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Araştırma Makalesi/Research Article

COINTEGRATION EVIDENCES FROM THE NEW FRAGILE FIVE

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ABSTRACT

Purpose of this study is to test the association between savings and current account deficit of the “New Fragile Five” falling into critical cycle. 1994-2019 period annual national savings, current account balance and external debt have been analyzed within the framework of panel data analysis. At the modeling stage of the research focused on the cointegration relationship. Panel cointegration tests with structural breaks based on LM were used. To examine the unique economic structures of countries, heterogeneous estimating techniques were employed. The research has four important findings; i. There is a cointegration relationship between indicators, ii. The external debt increases the current account deficit, iii. The increase of savings in Turkey decreases the current account deficit, iv. An increase in savings increases the current account deficit in Argentina, Egypt, Pakistan and Qatar. This study, which will contribute to the expansion of typology, is also contributory to the “Triple Deficit Hypothesis”.

Keywords: Current Account Deficit, Savings, Triple Deficit, Heterogeneous Panel, Cointegration with Structural Breaks, Unit Root with Structural Breaks

Jel Codes: E21, F32, E42, C33, C52

1. INTRODUCTION

For the first time in 2013, Morgan Stanley used the concept of fragility in order to refer to economies becoming fragile due to high current account deficits (CAD) and their dependence on global capital flows, and created the “*Fragile Five*”. Afterward, the “*Fragile Eight*” group was created. And in 2017, “*New Fragile Five*” group was created by Standard & Poor's (S&P). Common ground of these countries is; balance of payments disequilibrium, finance of which becomes more and more challenging, and the rising high borrowing need. Due to their dependence on international capital flows, these economies become fragile against foreign shocks. CAD is –if certain threshold values are exceeded– accepted as significant crisis indicators. The main symptom behind the CAD problem is; insufficiency of national savings (Çiğdem, 2017; Çiğdem and Ülgen, 2017). Researchers stated in Table 1 has also confirmed that savings are among the determinants of CAD. So that a decrease in savings-investment deficit contributes to improvement of CAD (Chowdhury and Saleh, 2007).

Table 1. Researchers

Researcher	Year	Researcher	Year
Obstfeld and Rogoff	1994	Choi et al.	2008
Calderon et al.	2001	Ketenci and Uz	2009
Calderon et al.	2002	Ketenci	2010
Taylor	2002	Brissimis et al.	2010
Herrman and Jochem	2005	Brissimis et al.	2011
Aristovnik	2006	Liang	2012
Engel and Rogers	2006	Murty et al.	2013

Existence, and in particular, direction of a relationship between CAD and savings have been one of the most debated subjects. Empirical studies carried out have produced different results, for example; Barış and Uzay (2015) determined a strong causality relationship from CAD to savings while Kaygısız et al. (2016) indicated a one-way relationship from savings to CAD. On the other hand, Karanfil (2014) and Altunöz (2018) found a two-way causality relationship between variables. Çiğdem and Ülgen (2017) pointed out a two-way relationship between variables in Brazil, South Africa and India, a one-way relationship from CAD to savings in Chile and Poland, and a one-way relationship from savings to CAD in Indonesia. No relationship between variables has been determined in Hungary and Turkey. In these countries with fragile structures, determining the existence and direction of a relationship between variables is of importance especially for policymakers. This study is contributory to the literature due to limited number of studies on the *New Fragile Five* and even the *Triple Deficit*.

2. METHODOLOGY, DATA AND EMPIRICAL RESULTS

In this section, where the savings-CAD relationship will be analyzed, the 1994-2019 period annual data obtained from IMF have been tested. GDP and investment data were also analyzed as auxiliary variables. Stata 14.0 and Gauss 10 software has been used from during econometric analyses. An analysis within the panel cointegration model has been carried out in order that reciprocal synchronous long-run relationships among the examined variables can be demonstrated. Heterogeneous estimation techniques are of particular importance. Because, while providing an overview about the Fragile Five, the unique economic structures of the countries can be observed. Several estimators which have different theoretical basis were used to estimate the panel regression model. Regression have been estimated for a more detailed analysis of the relationship between variables.

Within this context, both the relationship between variables during analysis and the effect of changes in the variables on the same variables have been observed. Table 2 indicates the variables used in the analyses.

Table 2. Variables

Variables	Code	Units	Source
Current Account Deficit	CAD	% GDP	IMF
National Savings	S	% GDP	IMF
External Debt	ED	%GDP	IMF
Gross Domestic Product	GDP	% Growth	IMF
Investment	I	%GDP	IMF

2.1. Panel Unit Root Tests

Before proceeding to the estimation phase of the regression model time series properties of macroeconomic variables were investigated. Panel unit root tests are divided into two within the literature that so-called first-generation panel unit root tests assuming there is no cross-sectional dependence. The so-called second-generation panel unit root tests run on the assumption of cross-sectional dependence. The main advantage of second-generation tests over other tests is that they allow cross-sectional correlation (Güloğlu et al. 2012:606). As argued by O’Connell (1998), possible correlations between cross-section series can lead to overreject of the null hypothesis of first generation tests. Whether there is cross-sectional dependency in variables must be tested before the selection of panel unit root test, and a panel unit root test must be selected accordingly. For this purpose, weak cross-sectional dependence CD_{NT} (N<10) test developed by Pesaran (2015) and bias adjusted LM test (LM_{adj.}) developed by Pesaran et al. (2008) were used.

For this purpose, three panel unit root tests were used: CIPS test developed by Pesaran (2007); MADF test developed by Taylor and Sarno (1998) and PANKPSS test developed by Carrion-i Silvestre et al. (2005) for testing unit roots in the variables.

Pesaran (2007), augmented the ADF regression through cross-section average and lagged values of series, and developed the cross-sectionally augmented IPS, namely the CIPS statistics, asserting that correlation between cross-sections had been eliminated through first-order difference of such regression. Null hypothesis of the test is formed as $H_0: \rho_i = 0$ (for each i). CIPS statistics is calculated as:

$$CIPS(N, T) = N^{-1} \sum_{t=1}^N t_i(N, T) \tag{1}$$

and truncated version of this statistics is;

$$CIPS^*(N, T) = N^{-1} \sum_{i=1}^N t_i^*(N, T) \tag{2}$$

Pesaran (2007) stated the powerful part of this test to be good small sample properties (Pesaran, 2007:277).

Taylor and Sarno (1998) propose the multivariate augmented Dickey-Fuller (MADF) unit root test, which is similar to the classic single equation ADF test. In the model which proposed a system with N equation is estimated and a test process is applied by considering the correlation between the cross sections. MADF statistics is actually standard Wald statistics and is shown as below:

$$MADF = \frac{(\iota - \varphi \hat{\beta}) \{ \varphi [Z'(\hat{\lambda}^{-1} \otimes I_T)Z]^{-1} \varphi' \} (\iota - \varphi \hat{\beta}) N(T-k-1)}{(Y-Z\hat{\beta})' (\hat{\lambda}^{-1} \otimes I_T) (Y-Z\hat{\beta})} \tag{3}$$

Where, φ represents dimensional with $N \times N(k+1)$ block diagonal matrix and I vector with $N \times 1$ dimensional. $\hat{\beta}$ and $\hat{\lambda}$ represent consistent estimators of β and λ . The null hypothesis of this test indicates that there is no unit root in the series (Taylor and Sarno, 1998:288). The

theoretical base of the panel unit root test proposed by Carrion-i Silvestre et al. (2005) are different and structural breaks are taken into account. Under the assumption that the long-run variance is constant (by groups), using the LM_{hom} statistic, the null hypothesis of stationarity is tested as follows:

$$LM_{hom}(\lambda) = N^{-1} \sum_{i=1}^N (\hat{\omega}^{-2} T^{-2} \sum_{t=1}^T S_{i,t}^2) \tag{4}$$

Where, $S_{it} = \sum_{j=1}^t u_{ij}$ and $N^{-1} \sum_{i=1}^N \hat{\omega}_i^2 = \lim_{T \rightarrow \infty} T^{-1} s_{i,T}^2$. When the long-run variance is allowed to change according to the groups, LM_{het} statistics are used and shown as follows:

$$LM_{het}(\lambda) = N^{-1} \sum_{i=1}^N (\hat{\omega}_i^{-2} T^{-2} \sum_{t=1}^T S_{i,t}^2) \tag{5}$$

In these equations (4, 5), \hat{u}_{ij} refers to OLS residuals, and ω_i^2 is the long-run variance of u_{ij} . LM statistics are standardized as follows:

$$Z(\lambda) = \frac{\sqrt{N}(LM(\lambda) - \bar{\xi})}{\bar{\zeta}} \sim N(0,1) \tag{6}$$

In this equation (6), $\bar{\xi}$ and $\bar{\zeta}$ are the average of the mean and variance for each cross section, respectively. Also, structural breaks are allowed to change according to the series (Carrion-i Silvestre et al., 2005: 161-163).

2.2 Panel Cointegration Test

Cointegration refers to a very special relationship structure that can be defined as a long-run synchronous movement between variables. In this study, the relationship between the “CAD-Savings-ED” in the *Fragile Five* was investigated by LM based panel cointegration tests. These tests are LM based cointegration tests developed by Westerlund (2006) and Westerlund & Edgerton (2008) that take into account structural breaks. The main advantages of these tests are that it allows cross-sectional dependence and heterogeneous slopes.

In panel LM test with multiple structural breaks developed by Westerlund (2006), breaks are determined endogenously. In other words, the breaks date is not known before. In this test, cross-sectional dependence and heterogeneous slopes are allowed, as well as different number of breaks and different break dates according to the groups. The model for this test is shown below:

$$y_{it} = z'_{it} \gamma_{ij} + x'_{it} \beta_i + e_{it} \tag{7}$$

$$e_{it} = r_{it} + u_{it} \tag{8}$$

$$r_{it} = r_{it-1} + \phi_i u_{it} \tag{9}$$

Where, $x_{it} = x_{it-1} + v_{it}$. The statistics of the test are as follows:

$$Z(M) = \sum_{i=1}^N \sum_{j=1}^{\mu_i+1} \sum_{t=T_{ij-1}+1}^{T_{ij}} (T_{ij} - T_{ij-1})^{-2} \hat{\omega}_{i,1.2}^{-2} S_{it}^2 \tag{10}$$

The null hypothesis of this test indicates the presence of cointegration. In equation 10 $\hat{\omega}_{i,1.2}^2 = \hat{\omega}_{i,11}^2 - \hat{\omega}'_{i,21} \hat{\Omega}_{i,22}^{-1} \hat{\omega}_{i,21}$ and $S_{it} = \sum_{k=T_{ij-1}}^t \hat{e}_{ik}^*$. Where, \hat{e}_{it}^* is an efficient estimator of e_{it} (Westerlund, 2006:103-104).

Another cointegration test used in the research is an LM based test developed by Westerlund and Edgerton (2008), which have a structural breaks assumption. This test also allows for serially correlated and heteroscedastic residuals, breaks in both constant and slope. LM cointegration test by suggested Westerlund and Edgerton (2008) can be which can simply be written as follows (Westerlund and Edgerton, 2008);

$$\varphi_N = \frac{1}{N} \sum_{i=1}^N T \hat{\varphi}_i S_i \tag{11}$$

$$\tau_N = \frac{1}{N} \sum_{i=1}^N \tau_i \tag{12}$$

$S_i = \hat{\omega}_i / \hat{\sigma}_i$ where $\hat{\sigma}_i$ is estimated regression¹, standard error $\hat{\varphi}_i$ is the OLS estimate of φ_i and τ_i its t-ratio. The null hypothesis of this test is that there is no cointegration relationship. As argued by Westerlund and Edgerton (2008) that this test has good performance in small samples.

2.3 Panel Regression Estimators

Slope heterogeneity should be tested before estimating a panel regression model. This term means that each cross section has its own slope, which is statistically significant. As argued by Maddala, Trost, Li and Joutz (1997), if panels with heterogeneous slopes are estimated by the assumption of homogeneity, then heterogeneity bias may occur. Homogeneous slopes were investigated with the \hat{S} test developed by Swamy (1970) and the slope homogeneity test developed by Pesaran and Yamagata (2008). Swamy \hat{S} test is for panels where cross-sectional dimension (N) is small relative to time dimension (T). The $\tilde{\Delta}$ test is for large panels (Pesaran and Yamagata, 2008:209). Therefore, were employed the bias adjusted version of this test ($\tilde{\Delta}_{adj}$) in the research.

In this study, advanced panel data analysis techniques have been applied where the characteristics of the groups such as individuals, countries and the correlation between cross-sections are not ignored. It is very important to provide information on the basis of groups as well as providing information about the overall panel. Thus, groups that are compatible with the results of the panel can also be identified. For this purpose, AMG estimator developed by Eberhardt and Teal (2010) and Eberhardt and Bond (2009); CCE estimator developed by Pesaran (2015); SUR estimator developed by Zellner (1962) and panel DOLS estimator developed by Pedroni (2001) was used. The values obtained for each group are combined with the MG approach developed by Pesaran and Smith (1995) (Eberhardt and Bond 2009:2-3). The theoretical details of the panel regression estimators used in the study are given respectively.

The panel regression model by AMG estimator can be expressed as follows:

$$y_{it} = a_i + b_i' x_{it} + c_{it} + d_i \hat{\mu}_t + e_{it} \tag{13}$$

Where “ μ_i ” unobserved common factors, x_{it} is explanatory variables and y is dependent variable.

At the last stage, the following model is estimated:

$$\hat{\beta}_{AMG} = N^{-1} \sum_{i=1} \hat{\beta}_i \tag{14}$$

The CCE estimator is based on a linear model such as:

$$y_{it} = a_i' d_t + b_i' x_{it} + e_{it} \quad i = 1, \dots, N \quad t = 1, \dots, T \tag{15}$$

Then each group is averaged and combined with the MG approach:

$$\hat{\beta}_{CCEMG} = N^{-1} \sum_{i=1} \hat{\beta}_i \tag{16}$$

Where β_i represents to the slope specific to each cross section (Pesaran, 2006: 982). Pesaran (2006) stated that the CCE estimator is more suitable for heterogeneous large panels, but later Monte Carlo experiments by Kapetanios, Pesaran and Yamagata (2011) showed that the CCE estimator is better in small samples than the alternative estimators in the literature (Pesaran 2006; Kapetanios et al.2011).

Another estimator included in the paper is the DOLS, which is frequently used in the estimation of cointegration relations. The DOLS estimator also includes preliminary and lagged values of arguments. Thus, it also ensures the destruction of endogeneity. A regression model with slope heterogeneity is based on:

$$y_{it} = \mu_i + \beta_i x_{it} + u_{it} \quad i = 1, \dots, N \quad t = 1, \dots, T \tag{17}$$

Then the results are combined for the panel;

$$\hat{\beta}_{DOLSMG} = N^{-1} [\sum_{i=1}^N (\sum_{t=1}^T (Z_{it} Z'_{it})^{-1}) (\sum_{t=1}^T (Z_{it} \bar{Y}_{it}))] \tag{18}$$

Where Z_{it} is column vector of explanatory variables and y is dependent variable (Pedroni, 2001:729).

SUR estimator is different from other methods. In SUR method, the system can be solved as a whole and loss of effectiveness can be prevented. In addition, the correlation between regression and residuals of models is also taken into account. Where in this method, first, each group is estimated individually as follows:

$$Y_i = X_i \beta_i + u_i \tag{19}$$

and omega matrix is calculated,

$$\hat{\beta} = (X' \Omega^{-1} X)^{-1} X' \Omega^{-1} Y \tag{20}$$

Where, Ω represents the variance-covariance matrix, y is a dependent variable and x_{it} explanatory variable. Then, regression model is estimated by GLS (Zellner, 1962: 340).

In this research, 1994-2019 period annual CAD, S, ED, INV and GDP data of five countries named the *New Fragile Five* (Argentina, Egypt, Qatar, Pakistan and Turkey) are examined. Panel regression model to be estimated within the scope of the research is shown as the following:

$$CAD_{it} = a_i + \beta_{1i} S_{it} + \beta_{2i} ED_{it} + u_{it} \tag{21}$$

Table 3. Descriptive Statistics

Variables	Obs. (NxT/25x5)	Mean	Median	St. Dev.	Min.	Max.
CAD	125	0.394152	-1.355	9.560282	-27.25	33.185
S	125	24.00102	20.218	13.82498	9.076	64.189
ED	125	2.982566	-2.139	14.12176	-13.489	47.199
GDP	125	4.966409	4.674	5.436894	-10.895	30.012
INV	125	22.75357	19.32	8.145491	10.306	46.674

Descriptive statistics for variables are presented in Table 3 before estimating the model. Furthermore, it is seen that the data set displays balanced and long panel characteristics. It is also very important that the median of the CAD and ED variables are negative. This situation is actually an indication that there is a CAD and external debt in the fragile five.

Table 4 : Cross-section Dependence Tests (for variables)

Variables	Bias Adj. CD St. (CD _{adj})	Pesaran (2015) CD _{NT} St.
CAD	45.717 *	3.742 *
S	45.717 *	1.878 ***
ED	45.717 *	2.131 **

Note: *, **, *** denote the significance levels of alpha at 0.01, 0.05, and 0.10 respectively.

Findings for the cross-sectional dependence are illustrated in Table 4. According to this table, is rejected the null hypotheses of absence of cross section dependence by looking at the results of CD_{NT} test and LM_{adj} tests. Thus, it was observed that there is problem of cross-sectional dependence. Therefore, before proceeding with the unit root analyses, second-generation panel unit root tests functioning under the presence of cross-sectional dependence must be selected. In this research, presence of unit root has been tested using the CIPS, MADF and PANKPSS (with structural breaks) panel unit root tests.

Table 5 : Panel Unit Root Tests

Variables	CIPS		MADF	PANKPSS	
	t-bar St. Intercept	t-bar St. Int&Trend	MADF St. Intercept	LM St. Intercept	LM St. Int&Trend
CAD	-0.575	-0.952	20.448	1.527 ***	39.478 *
S	-0.281	-0.199	18.948	4.681 *	27.410 *
ED	-0.681	-1.150	30.353	-0.055	16.458 *
ΔCAD	-5.077 *	-3.437 *	117.411		
ΔS	-2.740 *	-1.629 ***	146.478		
ΔED	-5.018 *	-3.365 *	136.176		

Note :i. *, **, *** denote the significance levels of alpha at 0.01, 0.05, and 0.10 respectively.

ii. Critical values for the MADF test are 31.844 (level) and 33.168 (first dif.).

Table 5 shows the results of the panel unit root tests with different theoretical basis. According to CIPS and MADF test statistics, the null hypothesis indicating the unit root existence can not be rejected. The results of CIPS and MADF test stat. are also supported by the result of PANKPSS test. The results of the panel unit root tests where the breaks are not taken into account and are taken are in consistency. Moreover, the results of the PANKPSS test showed that the factors affecting the stationary of variables are not only structural breaks.

Table 6 : Slope Homogeneity and CSD Test

Swamy Slope Het. Test χ^2 St.	Pesaran&Yamagata $\bar{\Delta}$ St.	Pesaran&Yamagata $\bar{\Delta}_{adj}$ St.
119.3632*	7.2769*	8.0970*
Cross-section Dependence Tests (for model)		
Bias Adj. CD Test St.	Breusch-Pagan LM St.	Breusch-Pagan LM _{adj} St.
6.399*	17.25***	3.974*

Note: *, **, *** denote the significance levels of alpha at 0.01, 0.05, and 0.10 respectively.

Table 6 shows the tests (slope homogeneity and CSD) applied for the model. It has been concluded that the null hypothesis stating that slopes are homogeneous was rejected (at different levels of significance). According to the CSD tests, there is a CSD problem in the model. Therefore, these two assumptions should be considered in the selection of both the panel cointegration test and the panel regression estimator. This situation turns the direction of analysis into second generation panel cointegration tests and regression estimators.

Table 7. Panel Cointegration Tests

Westerlund (2006)		Westerlund&Edgerton (2008)	
LM St. (Cons.)	LM St. (Cons.&Trend)	Tau St. (τ)	Phi St.(φ)
28.559	0.401	-3.519*	-2.495*

Note: *, **, *** denote the significance levels of alpha at 0.01, 0.05, and 0.10 respectively

Table 7 shows the results of the panel cointegration tests with the structural breaks. Tau, phi and LM statistics indicate cointegration. In other words, these variables show a synchronous relationship in the long-run. Therefore the level values of the variables can be used for the rest of the analysis. Figure 1 shows the graphs of macroeconomic variables of the *New Fragile Five*. Synchronous mobility between variables is clearly noticeable.

Figure 1. Graphics by Groups²

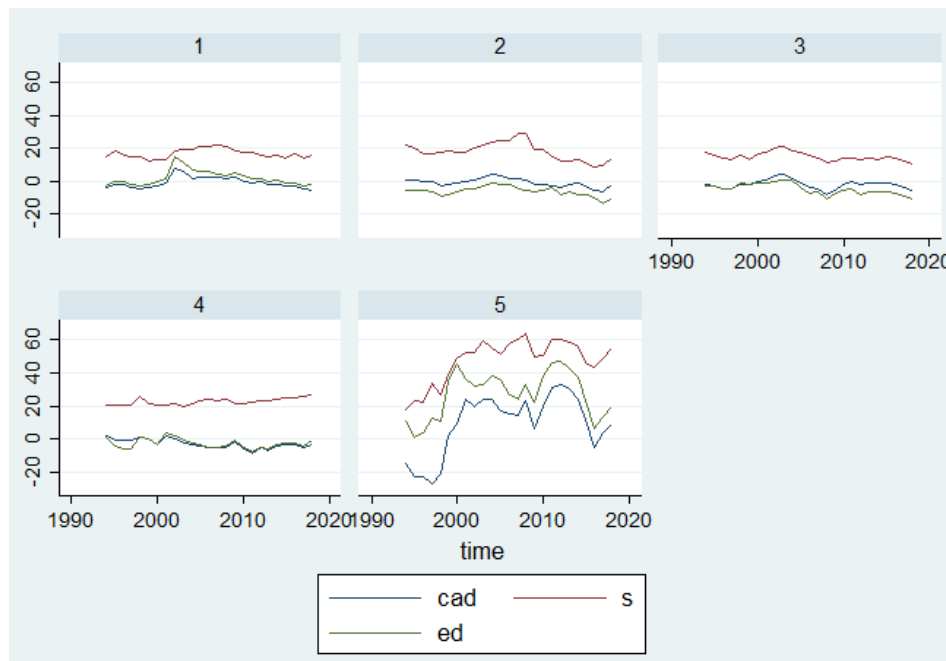


Table 8. Estimation Results (by panel)

Dependent Variables: CAD				
Regressors	CCE (robust)	AMG (robust)	DOLS	SUR
S	0.2352 [2.44]**	0.2463 [1.44]	0.4446 [6.793]*	0.2362 [4.54]*
ED	0.5960 [6.04]*	0.5873 [10.81]*	1.433 [18.13]*	0.5332 [12.43]*
Model				
RMSE	0.9847	1.3993		
Wald	42.41 *	118.84 *		

Note:i. *, **, *** denote the significance levels of alpha at 0.01, 0.05, and 0.10 respectively.

ii.Values in brackets indicate the t (only DOLS estimator) and Z statistics.

Panel regression model estimated with CCE, AMG, DOLS and SUR estimators is presented in Table 8. According to regression results both of explanatory variables seem to be significantly related to CAD (coefficient and significance level differ according to estimators). It is also observed that there is positive relationship between savings, ED and CAD. Nevertheless, in the model estimated only by the AMG estimator, the SAVINGS coefficient remains statistically insignificant.

Coefficients vary according to methods. However, the direction of the relationship is the same for all estimators:

- The effect of savings on CAD was estimated as 0.23 (CCE and SUR) and 0.44.

- The effect of ED on CAD ranges from approximately 0.59 (CCE and AMG) to 1.4 (DOLS).

The Wald statistics, which indicate the overall significance of the models, are also quite high.

Table 9. Estimation Results (by group)

Dependent Variable: CAD		Panel Estimators							
Countries	Regressors	CCE		AMG		DOLS		SUR	
Argentina	S	0.2589	[2.73]*	0.1719	[3.08]*	0.8507	[5.5689]*	0.1302	[2.81]*
	ED	0.6314	[11.50]*	0.6538	[17.13]*	0.6163	[4.665]*	0.6721	[22.89]*
Egypt	S	0.2378	[2.81]*	0.1859	[2.87]*	0.2293	[1.428]	0.1922	[4.03]*
	ED	0.4736	[3.32]*	0.5080	[4.23]*	1.198	[3.615]*	0.5574	[5.98]*
Pakistan	S	0.4146	[1.90]**	0.3211	[1.81]***	0.0637	[0.422]	0.4887	[2.71]*
	ED	0.3231	[1.49]	0.4802	[3.45]*	0.9154	[5.733]*	0.3337	[2.29]**
Turkey	S	-0.5440	[-4.41]*	-0.3909	[-2.90]*	0.0965	[0.2685]	-0.3820	[-2.86]*
	ED	0.7591	[11.12]*	0.7436	[8.11]*	1.502	[4.067]*	0.6720	[7.75]*
Qatar	S	0.1045	[0.99]	0.5607	[9.17]*	1.018	[7.548]*	0.7519	[6.65]*
	ED	0.7652	[9.12]*	0.5640	[10.71]*	0.7192	[5.475]*	0.5306	[4.99]*

Note: i. *, **, *** denote the significance levels of alpha at 0.01, 0.05, and 0.10 respectively.

ii. Values in brackets indicate the t (only DOLS estimator) and Z statistics.

In order to evaluate model estimations in more detail, results on the basis of groups are also shared. Table 9 shows the regression estimation results by groups. According to the results of the analysis;

The external debt increases the CAD in all countries in the fragile group of five countries.

In Turkey, an increase in savings affects the CAD differently; an increase in savings brings with it a decrease in the CAD.

In the *New Fragile Five Countries* (except Turkey), the increase in savings increase the CAD.

It is possible to explain this unexpected situation which is seen in the *New Fragile Five* (except Turkey) with the argument put forward by Caldéron. If the correlation between savings and growth is smaller than the correlation with growth and investments, then savings increasing the CAD. So is the GDP-Savings correlation in the *New Fragile Five*, lower than the GDP-Investment correlations? To clarify this question, the correlation coefficients between the mentioned variables were examined. Correlation tables are presented in Tables 10-11-12.

Table 10. Correlation Coefficient Table (Turkey)

	GDP	Savings		GDP	Investment
GDP	1.0000		GDP	1.0000	
Savings	0.0854	1.0000	Investment	0.5219	1.0000

Table 11. Correlation Coefficient Table (The Fragile Five Countries – Turkey excluded)

	GDP	Savings		GDP	Investment
GDP	1.0000		GDP	1.0000	
Savings	0.4722	1.0000	Investment	0.4578	1.0000

Table 12. Correlation Coefficient Table (The Fragile Five Countries – Turkey included)

	GDP	Savings		GDP	Investment
GDP	1.0000		GDP	1.0000	
Savings	0.4379	1.0000	Investment	0.4384	1.0000

At this stage, correlation coefficients were examined for three different situations. First, in Turkey's GDP-Savings correlation and GDP-Investment correlation has been analyzed (Table 10). Then, both the *New Fragile Five Countries* - include Turkey (Table 12) and the *New Fragile Five Countries* - except Turkey (Table 11) were examined. As can be seen from the Table 10; Savings-GDP correlation is smaller than Investment-GDP correlation in Turkey. But the findings do not appear to support the Caldéron argument. But when the results of the panel (Table 8 and Table 12) are evaluated together, it is seen that the argument as argued by Caldéron is valid.

3. CONCLUSION

Current account deficit is a closely monitored indicator as a significant signal of future crises. And inadequacy of national savings is regarded as a significant cause behind current account deficit. Purpose of this study is to test the relationship between savings and CAD in the *New Fragile Five*, which become fragile due to balance of payments disequilibrium. For this purpose, 1994-2019 period annual national savings, current account balance and external debt have been analyzed within the framework of panel data analysis. The model was expanded with the external debt variable to better explain the relationship between savings and current account deficit in the Fragile Five. At the modeling stage of the research focused on the cointegration relationship. Panel cointegration tests with structural breaks based on LM developed by Westerlund (2006) and Westerlund & Edgerton (2008) were used. Economic growth and investments are included in the analysis as auxiliary indicators.

According to the results of the analysis;

- There is a cointegration relationship between relevant macroeconomic indicators.
- The external debt increases the CAD in the *New Fragile Five* countries.
- An increase in savings in Turkey -in contrast to the other countries- leads to a decrease in CAD.
- An increase in savings in Argentina, Egypt, Pakistan and Qatar causes an increase in CAD.

This surprising result can be explained by the argument put forward by Caldéron et al. (2000); if the *growth-savings correlation* remains lower than the *growth-investment correlation*, an increase in savings may lead to an increase in the CAD. But when the correlations of the related variables are analyzed, a result that does not support the argument of Caldéron is encountered. However, when the panel results are evaluated for all countries that constitute the fragile five, the argument defended by Caldéron is valid. However, the unique economic structures of the countries are very important and taken into consideration in the research; in the *New Fragile Five Countries* (except Turkey), where savings increase current deficits, the savings-GDP correlation is higher than the investment-GDP correlation. Whereas, in Turkey, where savings reduce current deficits, the savings-GDP correlation is lower than the investment-GDP correlation. These results identified for Turkey, which contrasts with the studies of Caldéron et al. (2000) and Ayla and Küçükkale (2018). This study is contributory to the “*Triple Deficit*” hypothesis involving few studies on this subject and the results of this study will contribute to the expansion of typology.

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NOTES

¹ For detailed information about the model, see the study of Westerlund and Edgerton (2008): p.672.

²1.Argentina, 2.Egypt, 3.Pakistan, 4.Turkey and 5.Qatar.