The Effect Of Capital Movements Liberalisation On Economical Development: Boundary Test Approach

Mehmet MERCAN
ADÜ. Social Science Institute
mmercan48@hotmail.com

Osman PEKER
Dr., ADÜ. Nazilli İİBF
ottopeker@Yahoo.com

Abstract: In this study, liberalization of capital movements' impact on economic growth in Turkey has been investigated by the approach of the bounds testing. According to the empirical findings of study, in both long and short-term, capital movements impact on economic growth is statistically insignificant. This result is far from meeting our theoretical expectations.

Key Words: Turkey, Capital Movement, Libarelization, the Bound Test Approach.

1. Introduction

The view about that financial liberalisation would cause much higher economical development has been expressed firstly by Mc Kinnon and Show. According to this view known as Mc Kinnon and Show hypothesis in literature, the maximum rates applied to the deposit rates will cause a decrease in real interest rates in an economy repressed as financially. Considering the possibility of a decrease in real interest rates to the minus degrees in an inflationist atmosphere, the house hold could direct its savings to the unproductive investments like real estate, gold and hard goods instead of financial havings. By limiting the loanable fonds of banking sector, this situation will cause the credits pass to the preferred sectors and firms without being predicted on the objective criteria instead of their expected returns and will prevent the use of sources effectively. If the press on the interest rates is removed, it will be provided to be used the sources in productive areas via trending of savings to the banking sector. As the bank deposit will expand by this, much more credit possibility for investment will occur and economical growth will increase.(Mathieson, 1980; Melo ve Tybout, 1986; Dornbush ve Reynoso, 1989).

In international capital flows mutual profits exist for the countries. As the direction of capital flows is generally from the country that have more capital to the country that have less capital, marginal product of the capital is in higher rates than the country that has the capital.Thus, the capital is directed to more productive and effective fields. In this process that means much more production will happen per capital unit, a welfare increase occurs also in the country giving the capital.(Eichengreen vd., 1998:12; Bacchetta, 1992: 474). When evaluated on this point of view, for the poor countries capital movements liberalisation can be seen as an economic policy that is necessary to use for increasing the investment possibilities and decreasing the capital costs. (Fischer, 1998; Summers, 2000).

By the liberalasation of capital movements the market structure in financial sector changes in the direction of weaking the monopoly power of institutions. As this provides the chance to act in more suitable conditions in credit markets, it causes an increase on realizable real estates and a decrease on borrowing costs. (Kenen, 1976: 31). In this process that means the specializing in the financial services, the increasing specialization causes a development in international economic benefits. (Mathreson ve Suarez, 1992: 41).

However, when the recent developments considered we can see that capital movements gradually act more independently than real ecenomy. While most of the total transations in currency markets consists of short period profit making commercial transations, very little part of this is directed to the commercial activities. This transactions is the main reason for the the weekness in the international currency capital markets. (Verghese, 1985). So in 1980's the foreign capital lost its function in the 1950's and in general it tended to speculative short termed portfolio investments.

In this term portfolio investments contained most parts of the transations in financial markets. Much growth in portfolio investments caused some risks to occur in the economies of the countries firstly by decreasing the real investment possibilities. Especially the possible great fluctuations on the currency rates and financial asset prices resulted in crises by negatively affecting the macroeconomical balance. Since the capital flows occuring as portfolio investments can move fast and in a short time,UNCTAD warns for the possible risks. For instance, the determining factor in capital flows tended to Latin America wasn't economic and since it was shaped according the others' behaviors, it was speculative. In other words, investment owners behaved speculatively instead of behaving according to the economical reasons. This increased the prices of real estates while it made the currency of the country valuable irrationally. With this point of view the Mexican crisis was not a surprise. (Akyüz, 1995: 14).The Ex post point has revealed that some proofs of Ortodox economy is not realist. Today the countries having much financial crisis experience especially find it hard to pay their depts. It is anticipated to apply a program for depts in order not to delay in the system.

In fact Bhagwhati (1998), Rodrik (1998) and Stiglitz (2002), draw attention that capital account liberalisation doesn't improve the growth as it is said; even it may cause crisis. Kaminsky and Reinhart (1999), Detragiache and Demirguc-Kunt(1998) and Glick and Hutchinson also have expressed the similar views (2001) and added that financial liberalisation has a tendency in increasing bank and money crisis.According to UNCTAD (1990) , in a system that has no exchange controls, credit allocation can not be directed to the fields to increase the effectivity.Because a banking system based on liberal market is less sensible to the persuasion and sources tend to the short term profits instead of the use for the economical development.

As it is evaluated by the different poinf of views, it is difficult to say that there is an agreement about the effects of capital movements liberalisations on the econimical growth. Eichengreen and Leblang (2002: 1) point that it can't be estimated weather capital account deficit increases or prevent the growth and in general the proofs are not enough eventhough many researches are made on the subject.

2. Data And Methods

This survey covers 1998:01 and 2009:09 variables have been used and all variables have been calculated in percentages. The variable vektör of the survey is: $y_t=[i_t, m2_t, open_t, tk_t]$ y stands for Gross National Product (GNP), i stands for Treasury domestic borrowing interest rates, m2, stands for Money supply, open stands for opennes(export+import), tk stands for total capital movement liberalisation All data have been taken from the website of the Central Bank of Republic of Turkey(electronic data delivery system)(http://evds.tcmb.gov.tr).

In this survey boundary test approach which was developed by Pesaran vd.(2001) has been used in order to study the effect of capital movement liberalisation over economic growth. This method is considered to be more usable when comperad to cointegration method developed by Engle-Granger. Series have to be stable in the first differnce in the Engle-Granger and Johansen. Series can be in different stability levels in ARDL method. Another advantage of boundary test approach is that analysis can be made with only a few data. (Narayan and narayan, 2004:25) More over as the regresive variables included in analysis. The level and regressive values of independed veriables can be observed on depended variables. In boundary test apprach firstly whether series move together in long-term is analysized by means of ARDL cointegration method. İf there is conşntegration relationship betwen series the coefficient and statistic of regression carried out with this serries will be meaningfull and reliable. If relationship can be pointed out whit be serries lon an short term analysis are held by means of ARDL method.

3. Analysis And Empirical Findings

Before analysis, the certain tests and procedures relation variables used in the study are needed. *tk*, *open* ve *y* series have seasonal effect. Series were purifed from seosanal effect by means of Moving Avarage Methods. Stationary of series were tested with Augmented Dickey Fuller: ADF

3.1. ADF Unit Root Test

If time serries is not stable, medyan, variance and covariance changeble in time. Shocks take place in a term can effect the others and it becomes permanent. The analysis carried out in this case includs fake regression and F and t statistics loos their meaning (Gujarati, 1999:2.712).
The stability levels of serries and unitroot test have been studied with ADF test.
DF test is carried out based on three regression equation (Dickey and Fuller, 1979).

Simple situation:

$$\Delta Y_t = \gamma Y_{t-1} + u_t \qquad (1)$$

Intercept:

$$\Delta Y_t = \alpha_0 + \gamma Y_{t-1} + u \qquad (2)$$

Trend and intercept:

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \gamma Y_{t-1} + u_t \qquad (3)$$

As a result of this tests the DF statistic been compared Mac Kinnon crtitical values zero hypotesis is tested against the lternative hypotesis. Zero hypotesis showes that serries is not stable alternative hypotesis. İf error correction term is autocorrelated equation (3) is regulated as:

$$\Delta Y = \alpha_0 + \alpha_1 t + \gamma Y_{t-1} + \beta_i \sum_{i=1}^{m} \Delta Y_{t-i} + u_t \qquad (4)$$

Here m stands for regression length and Δ stands for difference operator. Regression number depends on obtaining model without autocorrelation. A test which is carried out this way is called ADF test in short. Tests results obtained accordingly are shown in Table 1.

Table 1: ADF Test Results Expanded for Dickey-Fuller Variables (ADF)

Variables	ADF Test	Critical Values
Y	-1,06[11]	-3,48
Δy	-7,04[10]	-3,48
İ	-2,14[2]	-3,47
Δi	-9,86[1]	-3,47
m2	-6,02[3]	-4,02
open	-3,14[12]	-3,48
Δopen	-5,69[10]	-3,48
Tk	-3,07[5]	-3,47
Δtk	-10,39[4]	-3,47

Note:The values in [ ] points out teh lag number. By taking the lag lenght which Akaike Lag is the lowest. Mac Kinnon test values pointed out without trend and intercept test values. In this test were used trend and intercept for *m2* ve *open variables, intecept other variables. For first difference of variables*(Δ) *were used intercept.*

3.2. Co-Integration Test

The level values of many macroeconomic variables are not stable. If there is a co-integration relationship between series in other words if series move together in the long term, a fake regretion trouble will not be faced in an analysis to be carried out with level values(Pesaran etc, 2001:290;Gujarati 1999). However, the dynamic behaviors of variables moving together in the long term cause some deviations in the balance equation(Enders, 1996:151). This is one of the basic characteristic of co-integration variables and plays an important part in the short term dynamic. The dynamic model appearing along with this process is called error correction model(Enders, 1995: 365). An unrestricted error correction model is setup so that boundary test approach can be applied. (unrestricted error correction model: UECM) This model can be applied to our survey as fallows:

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \Delta y_{t-i} + \sum_{i=0}^{m} \alpha_{2i} \Delta i_{t-i} + \sum_{i=0}^{m} \alpha_{3i} \Delta m2_{t-i} +$$

$$+ \sum_{i=0}^{m} \alpha_{4i} \Delta open_{t-i} + \sum_{i=0}^{m} \alpha_{5i} \Delta tk_{t-i} + \alpha_6 y_{t-1} + \alpha_7 i_{t-1} + \alpha_8 m2_{t-1}$$

$$+ \alpha_9 open_{t-1} + \alpha_{10} tk_{t-1} + u_t \qquad (5)$$

Here, m; stands for optimum lag length, Δ stands for difference operator, u_t stands for error correction term, those which are given with other letter abbreviation stands fort he meanings in variable definitions. In this survey

optimum lag lenght has been determined by means of Akaike Criterion. According to Kamas ve Joyce (1993) there musn't be autocorelation between error terms of model's optimum lag length so that the test can give healthy result. If there is autcorolation in the lag lenght which Akaike Criteria lowest. One has to next lag.

The test result of lag lenght are presented in Table 2. Maksimum lag lenght is 2 since the data in this survey is monthly.

m	AIC	LM Test
1	4.86	0,00
2*	4,71	0,66
3	4,77	0,66
4	4,80	0,62
5	4,86	0,12
6	4,86	0,32
7	4,91	0,32
8	4,96	0.51

Table 2: The lag length is point out for boundary test

The optiumum lag length determined as a two in the Table 2. In this lag length hasn't autocorelation. After lag length determined it passed testing process cointegration relationship between variables. In boundary cointegration relationship between values is made by mines of testing ziro hypotesis. (H_0:α_4=α_5=α_6=0) Zero hypotesis accept or reject is determinated with F test. Calculate value contrasted Table conpered and contrast min and max value in Pesaran etc. 2001 Table. In the fisrt case if calculated F statistic value lover than min critic value. It is decided that there is coengration relation between series. In the second case if calculated F statistic value in between max and min critice value no definite commend can be made. In this case must be tried alternative coentegration methots. Finaly calculated F statistic value bigger than Table max critic it is decided that there is cointegration relationship between series.

For testing H_0 calculated F statistic value compared with critic value which taken Pesaran etc 2001 in Table 3. This critic values given fort 4 independed variable and mining full %1.

k	Calculated F	Alt Sınır	Üst Sınır
4	6,46	3,74	5,06

Note: k stands for variable number. Critical values are extracted from Table CI (iii) in Pesaran etc.
Tablo 3: Boundary Test Results

It is observed that calculated F statistics is higher than utmost critical value. In this case H_0 hypothesis is denied and it is concluded that there is a co-integration relationship between variables. Since the existence of co-integration relationship between series is remarked, ARDL models started to be estimated to search the long and short term relationships between variables.

3.3 Long Term Analysis

ARDL model which is used in order to analyse long term relations is formulated as:

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} y_{t-i} + \sum_{i=0}^{n} \alpha_{2i} i_{t-i} + \sum_{i=0}^{p} \alpha_{3i} m2_{t-i} +$$

$$+ \sum_{i=0}^{r} \alpha_{4i} open_{t-i} + \sum_{i=0}^{k} \alpha_{5i} tk_{t-i} + u_t \quad (6)$$

Here *m, n, p, r* ve *k* is Lag length and determined with AIC. This transaction has been carried out with the method that Kamas and Joyce(1993) proposed in their causality analyses so as to determine Lag length. Therefore; first of all, regression according to dependent variables' own regressive values is made and the lag length of without

otecorelation model which gives the lowest AIC value. Then, regression models were formed by keeping the identified lag length of the dependent variable stable and all possible regressions of foreign direct investment variable which is the first independent variable and the regressive number of independent variables was found by taking AIC values into consideration. Optimum regression number was obtained by repeating similar transactions for other variables. As a result of the transaction carried out, it was decided that ARDL(7.1.1.0.0) was the long term ARDL model to be estimated and results are presented in Table 4.

	AIC	LM Test		AIC	LM Test
m			*n*		
1	5,10	0,00	0	4,65	0,72
2	5,12	0,00	1*	4,58	0,97
3	4,75	0,21	2	4,60	0,97
4	4,76	0,08	3	4,61	0,97
5	4,78	0,00	4	4,61	0,77
6	4,78	0,00	5	4,62	0,85
7*	4,70	0,76	6	4,64	0,84
8	4,72	0,39	7	4,65	0,84
			8	4,67	0,44
p			*r*		
0	4,60	0,38	0*	4,58	0,62
1*	4,59	0,47	1	4,59	0,61
2	4,61	0,39	2	4,60	0,68
3	4,62	0,38	3	4,61	0,70
4	4,64	0,33	4	4,62	0,81
5	4,64	0,37	5	4,63	0,83
6	4,65	0,24	6	4,64	0,81
7	4,65	0,97	7	4,66	0,71
8	4,67	0,97	8	4,67	0,79
k					
0*	4,59	0,62			
1	4,60	0,49			
2	4,61	0,47			
3	4,62	0,50			
4	4,64	0,47			
5	4,64	0,66			
6	4,65	0,66			
7	4,66	0,57			
8	4,66	0,88			

Tablo 4: Determination of Lag Length for Long Term Boundary Test

The estimate results of long term ARDL(7.1.1.0.0) and long term coefficients calculated based on the results mentioned are available in Table 5.

In Table 5; variables of Money supply, opennes and capital movement coefficient's signs accord with our teoric expects.

Variables	Coefficient	t-statistic
C	0,3481	0,8154
i	0,0259	3,4533
$m2$	0,2049	1,3995
$open$	0,0538	2,0456
tk	0,0005	0,7142
Diagnosis Tests		
$R^2=0.45$		$\chi^2_{BGAB}(2)=0,51(0.60)$
$\overline{R}^2=0.39$		$\chi^2_{WDV}=0,63(0.90)$
$F\ ist.=7,71(0,00)$		$\chi^2_{JBN}=239,78(0.00)$
$DW=2,00$		$\chi^2_{RRMKH}(2)=0,73(0.48)$

Note: Here, $\chi2_{BGAB}$, $\chi2_{WDV}$, $\chi2_{JBN}$ and $\chi2_{RRMKH}$ are respectively Breusch-Godfrey successive dependence, White changing variance, Jarque-Bera normality test and Ramsey model establishment error statistics in regression. The figures in parentheses reflect p-probability values

Tablo 5: The Results of Calculated Long Term Coefficient of ARDL (7.1.1.0.0) Model

Taking the results in Table 5 into consideration, capital movement and money supply can't be interpreted so that Theirs coefficient is meaningless as regards statistic value. Coefficient of interest variables increased positive unlike our teoric expectations.

3.4 Short Term Analysis

Short term relation between variables again investigated by means of ARDL Error Correction Model based on boundary test approach. ARDL model which is used in order to analyse short term relations is formulated as:

$$\Delta y_t = \alpha_0 + \alpha_1 EC_{t-1} + \sum_{i=1}^{m}\alpha_{2i}\Delta y_{t-i} + \sum_{i=0}^{n}\alpha_{3i}\Delta i_{t-i} + \sum_{i=0}^{p}\alpha_{4i}\Delta m2_{t-i} +$$
$$+ \sum_{i=0}^{r}\alpha_{5i}\Delta open_{t-i} + \sum_{i=0}^{k}\alpha_{6i}\Delta tk_{t-i} + u_t \quad (7)$$

Here EC_{t-1} is error correction terms and it stands for one term lagged of error terms series which it is obtained from long term relationship. Coefficient for this variable is point out duration of sort term deviation. If this sign of coefficient is negative, deviations happen in short term between series is convergences to long term balance value. If this sign of coefficient is positive, not convergences to long term balance value.

In this model lag length of veriables determineted just like long term. As a result of the transaction carried out, it was decided that ARDL(5.1.0.0.0) was the short term ARDL model to be estimated and results are presented in Table 6.

	AIC	*LM Test*		*AIC*	*LM Test*
m			*n*		
1	5,29	0,00	0	4,68	0,25
2	4,71	0,05	1*	4,64	0,46
3	4,71	0,07	2	4,65	0,43
4	4,72	0,02	3	4,66	0,35
5*	4,69	0,29	4	4,67	0,36
6	4,70	0,41	5	4,69	0,30
7	4,70	0,36	6	4,70	0,35
8	4,68	0,00	7	4,71	0,39
			8	4,73	0,42
p			*r*		
0*	4,65	0,52	0*	4,61	0,48
1	4,66	0,44	1	4,62	0,50
2	4,65	0,43	2	4,63	0,60
3	4,69	0,42	3	4,64	0,15
4	4,69	0,48	4	4,65	0,65
5	4,71	0,45	5	4,66	0,66
6	4,69	0,41	6	4,68	0,63
7	4,71	0,31	7	4,68	0,70
8	4,73	0,27	8	4,70	0,67
k					
0*	4,63	0,44			
1	4,64	0,44			
2	4,65	0,47			
3	4,66	0,40			
4	4,67	0,44			
5	4,68	0,43			
6	4,69	0,45			
7	4,68	0,53			
8	4,70	0,34			

Table 6: Determination of Lag Length for Short Term Boundary Test

The result of estimated ARDL (5.1.0.0.0) model given in Table 7. Coefficient of EC_{t-1} (error correction terms) is -0,72 in Table 7. This coefficient is negative and meaningful like expected. If coefficient's signs of error correction terms is negative, model is convergences to long term balance level.

If this sign of coefficient is negative, deviations happen in short term between series is convergences to long term balance value. If this sign of coefficient is positive, not convergences to long term balance value (Narayan ve Smyth 2006). Therefore error correction of model is works. Although capital movements impact on economic growth, like long term effect, is positive and according with theoritical expectation, statistically insignificant.

Variables	Coefficient	t-statistic
Δy_{t-1}	-0,3538	-2,0340
Δy_{t-2}	-0,3392	-1,8955
Δy_{t-3}	0,0961	0,5281
Δy_{t-4}	-0,1636	-1,4758
Δy_{t-5}	-0,1825	-2,2912
Δi_t	-0,0319	-1,9067
Δi_{t-1}	0,0509	2,9609
$\Delta m2_t$	0,0152	0,1873
$\Delta open_t$	0,0380	2,5170
Δtk_t	0,0002	0,4738
ec_{t-1}	-0,7274	-3,6701
C	-0,0587	-0,2843

Diagnosis Tests

$R^2=0{,}70$	$\chi^2_{BGAB}(2)=2{,}56(0{,}08)$
$\overline{R}^2=0{,}68$	$\chi^2_{WDV}=0{,}62(0{,}89)$
$DW=1{,}98$	$\chi^2_{JBN}=228{,}78(0{,}000)$
$F=26{,}80(0{,}00)$	$\chi^2_{RRMKH}(2)=0{,}13(0{,}87)$

Note: Here, χ^2_{BGAB}, χ^2_{WDV}, χ^2_{JBN} and χ^2_{RRMKH} are respectively Breusch-Godfrey successive dependence, White changing variance, Jarque-Bera normality test and Ramsey model establishment error statistics in regression. The figures in parentheses reflect p-probability values

Table 7: The Results of ARDL (5.1.0.0.0) Model

Results

In this survey, capital movement impact on economic growth in Turkey has been investigated by using monthly datum term of 1998:01-2009:09. In survey, boundary test approach which was developed by Pesaran has been obtained cointegration findings between variables and based on this has been formed long and short term ARDL models

According to obtained ampirical evidence, although in long and short term capital movement impact on economic growth is positive, meaningless as regards statistic value. Therefore Coefficient of capital movement can't be interpreted.

It is determined that opennes and interest variables positive effected on economic growth in the in long term. It is observed that effect of interest one term lagged and opennes on economic growth is positive in short term.

In this study the relation between capital movement liberalisation and economic growth meaningless and this is not according with economic literature.

This may be due to different reasons. Therefore this subject must be with other ampirical studies. So, It is thought that be made open to the outside of the capital account's effect in financial crisis happen Turkey is important.

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