on the trade balance (Rose and Yellen 1989).

Following Rose and Yellen (1989), the literature mainly concentrate on the analiysis in bileteral basis and Marwah and Klein (1996), Shirvani and Wilbratte (1997), Bahmani-

[1] Early example of J-Curve studies can be found in Cooper (1971), Connolly and Taylor (1972), Laffer (1976), Salant (1976) and Miles (1979).

Oskooee and Brooks (1999), Bahmani-Oskooee and Kanitpong (2001), Wilson (2001), Baharumshah (2001), Bahmani-Oskooee and Goswami (2003) Bahmani-Oskooee and Ratha (2004a), Bahmani-Oskooee and Ratha (2004b), Hacker and Hatemi (2004), Narayan (2004), Narayan and Narayan (2004), Bahmani-Oskooee *et al*. (2005), Bahmani-Oskooee *et al*. (2006) all investigate the effect of exchange rate on trade balance. As in aggregate trade data basis analysis, the results are mixed and there is no general consensus for the effect of real exchange rate on trade balance.

As in general tendency, empirical evidence of a few studies for the Turkish J-curve show that there is no conclusive result. Rose (1990), Bahmani-Oskooee and Malixi (1992), has found no support that real exchange rate has significant impact on trade balance. Kale (2001) found that a real depreciation of the domestic currency improve trade balance in the long-run. Brada et al. (1997) using the model of Rose and Yellen (1989), find that there is no long-run relationship between trade balance and real exchange rate during 1969-1979, however it turns out to significant one during the corresponding period 1980-1993. Akbostanci (2004) employing Johansen cointegration technique found that there is long-run relationship between real exchange rate and trade balance however there is no evidence for existence of J-Curve effect but pattern of S curve. These all studies above used aggregate trade data either to estimate trade elasticities or to test the J-curve hypothesis. Recently, Halicioglu (2007) and Kimbugwe (2006) have studied empirically the dynamics of Turkish aggregate and bilateral trade between Turkey and her nine trading partners, by employing cointegraiton and VECM. They both found that long-run relationship is country specific and there is no empirical evidence for existence of the J-curve effect both in aggregate and bilateral basis.

The methods used in the literature can be categorized into three groups; standard OLS regressions, residual based cointegration techniques and multivariate maximum-likelihood procedure, suggested by Johansen (1988). All of them have some deficiencies. Standard OLS regressions applied on non-stationary time leads to ‘‘spurious regression’’ problem. Residual based cointegration techniques assume there exists only one cointegration vector, which may not be the case in a system that includes more than two variables. This method also suffers from the normalization problem. Johansen technique depends heavily on asymptotic theory, and hence requires a large number of observations. Also simulation studies showed that, in the most critical step of the Johansen procedure, the determination of cointegration rank, less than 100 observations can give rise to misleading results (Irandoust at al, 2006; Toda 1994, 1995).

To establish the long-run relationship between variables, cointegraiton technique would be an appropriate methodology. By pooling the limited time series data across many countries and employing panel cointegration increase the power of test (Irendeust et al., 2006). In this study two panel cointegration test employed; Pedroni and Larsson panel cointegration test.

The main motivation of this study is to investigate in bilateral basis the existence of J-Curve phenomenon in Turkey during the period of 1985-2006. Since 1980, Turkey experienced five recessions in 1989, 1991, 1994, 1999, and 2001 and recessions of 1991, 1994 and 2001 were accompanied by devaluation in exchange rate. However, since 2002 due to floating exchange rate regime and decreasing inflation rate, Turkish Lira is appreciating against the major world currencies and help to deteriorate trade balance. By considering the monthly foreign trade weight and availability of data, it is analyzed trade dynamics with France, Germany, Holland Italy, Japan, US and UK which they altogether count about half of total foreign trade of Turkey during the corresponding period are selected.

The paper is organized as follows: Section two describes the model and econometric methodology. Section three discusses the empirical results, and finally, section four concludes. Detailed data definition and sources are cited in the Appendix.

2. Model and Econometric Methodology

In this study, following the literature, the reduced trade balance model is formulated as:

$$\ln TB_{jt} = \alpha + \beta_1 \ln Y_t + \beta_2 \ln Y^*_{it} + \beta_3 \ln RER_{jt} + \varepsilon_t \qquad (1)$$

where TB_{jt} is trade balance of Turkey with country *j,* and defined as ratio of export of Turkey to j country over import of Turkey from j country , Y_t is real income of Turkey, Y^*_{it} is real income of country *j,* RER_{jt} is real exchange rate between Turkish currency and *j*'s currency and ε_t is error term. However, to employ panel cointegration we need to cross sectional variable therefore we consider joint effect of real income by introducing the variable $\ln(\frac{Y^*_{it}}{Y_t})$, hence reduced trade balance model is as fallows:

$$\ln TB_{jt} = \alpha + \beta_1 \ln\left(\frac{Y^*_{it}}{Y_t}\right) + \beta_2 \ln RER_{jt} + \varepsilon_t \qquad (2)$$

As theory suggest, if J curve phenomenon exist, one can expect that in the short-run the coefficient of real exchange rate negative and then turn into positive in the long-run after a real depreciation of Turkish currency.

Pedroni (1997, 1999) proposes seven tests for cointegration in a panel. Pedroni's tests allow for multiple regressors and heterogeneity in the errors across cross-sectional units. The panel cointegration statistics test for the null of no cointegration.

Two type of test considered by Pedroni: The first four statistics (panel v statistic, panel ρ statistic, panel t statistic, and panel t statistic) are based on within-dimension approach and pooling the autoregressive coefficients across different sections of the panel. The other three statistics (group ρ statistic, group t statistic, group t statistic) are based on between-dimension approach and allow autoregressive parameter vary over the cross-section. Under the null hypothesis of no cointegration and standardization, the asymptotic distributions for these statistics can be shown as

$$k = \frac{k_{N,T} - \mu\sqrt{N}}{\sqrt{v}} \Rightarrow N(0,1)$$

where $k_{N,T}$ is the approximately standardized form for panel cointegration statistic and μ and v are the expected mean and variance, respectively (Pedroni, 1999).

Panel cointegration statistics are as follows (Pedroni, 1999):

1. Panel *v* statistic

$$T^2 N^{3/2} Z_{\hat{v}_{N,T}} \equiv T^2 N^{3/2} (\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{2})^{-1}$$

2. Panel ρ statistic

$$T\sqrt{N} Z_{\hat{\rho}_{N,T^{-1}}} \equiv T\sqrt{N} (\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{2})^{-1} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i)$$

3. Panel *t* statistic (non-parametric)

$$Z_{t_{N,T}} \equiv (\tilde{\sigma}_{N,T}^{2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{2})^{-1/2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i)$$

4. Panel t statistic (parametric)

$$Z^{*}_{t_{N,T}} \equiv (\tilde{s}^{*2}_{N,T} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}^{*2}_{i,t-1})^{-1/2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}^{*}_{i,t-1} \Delta \hat{e}^{*}_{i,t}$$

5. Group ρ statistic

$$TN^{-1/2} \tilde{Z}_{\hat{\rho}_{N,T^{-1}}} \equiv TN^{-1/2} \sum_{i=1}^{N} (\sum_{t=1}^{T} \hat{e}^{2}_{i,t-1})^{-1} \sum_{t=1}^{T} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i)$$

6. Group t statistic (non-parametric)

$$N^{-1/2} \tilde{Z}_{t_{N,T}} \equiv N^{-1/2} \sum_{i=1}^{N} (\hat{\sigma}_i^{2} \sum_{t=1}^{T} \hat{e}^{2}_{i,t-1})^{-1/2} \sum_{t=1}^{T} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i)$$

7. Group t statistic (parametric)

$$N^{-1/2} \tilde{Z}^{*}_{t_{N,T}} \equiv N^{-1/2} \sum_{i=1}^{N} (\sum_{t=1}^{T} \hat{s}_i^{*2} \hat{e}^{*2}_{i,t-1})^{-1/2} \sum_{t=1}^{T} \hat{e}^{*}_{i,t-1} \Delta \hat{e}^{*}_{i,t}$$

Larsson and Lyhagen (1999) and Larsson et al. (2001) introduced an alternative test for cointegration which has advantageous to test multiple cointegrating vectors in the heterogeneous panel. To increase the power of the Johansen technique, they have developed a panel cointegration test for deciding cointegration rank. By using a panel vector autoregressive model the problem of one cointegrating vector and the normalization can be avoided. In addition to this, using panel rank tests increase the power of test when the cross-sectional dimension of the panel is expanded, as compared to the low power of the standard cointegration test for small samples (Kao, 1999; Irandoust at al, 2006,; Larsson and Lyhagen, 1999; Larsson et al., 2001).

Consider the panel data set consists of N cross-sections observed over T time periods, where i is the index for the cross-section, t represents the index for the time dimension and j =

1,........,p is the number of variables in each cross-section. Then y_{ijt} denotes the ith group, the jth variable at time period t. For simplicity, no deterministic components are assumed. The vector error correction model can now be written as:

$$\Delta Y_{it} = \prod_i Y_{it-1} + \sum_{k=1}^{m-1} \gamma \Delta Y_{it-k} + \varepsilon_{it} \quad \text{i=1,.........N} \tag{2}$$

where $Y_t = [y'_{1t} \;\; y'_{2t} \;\; .... \;\; y'_{Nt}]$, $\prod$ is of order $N_p \times N_p$ and $\varepsilon_t = [\varepsilon'_{1t} \;\; \varepsilon'_{2t} \;\; .... \;\; \varepsilon'_{Nt}]'$ of order $N_p \times 1$ and assume to be Gaussian white noise with a nonsingular covariance matrix; $\varepsilon_{it} \sim N_p(0, \Omega)$.

In the reduced rank form it is possible to write $\prod_i = \alpha_i \beta_i^{'}$ where α_i contains short run coefficients α_{ij} and $\beta_i^{'}$ contains long-run coefficient β_{ij} and both of order $p \times r_i$ and have full column rank.

Larsson *et al.* (2001) consider the null hypothesis that all of the N cross-sections have at most r cointegrating relationships among the p variables. Then the null hypothesis for the panel cointegration test is:

$$H_0: \; rank(\Pi_i) = r_i \le r, \quad \forall i = 1,..........N \tag{4}$$

$$H_1: \; rank(\Pi_i) = p, \quad \forall i = 1,..........N \tag{5}$$

The starting point for the standardized LR-bar statistic of Larsson *et al.* (2001) is the computation of the trace statistic for each cross-section i, which is denoted as:

$$\overline{LR}_{NT}\{H(r) \mathrm{I} | H(p)\} = \frac{1}{N} \sum_{i=1}^{N} LR_{iT}\{H(r) \mathrm{I} | H(p)\}. \tag{6}$$

where $\hat{\lambda}_{i,j}$ is the *j*th eigenvalue of the *i*th cross-section to the eigenvalue problem given in Johansen (1995). The statistic proposed as the panel cointegration rank test is a standardized LR-bar statistic, defined as

$$LR_{iT}\left\{H(r)\mathrm{I}\middle|H(p)\right\} = -2\ln Q_{iT}\left\{H(r)\mathrm{I}\middle|H(p)\right\} = -T\sum_{j=r_i+1}^{p}\ln(1-\hat{\lambda}_{i,j}), \tag{7}$$

The standardized LR-bar statistic for the panel cointegration rank test is defined as:

$$\delta_{\overline{LR}}\left\{H(r)\middle|H(p)\right\} = \frac{\sqrt{N}\left(\overline{LR}_{NT}\left\{H(r)\middle|H(p)\right\} - E(Z_k)\right)}{\sqrt{Var(Z_k)}}. \tag{8}$$

where E(Zk) is the mean and Var(Zk) is the variance of the asymptotic trace statistic. These values can be obtained from Larsson et al. (2001). The standardized LR-bar statistic is asymptotic Standard Normal as $N \to \infty$ and $T \to \infty$ such that $\sqrt{NT^{-1}} \to 0$. The proposed testing procedure is the sequential procedure suggested by Johansen (1988). First r = 0 is tested. If the hypothesis is rejected, r = 1 is tested. This sequential procedure is continued until the null is not rejected. Before performing the panel rank test, the time series under consideration have to be tested for the presence of unit roots.

3. Empirical Results

Before employing panel cointegration, firstly it is needed to investigate presence of panel unit root. Table 1, shows the results of three panel unit root test: LLC, IPS and Hadri test where LLC and Hadri are common, IPS is individual unit root test. First difference of all variables is stationary.

Table 1: Panel Unit Root

lnTB			
	LLC	IPS	Hadri
Constant	5.56** (1.00)	-0.99** (0.16)	15.02** (0.000)
Constant and trend	6.86** (1.00)	-1.36** (0.08)	13.27** (0.000)
lnRER			
Constant	1.12** (0.86)	-2.69 (0.003)	9.78** (0.000)
Constant and trend	-1.93 (0.02)	-5.19 (0.000)	5.86** (0.000)
lnDY			
Constant	-0.32** (0.37)	1.69** (0.95)	30.60** (0.000)
Constant and trend	-0.65** (0.25)	-0.30** (0.38)	6.95** (0.000)

LLC and IPS tests assume asymptotic normality and are distributed N (0, 1) under null of unit root. Hadri test assume asymptotic normality and are distributed N (0, 1) under null of no unit root. Maximum lag length is set to 12 and the lag length is chosen depending on the Modified Hannan–Quinn information criteria. The numbers in brackets are the p-values for LLC, Hadri, and IPS tests. (*) denotes significance at 5 % level, and (**) denotes significance at 1 % level.

The findings are mixed. According to LLC and Hadri test in both case all variables have unit root. According to lnTB and lnDY have unit root in both case but lnRER is stationary. As a general conclusion using a significance level %1 and trusting more on LLC and Hadri test, we can suggest that all variables has unit root.

Secondly we employ the Pedroni panel cointegration test with heterogeneous and homogenous trends. Test results are depicted on Table 2.

Table 2: Pedroni Panel Cointegration Tests With Heterogeneous and Homogenous Trends

Heterogeneous trend		**Homogenous trend**	
Panel ν statistic	16.76**	Panel ν statistic	19.71**
Panel rho-statistic	-39.75**	Panel rho-statistic	34.22**
Panel pp-statistic	-22.77**	Panel pp-statistic	-17.09**
Panel adf statistic	-6.16**	Panel adf statistic	-5.42**
Group rho-statistic	-41.85**	Group rho-statistic	-38.13**
Group pp statistic	-25.74**	Group pp statistic	-21.19**
Group adf statistic	-7.95**	Group adf statistic	-7.09**

All reported values are distributed N (0, 1) under null of no cointegration. Pedroni (1997) statistics have critical values of -1.64 (k < -1.64 suggests a rejection of the null) except the ν statistic. The ν statistic has a critical value of 1.64 (k > 1.64 suggesting a rejection of the null). (*) denotes significance at 5 % level, and (**) denotes significance at 1 % level. Nsecs = 7, Tperiods = 264, no. regressors = 2

The all test results show that both in the case of heterogeneous and homogenous trends, there exists cointegration. Statistics are very high and significant at %1 level. Hence using Pedroni cointegration test we reached that there is a dynamic relationship among trade balance, real exchange rate and difference of real income.

Thirdly we employed the panel cointegraiton of Larsson et al. (2001) to strengthen and solidify the existence of cointegration. Table 3, shows the individual trace statistics for Johansen, and Y_{LR} test results.

Table 3: Larsson Test for Panel Cointegration

	Constant			**Constant and trend**		
	r=0	r=1	r=2	r=0	r=1	r=2
France (lag=2)	51.77*	21.52*	6.26	78.12*	28.12*	9.95
Germany (lag=2)	44.37*	16.02	5.17	52.54*	22.61	6.67
Holland (lag=2)	50.82*	23.56*	5.50	60.02*	32.68*	14.75
Italy (lag=2)	52.65*	18.91	3.98	61.62*	24.70	9.82
Japan (lag=2)	52.80*	14.31	2.62	76.09*	27.51	10.57
UK (lag=3)	50.78*	23.48*	5.59	52.16*	22.63	5.78
USA (lag=2)	53.89*	21.46*	5.86	89.51*	37.95*	6.50
%5 critical value for trace	*35.19*	*20.26*	*9.16*	*42.91*	*25.87*	*12.51*
LR_{NT}	51.01	19.89	5.00	67.15	28.03	9.15
Y_{LR} test	**19.18***	**11.26***	**6.87***	**27.77***	**17.88***	**14.25***

The null hypothesis is that there are no more than r cointegraiting relationship. Reported values are distributed N (0,1) under null of no cointegration. (*) denotes significance at 5 % level. The lag value is selected to 2 for all countries according to Schwarz information criteria suggest.

Except UK, lag length selected 2 for all countries according to Schwarz criteria. In the case of constant, Johansen rank test shows that for 3 out of 7 countries; Germany, Italy and Japan there is one cointegtaing vector and for others, there are two cointegrating vector. In the case of constant and trend Germany, Italy, Japan and UK have one cointegrating vector. As trace statistics are very high, Y_{LR} test results show that there is cointegration relationship but common cointegrating rank is higher than one. Existence of more than one long-run relationship between countries makes interpretation of cointegraiton vectors very difficult. Kimbugwe (2006) found that there is more than one cointegraiton vector for studied all nine trading partner of Turkey. In Halicioglu (2007), studied same trading partners with Kimbugwe (2006), Johansen trace statistics showed that for 6 of 9 countries (Belgium, France, Holland, Italy, Switzerland, USA,) there is more than one long-run cointegrating relationship. However since the primary aim of this study is to concentrate on existence of J-curve, rather than the meanings of estimated cointegrating vectors, we can select only one vector (Halicioglu, 2007).

One of the best way of deriving evidence of the J-curve is to use impulse response function (Lal and Lowinger, 2002). Generalized impulse response function displays response of a variable to an unexpected shock over a time horizon via error terms. In order to see the existence of J-curve, the generalized impulse response functions are derived from VECM representations. The lag lengths are selected according to Schwarz and Hanna-Quinn information criteria. Response of the trade balance to one standard-error depreciation in exchange rate was traced. As one can expect, if the J-Curve effect is present, in the case of devaluation, trade balance first deteriorates and then improves. Figures 1-7 shows the generalized impulse response functions derived for the both case that of constant and, constant and trend for all countries.

Figure 1a: Generalized Impulse Response Function
(France, Constant)

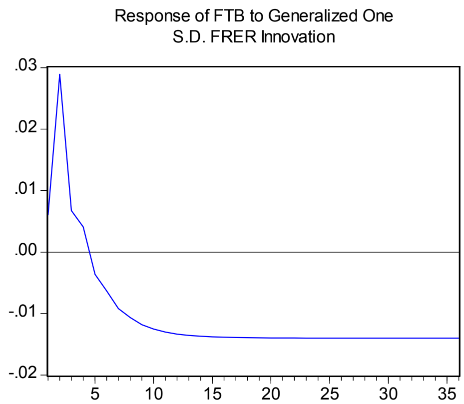


Figure 1b: Generalized Impulse Response Function
(France, Constant and Trend)

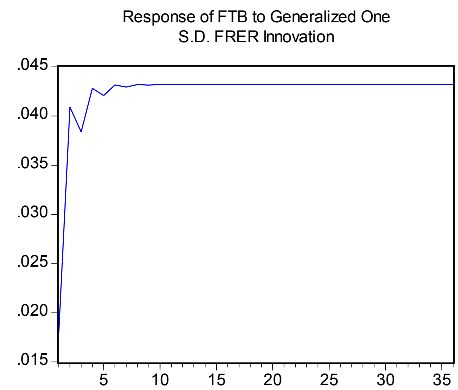


Figure 2a: Generalized Impulse Response Function
(Germany, Constant)

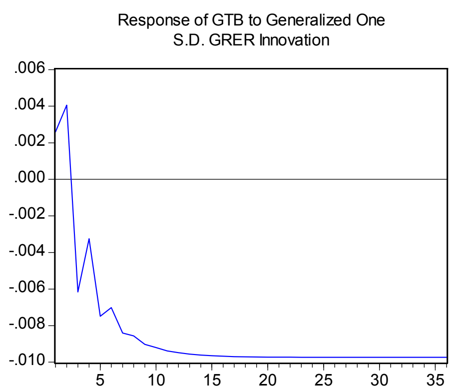


Figure 2b: Generalized Impulse Response Function
(Germany, Constant and Trend)

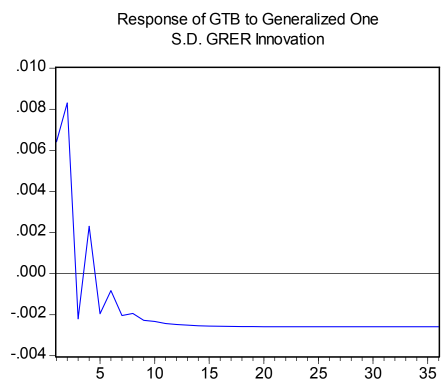


Figure 3a: Generalized Impulse Response Function
(Holland, Constant)

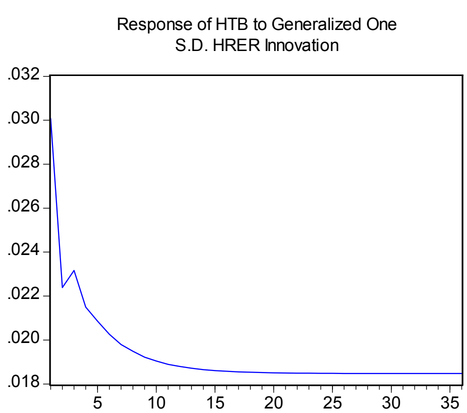


Figure 3b: Generalized Impulse Response Function
(Holland, Constant and Trend)

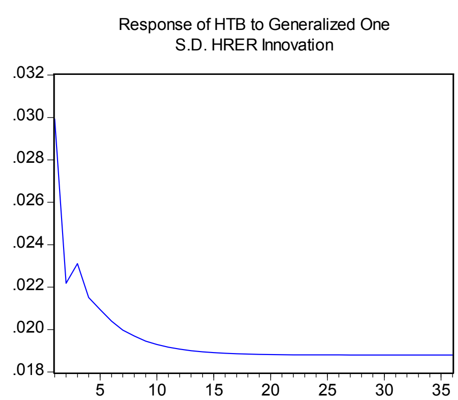


Figure 4a: Generalized Impulse Response Function (Italy, Constant)

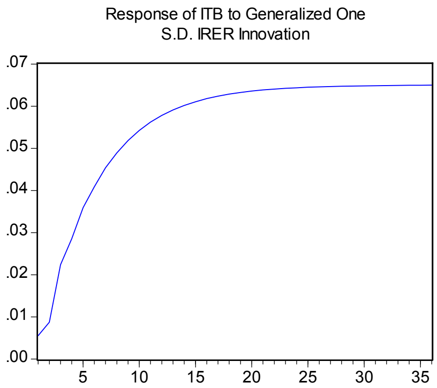


Figure 4b: Generalized Impulse Response Function (Italy, Constant and Trend)

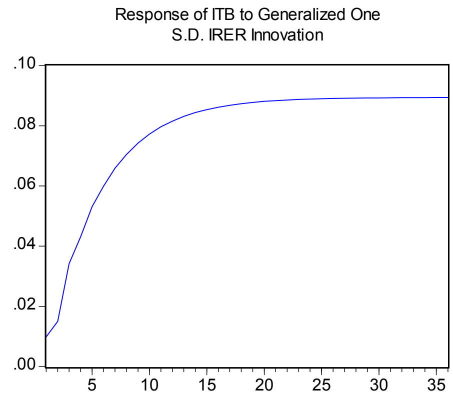


Figure 5a: Generalized Impulse Response Function (Japan, Constant)

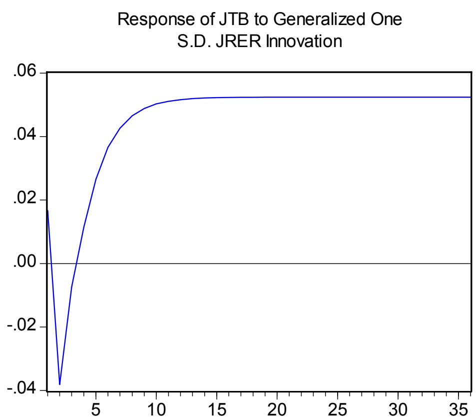


Figure 5b: Generalized Impulse Response Function (Japan, Constant and Trend)

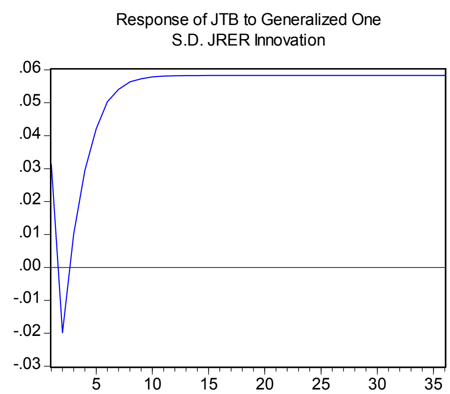


Figure 6a: Generalized Impulse Response Function (UK, Constant and)

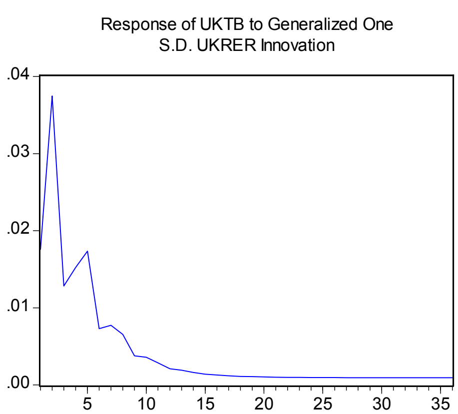


Figure 6b: Generalized Impulse Response Function (UK, Constant and Trend)

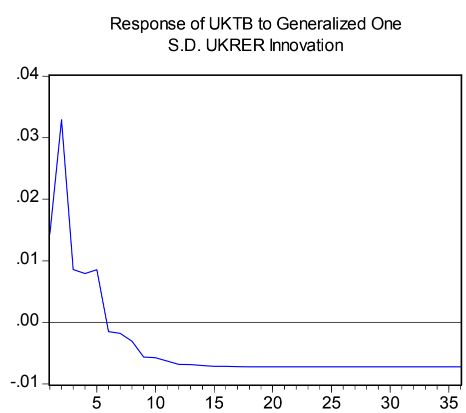


Figure 7a: Generalized Impulse Response Function (USA, Constant)

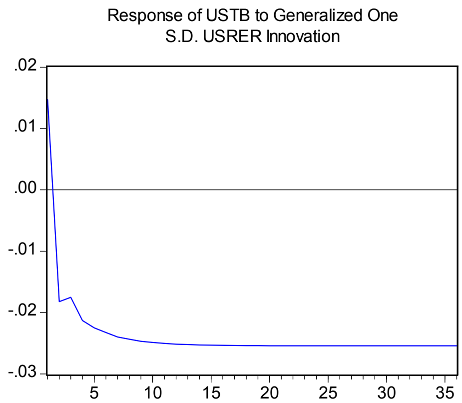
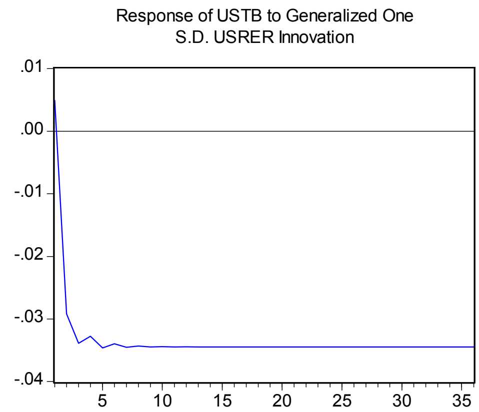


Figure 7b: Generalized Impulse Response Function (USA, Constant and Trend)



Generalized impulse response functions indicate that there is evidence of J-Curve effect only in Japan case. In first two month trade balance deteriorates and then improves quickly. Table 5, summarizes the findings of all impulse response functions.

Table 5: Impact of Real Exchange Rate Devaluation

Trading Partner	Main impact of devaluation on trade balance
France	In constant case there exists reverse J-curve effect. Trade balance first improves and then deteriorates
Germany	Reverse of J-Curve effect exists. Trade balance first improves and then deteriorates
Holland	Devaluation deteriorates trade balance
Italy	Devaluation improves trade balance
Japan	There exist J-Curve effect, trade balance first deteriorate and then improve
UK	Reverse of J-Curve effect exists. Trade balance first improves and then deteriorates
USA	Devaluation deteriorates trade balance

4. Conclusion

The aim of this paper is to investigate the existence of J-Curve effect between Turkey and her seven main trading partners which are France, Germany, Holland, Italy, Japan, UK and US. To investigate the long-run relationship between trade balance and real exchange rate Pedroni panel cointegration, developed by Pedroni (1997, 1999), and Larsson panel cointegraton, developed by Larsson and Lyhagel (1999) and Larsson et al. (2001) techniques employed. To examine the existence of J-Curve effect, impulse response function is derived from VECM model.

Both cointegraiton techniques detect the cointegration relationship, but Y_{LR} statistics, with the Johansen trace statistics indicate that, there can be more than one long-run relationship. Taking only one cointegrating relationship, results derived from generalized impulse response function and found that there exists J-Curve effect only in Japan case. The reverse J-Curve is presence, in the case of France, Germany and UK. A devaluation improve trade balance in the case of Japan and Italy. In general, effect of a real depreciation on trade balance is county specific.

5. References

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Appendix

Data definition and sources

Real exchange rates is defined as P_i*E_i/P_T, where P_i is consumer price index of country i, E_i is nominal bilateral exchange rate defined as number of TL per unit of country i's currency and P_T is consumer price index of Turkey.

Y is seasonally adjusted industrial production index and it is used as a proxy for real income.

CPI's and industrial production indexes are taken from IMF.

The data set used in this study cover the period 1985M1 to 2006M12. All data are collected from International Financial Statistics (IMF), and Central Bank of Turkish Republic (CBTR).