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THE INFLUENCE OF ARAB SPRING EFFECT ON ECONOMIC GROWTH IN THE MIDDLE EAST COUNTRIES: STRUCTURAL BREAK PANEL DATA ANALYSIS

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Abstract

Civil commotions that are started in December, 2010 and named as "Arab Spring" had been spread to Middle East countries and had also brought with it economic and political crises. Many economic, social and political factors that are mostly structural had been effective on starting this process. In this research, influence of Arab Spring on economic growth had been investigated with the help of cross-sectional dependency and structural break unit root test in five Middle East countries by using annual data in between 1990-2014. While cross-sectional dependency has been determined for the overall of panel, it had been reached to the conclusion that there is not structural break unit root.

Keywords: Economic Growth, Arab Spring, Structural Break Panel Unit Root Test

1. Introduction

Civil commotions that are started in Tunisia in December, 2010 have been accepted as one of the most important historical events of 21st century and have been named as the process of change and democratization spreading all over Arab geography (Dede, 2011). Arab Spring that has led to a big change in Arab world and has created great reaction with similar slogans like "more freedom, more democracy and more fundamental and civil rights" despite the differences on the national scale had arisen in reaction to problems like unemployment, inflation, political corruption, limitation to freedom of expression in Middle East countries and it had created traumatic effects in these countries in a short span of time. After the passing decades in the name of domineering state apparatus and stationary dictators, on December 17, 2010 rebellion that is started by undertaking a terrifying action as sacrificing by burning himself in front of the urban district of a man named as Muhammed Bouazizi who is a university graduate doing marketing in a hick town of Tunisia because of the unemployment and economic problems was not likely to be heard in the whole region. However, this action that was over by the death of the young man had created a great reaction in public opinion and had opened the doors to social response of Tunisian people who repressed anger for a long time, disappointment, hopelessness and exhaustive pressures has been brought to the boil and by reaching to presidential palace in a couple of

weeks, it had deposed Zeynel Abidin bin Ali who is powerful man in potency of Tunisia for a long time (Fuller, 2014). While political uncertainty was going on in some of the countries that had government changes, organizational structures could not be replaced by dictatorial regimes that were destroyed in this process.

In company with Arab Spring process, in addition to the traditional problems faced by countries in similar groups in the process of economic development, countries in the region have fallen behind in the process they are in (Gullu, 2015). The purpose of this research within this scope has examined that whether there is an effect of developments that happened recently in the region on economic growth of Arab Spring in various Middle East countries or not. In this context, effects of Arab Spring had been searched in five Middle East countries (Tunisia, Egypt, Bahrain, Jordan, Libya) by using data of the era between 1990-2014 with the help of panel unit root (structural break) test that considers the assumption which macroeconomic shock happening in any country is also going to affect other countries. The study has consisted of three chapters. In the first chapter reasons of Arab Spring and theoretical information about effects on the region, in the second chapter empirical analysis results and in the third chapter result and evaluations had been included.

2. Economic Effects and Results of Arab Spring

The structural factors have been located behind the construction that goes to Arab Spring. To explain Arab Spring, it has been needed to reveal which structural economic, social and political factors reflect as negatively to welfare of a vast majorities of public of economic performance (Ozturkler, 2014).

Civil commotion that destroyed the Middle East in the beginning of year 2011, has altered dramatically the political view of the region by toppling of autocratic regimes in Egypt, Libya, Tunisia and Yemen. These commotions have given hope to citizens as the beginning of the democratic transition process that continues in Arab world for a long time. Although heads had remained in power, Jordan and Morocco monarchies had lived great political changes. While democracy promise has been seen as the driving power of rebellions in Arab countries, economic subjects had been important factor at the same level. Nondemocratic regimes, corruption, high level of unemployment and increased income and wealth inequalities have constituted the base of the rebellions (Khan, 2014). The struggle between the political parties that play an active role in Arab Spring has weakened the national economy (Gullu, 2015).

The size indicator of economy of a country is Gross Domestic Product (GDP) that is created in that economy. In this context, the progress of sizes of GDP and GDP per capita in countries that Arab Spring happened have been shown in Table 1 as before Spring and after.

Table 1. GDP (Billion $) and GDP per Capita ($)

Country	Indicator	2008	2009	2010	2011	2012	2013	2014	2015
Tunisia	GDP	45	43	44	46	45	46	47	43
	GDP per capita	4342	4162	4177	4291	4179	4248	4328	3872
Egypt	GDP	162	188	218	236	276	286	301	331
	GDP per capita	2061	2349	2668	2816	3226	3264	3365	3614
Bahrain	GDP	25	22	25	29	31	33	34	32
	GDP per capita	23043	19166	20386	22238	23063	24378	24855	23395
Jordan	GDP	22	23	26	28	30	33	35	37
	GDP per capita	3655	3800	4054	4266	4423	4656	4830	4940
Libya	GDP	87	63	74	34	81	65	41	29
	GDP per capita	14231	10151	11933	5517	13035	10453	6573	4643

Source: World Bank (2017)

As seen from Table 1, no important decrease in GDP and GDP per capita has been seen in other countries that Arab Spring were lived through except Tunisia in 2012 when it is compared to previous year. While GDP was 46 billion $ in this country that the effect of Arab Spring was extremely felt in 2011, this number had dropped back to 45 billion $ in the end of 2012. While it is seen that GDP increased by approximately two times in Libya in 2011 compared to previous year,

it is seen that it escalated to 81$ by increasing by approximately two and half times in 2012 immediately after going of Kaddafi who is the President of Libya in the end of 2011.

Table 2. Unemployment and Inflation Rate (%)

Country	Indicator	2008	2009	2010	2011	2012	2013	2014	2015
Tunisia	Inflation	4.9	3.5	4.4	3.5	5.1	5.7	4.9	4.8
	Unemployment	12.4	13.3	13	18.3	14	13.3	13.3	.
Egypt	Inflation	18	11.71	1.2	10	7.11	9.42	10.14	10.35
	Unemployment	8.7	9.4	9	12	12.7	13.2	13.2	.
Bahrain	Inflation	3.5	2.7	1.9	-0.36	2.75	3.3	2.6	1.8
	Unemployment	3.7	4	3.6	4	3.7	3.7	3.9	.
Jordan	Inflation	14	-0.6	5.1	4.15	4.52	4.83	2.89	-0.87
	Unemployment	12.7	12.9	12.5	12.9	12.2	12.6	11.1	.
Libya	Inflation	10.36	2.45	2.79	15.51	6.05	2.6	.	.
	Unemployment	18.8	18.6	18.5	17.7	19.2	19.2	19.2	.

Source: World Bank (2017)

In Table 2, unemployment and inflation rates have been shown in the countries that Arab Spring is lived in. According to this table, while inflation shows increase in Egypt and Libya after 2011 that Arab Spring is lived in, it is in tendency to decrease in the same countries. In Tunisia, unemployment rate had risen to level of 18.3% by increasing 5% while inflation had risen to 5.1 by increasing 2% in 2011 compared to previous year. It is possible to say that this high unemployment level lived in Tunisia comes at the beginning of the factors that triggered Arab Spring.

3. Analysis
3.1. Research Period and Data Set

In the study, annual data between 1990 and 2014 had been used as a research period. Five Middle East countries that are included in analysis have consisted of Egypt, Tunisia, Bahrain, Jordan and Libya. Countries like Syria, Algeria had been left out of research since data belonging to these countries were not reached to.

In the analysis, logarithm of Gross Domestic Product (log GDP) of chosen countries had been included as dependent variable, export (log exp), importation (log imp) and net foreign assets (log net) as independent variable to the model. Variables used in the model had been obtained from database of World Development Indicators of World Bank. Gauss 10 and Eviews 9 programs had been used for analysis. Econometric model that are going to be guessed in the study is as follows.

$$logGDP_{it} = \alpha_i + \beta_1 logexp_{it} + \beta_2 logimp_{it} + \beta_3 lognet_{it} + \varepsilon_{it} \tag{1}$$

Cross-sectional dependency and homogeneity tests had been done firstly for the variables. Not taking into consideration of cross-sectional dependency and homogeneity test by choosing unit root tests to do is going to make the results of the analysis unbiased and consistent. While there is cross-sectional dependency in between series, making analysis without consideration has affected the results to be obtained significantly (Peseran, 2004).

3.2. Empirical Analysis Findings
3.2.1. Cross-sectional Dependency

The existence of cross-sectional dependency has been checked by Breusch-Pagan (1980) CDLM1 test when time dimension is bigger than cross-sectional size, checked by Peseran (2004) CDLM2 test when time dimension is equal to the cross-sectional size and checked by Peseran (2004) CDLM test when time dimension is smaller than the cross-sectional size. These tests have

been deviated when the group differs from zero (Breusch-Pagan, 1980; Peseran, 2004). Statistic of LM test is at first as follows:

$$LM = T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \left(\hat{\rho}_{ij}^2 \right) \sim \frac{\chi_{N(N-1)}^2}{2}$$

(2)

Peseran and Yamagata (2008) had corrected this deviation by adding variance and average into the test statistic. Therefore, its name has been expressed as deviation corrected LM test (LMadj). Statistic of LMadj is as follows (Peseran and Yamagata, 2008):

$$LM_{adj} = \left(\frac{2}{N(N-1)} \right)^{1/2} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2 \left(\frac{(T-K-1)\hat{\rho}_{ij} - \hat{\mu}_{Tij}}{\upsilon_{Tij}} \right) \sim N(0,1)$$

(3)

Null and alternative hypothesizes of the cross-sectional dependency test that examines the existence of cross-sectional dependency in this study:

H_0: There is no cross-section dependency.
H_1: There is cross section dependency.

Table 3. Test Results of Cross-sectional Dependency

Fixed Model	Loggdp Statistic	pvalue	Logexp Statistic	pvalue	Logimp Statistic	p-value	Lognet Statistic	p-value
CD$_{lm}$ (BP,1980)	71.868	0.000***	64.456	0.000***	56.049	0.000***	16.499	0.086*
CD$_{lm}$(Peseran,2004)	13.834	0.000***	12.177	0.000***	10.297	0.000***	1.453	0.073*
CD(Peseran, 2004)	-0.189	0.425	-1.156	0.124	-1.240	0.108	-2.929	0.002***
LM$_{adj}$ (PUY, 2008)	5.881	0.000***	1.660	0.048**	1.850	0.032*	4.646	0.000***

Note: *, **, *** represent 10%, 5%, 1% significance levels

Table 3 has shown the test results of cross-sectional dependency. As seen from Table 3, since probability values belonging to logdp, logexp, logimp and lognet variables are smaller than 0.05, it had been decided that there is cross-sectional dependency in the series that H_0 was rejected. Hence, while unit root analysis of the series used in the study was held, tests that consider the cross-sectional dependency have been used.

3.2.2. Homogeneity Test

Homogeneity test has been searched via delta tests of Peseran and Yamagata (2008). Disturbance terms have presented normal distribution as long as $\sqrt{N}/T \to \infty$ under null hypothesis of slope homogeneity so delta-tilde statistic of Peseran and Yamagata (2008) has shown standard normal distribution. Peseran and Yamagata (2008) have recommended corrected delta-tilde statistic for small sample. This statistic has also normal distribution specifications (Peseran and Yamagata, 2008). Therefore, null hypothesis that argues for that slope coefficients are homogeneous when probability values of test statistics are smaller than 0.005, level of significance are going to be rejected. Null and alternative hypothesizes of homogeneity test that allows that slope coefficients are homogeneous or heterogeneous for each country are as follows:

H_0: *Slope coefficients are homogeneous.*
H_1: *Slope coefficients are not homogeneous.*

Table 4. The Results of Homogeneity Test

	Statistic	p-value
$\tilde{\Delta}$	8.477	0.000***
$\tilde{\Delta}_{adj}$	9.433	0.000***

Note: *, **, *** represent 10%, 5%, 1% significance levels

Since probability values of tests calculated in Table 4 are smaller than 0.5, H_0 hypothesis had been rejected and H_1 hypothesis had been accepted. Hence, slope coefficients are heterogeneous.

3.2.3. Structural Break Unit Root Test (Im et al. 2005)

Panel LM test developed by Im et al. (2005) has allowed until heterogeneous two break in level as well as in slope.

$$\tilde{y}_t^* = \begin{cases} \dfrac{T}{T_{B_1}} \tilde{y}_t & \text{for } t \leq T_{B_1} \\[2ex] \dfrac{T}{T_{B_2} - T_{B_1}} \tilde{y}_t & \text{for } T_{B_1} < t \leq T_{B_2} \\[1ex] \vdots \\[1ex] \dfrac{T}{T - T_{B_R}} \tilde{y}_t & \text{for } T_{B_R} < t \leq T \end{cases} \tag{4}$$

By using average of test statistics;

$$\bar{t} = \frac{1}{N} \sum_{i=1}^{N} \tilde{\tau}_i^* \tag{5}$$

Then they have calculated the standardized state of this average test statistics. Panel LM test statistic having standard normal distribution by using estimated values of averages of means and variances of numbered (5) equation. Numbered (6) equation has been obtained in the result (Im et al., 2008).

$$LM\left(\tilde{\tau}^*\right) = \frac{\sqrt{N}\left[\bar{t} - \tilde{E}\left(\bar{t}\right)\right]}{\sqrt{\tilde{V}\left(\bar{t}\right)}} \tag{6}$$

Hypothesizes of test are as follows:

H_0: *There is unit root.*
H_1: *There is not unit root.*

If probability value of calculated test is smaller than 0.05, H_0 has been rejected and it has been decided that there is not unit root test in between series.

Table 5. One Break Panel Unit Root Test

	One break model			

LogGDP	\multicolumn{3}{c}{Level shift model:Break in constant}	\multicolumn{3}{c}{Level and trend shift model:Break in constant and trend}
LogGDP	Lag	LM-stat.	Break (s)	Lag	LM-stat.	Break
Tunisia	0	-3.374	2003	0	-3.325	2003
Egypt	1	-3.936	2003	1	-4.745	2009
Bahrain	0	-3.215	2004	0	-3.190	2005
Jordan	2	-3.105	2007	2	-2.803	2001
Libya	2	-4.965	2005	2	-5.344	2005
Panel LM		-6.288			-4.277	
p-value		0.000***			0.000***	
Logexp						
Tunisia	4	-3.511	2003	4	-4.351	2007
Egypt	4	-4.503	2003	4	-4.482	2003
Bahrain	0	-3.700	2004	0	-3.805	2005
Jordan	2	-2.973	1999	2	-3.282	1999
Libya	4	-4.381	2004	4	-4.707	2005
Panel LM		-6.741			-4.977	
p-value		0.000***			0.000***	
logimp						
Tunisia	4	-3.572	2006	4	-4.683	2007
Egypt	0	-5.023	2003	0	-5.105	2003
Bahrain	4	-3.076	2004	4	-3.226	2004
Jordan	4	-3.360	2004	4	-3.338	2004
Libya	0	-4.183	2001	0	-4.148	2001
Panel LM		-6.793			-4.847	
p-value		0.000***			0.000***	
Lognet						
Tunisia	0	-4.178	2005	0	-4.0603	2005
Egypt	1	-2.717	2001	1	-2.730	2007
Bahrain	0	-3.402	2007	0	-3.269	2007
Jordan	4	-5.129	2001	4	-4.371	1999
Libya	2	-3.473	1999	2	-3.846	1999
Panel LM		-6.498			-3.410	
p-value		0.000***			0.000***	

Note: *, **, *** represent 10%, 5%, 1% significance levels

In Table 5, results of the one break LM test had been given. It has been decided that there is not structural break unit root for overall of panel by considering cross-sectional dependency when results are examined in the table and so it is decided that it is stable. Structural breaks had been found in five countries by this test method according to one break model. Breaks that happened in these five countries had occurred in between 1999-2009.

Table 6. Two Break Panel Unit Root Test

	Two break models					
	Level shift model: Break in constant			Level and trend shift model: Break in constant and trend		
logGDP	Lag	LM-stat.	Break (s)	Lag	LM-stat.	Breaks
Tunisia	0	-7.067	2000-2009	0	-6.911	2000-2009
Egypt	1	-4.301	2002-2006	1	-7.637	2002-2011
Bahrain	0	-7.080	2000-2008	0	-8.188	2000-2008
Jordan	2	-5.161	1999-2007	2	-5.417	2002-2007
Libya	2	-6.621	2004-2011	0	-7.928	2002-2011
Panel LM		-14.55			-14.909	
p-value		0.000***			0.000***	
Logexp						
Tunisia	4	-6.882	2001-2007	4	-6.368	2001-2007
Egypt	4	-5.820	2000-2007	4	-5.753	1998-2010
Bahrain	0	-7.378	1997-2005	0	-7.564	1997-2005
Jordan	2	-7.627	2002-2008	2	-10.915	2002-2008
Libya	4	-5.975	2002-2011	4	-7.691	1998-2011
Panel LM		-16.792			-16.680	
p-value		0.000***			0.000***	
logimp						
Tunisia	0	-5.773	2001-2007	0	-5.925	2002-2008
Egypt	1	-7.389	2000-2010	1	-7.489	2000-2010
Bahrain	4	-5.024	2002-2009	4	-4.929	2002-2009
Jordan	3	-5.792	2000-2006	3	-5.327	2001-2006
Libya	0	-6.487	2001-2010	3	-8.817	2001-2010
Panel LM		-14.498			-12.262	
p-value		0.000***			0.000***	
Lognet						
Tunisia	0	-5.567	2005-2009	0	-5.409	2002-2005
Egypt	1	-2.789	2007-2010	1	-2.732	2007-2010
Bahrain	0	-6.600	2001-2008	0	-5.962	2001-2008
Jordan	0	-7.307	2002-2008	0	-6.901	1999-2012
Libya	2	-6.109	1999-2006	2	-4.729	1998-2007
Panel LM		-13.185			-7.152	
p-value		0.000***			0.000***	

Note: * Common factor number had been taken as 2. *, **, *** represent 10%, 5%, 1% significance levels

Two break LM test had been included in Table 6. While breaks were happening in between 1998-2002 in this table, it has been taken attention that second breaks are corresponding to after 2005 and years that Arab Spring happened. The effect of Arab Spring has influenced on different series in each country; while break has been seen in GDP per capita substituted as growing variable and export in Egypt and Libya in 2011 that Arab Spring happened, a break has been seen in net foreign assets variable in Jordan in 2012.

3.2.5. Fixed Effects Model

Fixed effects name has been given to panel data model that slope coefficients are same for time and section units but constant coefficient changes in between cross section units. This model has been explained with differences in behaviors of cross section units and constant coefficients. Fixed effects model has two variations as one way and two ways. Changes happened

in parameters of one way fixed effects model have been originated from changes happened in cross-sectional data. Therefore, there is not any effect of time series on change in this model. However, changes have been considered in both cross-sectional data and time series in two way fixed effects model (Baltagi, 2001). The results of two way fixed effects model have been given in Table 7 below.

Table 7. Estimation Results of Fixed Effect Model

Variables	Coefficients	t-statistic	Probability
Logexp	0.3836	4.6601	0.000***
Logimp	0.3489	3.7111	0.000***
Lognet	-0.1259	-6.1610	0.000***
Constant	-2.5569	-2.7631	0.006***
R^2			0.983
F-statistic			180.199
Prob (F-statistic)			0.000***
Cross Section F			293.999 (0.000***)
Cross Section/Period F			84.707 (0.000***)

Note: *, **, *** represent 10%, 5%, 1% significance levels. exp: export, imp: import, net: foreign assets

According to fixed effects model results, value of R^2 has been guessed as 98.36%. In other words, the power of influence of independent variables on dependent variable is 98%. When probability value of F-statistic was considered, it has been seen that all variables are significant as statically. Since probability values of Cross-section F and Cross-section/Period F that are used to check on the significance of effects are smaller than 0.05, it has been concluded that model is significant as a whole.

4. Conclusion

As a result of civil commotions that were started at the end of 2010 and comprehended the Near and Middle East regions, oppressive managements had been toppled in most of the region countries except Gulf countries but a democratic, persistent state structure and organizations could not have been constituted in this process. While present regimes in Morocco, Algeria, Kuwait, Omani and Saudi Arabia preserve their existence with the suppression on the onset of civil commotions, present regimes had been always yielded to internal conflicts in Bahrain, Syria and Yemen; present regimes had been toppled with the demonstrations of crowds gathered in squares in Tunisia and Egypt and present regimes had been toppled by conflict in Libya.

In this study; it had been investigated that whether Arab Spring has an effect on economic growth or not in Tunisia, Egypt, Jordan, Bahrain and Libya with the help of structural break panel unit root tests. Annual data between 1990 and 2014 had been used as a research period. Countries like Syria, Algeria had been left out of research since data belonging to these countries were not reached to.

It had been seen that there is cross-section dependency in between the countries constituting the panel in the empirical analysis done. As a consequence of that, while unit root analysis of series used in this study is held, structural break panel unit root tests that consider cross-section dependency had been used. It had been seen that all variables are stable in the level. This situation means that effect of Arab Spring is not permanent in the related countries. As a result of one-break panel unit root test; while breaks are corresponding to between 1999 and 2009, it has especially remarked that breaks are corresponding to after 2010 that Arab Spring happened in Egypt and Libya as a consequence of the two-break panel unit root test. The effect of Arab Spring has influenced on different series in each country; while break has been seen in GDP per capita substituted as growing variable and export in Egypt and Libya in 2011 that Arab Spring happened, a break has been seen in net foreign assets variable in Jordan in 2012.

According to the two-way fixed effect model, the independent variables have a power to influence the dependent variable by 98%. Since the probability values of the independent

variables are less than 0.05 and the coefficients are significant, the model is significant. According to the results, a 1% change in exports in the countries where Arab Spring is experienced increases the economic growth by 38% and a 1% change in the importation likewise increases the economic growth by 34%. A 1% change in net foreign assets reduces economic growth by 12%. Export and import increase economic growth. For this reason, the Arab Spring countries need to focus on the goods and services they export and import in order to increase their economic growth. Economic growth rate should be carefully monitored and it should be tried to be raised in accordance with the program targets. Because the investment is the engine of growth, the investment environment must be sustainable.

As a conclusion, although empirical findings have shown that effect of Arab Spring is not permanent in the countries at issue, it is necessary that policymakers have to provide fair income distribution, constitute the social and financial order that provide employment to unemployed in these countries. Even if governments had changed hands in some of Middle East countries during Arab Spring, some basic regulations are inevitable to solve the problems arising from structural specifications of country economies, regional relationships and financial developments in global level. Otherwise, low welfare level, high unemployment rate, inequality between social groups creating society are going to feed a political disablement not only in countries that are in the center of the Arab Spring events but also in nearby countries.

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