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TWIN DEFICIT HYPOTHESIS IN PAKISTAN: A NON-LINEAR APPROACH WITH STRUCTURAL BREAK

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Abstract: In current scenario of surging current account deficits in Pakistan this study attempts to explore causes behind the phenomenon. It is also a fact that current account deficit and fiscal deficit are chronic troubles of Pakistan hence twin deficit hypothesis is the best candidate to be investigated. In earlier studies cointegration analysis was used to confirm the hypothesis but no study takes into consideration the structural break in the analysis which could mislead the findings. Therefore, in this study twin deficit hypothesis is investigated specifically in the presence of structural break. Gregory-Hansen test of co-integration is applied on data from 1980 to 2017 which confirms the long run relationship between current account deficit, fiscal deficit, real effective exchange rate, economic growth and fuel imports. Then in the perspective of structural break and long run relationship, ARDL methodology inclusive of dummy interaction terms validates twin deficit hypothesis in recent scenario of Pakistan. It is also concluded that proclaims of policy makers in Pakistan regarding catching up effect of growthforcurrent account deficit are found to be partially true because economic growth is inlong run relationship with current account deficit but itsroleis not yet clear.

Key Words: Twin Deficit, Structural Break, Cointegration, Gregory-Hansen Test

I. INTRODUCTION

Recently Pakistan economy is under stress due to unprecedented increase in current account deficit (CAD). Since 2015 CAD is increasing fast and reaches to a level of $ 18 billion in 2018 from $ 4.9 billion in 2015. On June 30 at the end of FY 2018 current account deficit is recorded as 5.7 percent of GDP which is alarming for its sustainability. The phenomenon is not new for Pakistan economy and cyclically almost after every decade Pakistan has to face the same circumstances.After independence hardly in few years Pakistan experienced surpluses. Since 1980, out of seven quinquennial averages of CAD as percentage of Gross Domestic Product (GDP), five times its value remains equal to or more than 4 which is not a good sign for sustainability. Maximum threshold value in this regard is described as 3 and less than 3 is only experienced in Pakistan during 2000-05 and 2010-15 only. On the other the era of 2010-15 relates to global recession, hence, only one quinquennial is considered to be sustainable. Such a state of affairs for current account needs to be explored on theoretical grounds.

In macroeconomics current account imbalance is a major dilemma and sustainability of current account deficit (CAD) is chronic issue of developing world like Pakistan. Theoretically, Laursen & Metzler(1950) firstly posed arelationship between CAD and saving-investment gap, nevertheless, initially the phenomenon behind current account imbalanceswasexplained in the short run dynamics by Mundell (1962) and Fleming (1963) whoutilized ISLM in perspective of open economy by including balance of payments (BoP) curve in the framework.Rapid pace of varying global imbalances, on account of fiscal shocksin 1980s, attracted academicians to explain the process in the long run whenMasson an& Knight (1986) and Knight & Masson (1988) within the framework ofLaursen and Metzler (1950)explicatedCAD and found fiscal shock as its determinant.On the other hand, in the long run,role of private sector for decision making about saving and investment was exploredin an intertemporal CAD framework by Sachs (1982).One more aspect, which considered overlaping generations in CAD'sexplanations and avoided assumption of homogenous labour force, was presented by Diamond(1965). All these explanations of CAD necessarily deem interdependence of CAD and fiscal deficit (FD) as builtin which is recently known as Twin Deficit Hypothesis (TDH). The term TDH and empirical investigation on this topic is introduced in literature since 1980s and early attempts which specifically investigated interdependence between FD and CAD are Milne (1977), Darrat (1988) and Miller & Russek(1989). Thereafter a large number of empirical evidence is available in literature on TDH.

What is the basic cause of economic ills, inclusive of CAD, in Pakistan? Answer to this question is not straightforward, however, primary and vital cause out of many could be termed as immenselypoor level

of resource base. As an economy Pakistan is dependent on international community to maintain economic process smoothly. Why Pakistan is to be dependent? The reason observed historically is tax culture whereby two major phenomena are apparent feature of tax structure in Pakistan i.e. firstly, resource base remains exceptionally less than its potential value and secondly, proportion of indirect taxes remains extraordinarily highin comparison to direct taxes. This is why sustainability ofFD is also a main characteristics of Pakistan economy which consequently is twined with CAD and other economic woes. These circumstances lead this study to hypothesize that FD leads to CAD i.e. TDH.Hence, major objective of this study is to explore TDH in Pakistan while utilizing latest time series econometric technique i.e. nonlinear Autoregressive Distributed Lage (ARDL) model with structural break.

The study comprises of five sections. In first section theme and objective of the study is introduced. Next, in Section-II, this study attempts to put forwarda survey ofappropriate, quality oriented and most cited research literature along with proclaiming a research gap and to highlight the contribtion of this study. Within section-III data and methodology is elaborated while section-IV is about the results and discussions. Section-V attempts to conclude the study with objectivity and realibility .

II. Survey of Literature

On theoretical grounds interdependence between CAD and FD is found to be multidimensional. In one dimension, it is hypothesized that FD causes CAD, which is known to be TDH (Fleming 1962; Mundell 1963;Diamond 1965;Masson, Knight 1986 & 1988; Sachs 1982 and Romer2000). Feldstein Chain is one of the explanations of the dynamics behind TDH (Feldstein 1986). In other dimension there exists reverse causality between the two whereby CAD is the determinant of FD(Laursen, Metzler 1950; Bispham 1975 and Summers 1988). Third dimension is that of independence of causality in either direction as explained by Ricardian Equivalenc Hypothesis (Polak 1957; Johnson 1976 and Barro 1989). Along with this it is also observed in literature that just like deficits the surpluses are also twined (Bluedorn,Leigh 2011). It looks that in theory no certain dimension is confirmed for interdependence of the FD & CAD butempirical studies discover more than three dimensions but most of the time empirical literature tilts in favour of TDH.

Sulikova & Gazda (2016) is the state of the art review on empirical studies related to TDH and it is necessary to go through this study whenever an attempt has been made on analyzing TDH and it is highlited in this study that no consensus has yet been developed for TDH. When explicitly the literature on TDH has been perused, it comes to the surface that time series econometric techniques are used frequently for analysis purpose. This study has attempted to assemble the evidence in perspective of empirical methodolgies. Earlier studies investigated the relationship in a single equation model and more often than not found a positive relationship between FD and CAD. Eisner (1986) and Summers (1986) used regression analysis to find the relationship in context of United States data and cofirmed TDH. In case of simple regression analysis of United States from 1954-87,Dewald & Ulan(1990) exibited Ricardian Equivalence Hypothesis. However, Salvatore (2006) used regression with lagged variables for G-7 countries from 1973-2005 and observed TDH upto two lags. Additional determinats of current account balance used in single equation models were domestic investment and gross national product.

In another segment of the researchcausality analysis in autoregrssive framework was the choice of academicians for searching the interdependence within TDH.Darrat (1988)estimated quaterly data of United States from 1960 to 1984 with full information maximum likelihood technique and found bidirectional relationship with comparatively strong reverse causality. However, role of interest rate as intervening variable in TDH relationship for United States was also observed on account of impulse responses (Abell 1990). Islam (1998) utilized Brazil's quarterly data from 1973 to 1991 and detected bidirectional causality. An unbalanced panel of developed and developing countries was the context of Kouassi et al. (2004)who utilized causality analysis on all the countries separately and confirmed TDH for developing countries.Variables other than fiscal and current account balance which these studies utilizedwere interest rate, exchange rate, real income/output, money supply and inflation.

Vector Autoregressive (VAR) methodology wasalso utilized extensively in the literature for exploring the relationship between CAD and FD (Enders, Lee 1990;Rosensweig,Tallman 1993;Dibooglu 1997; Kaufmann et al.2002; Baharumshah et al. 2006;Jobert, Zeyneloglu 2006; Muller 2008 and Algieri 2013). VAR methodology futher supplemented estimation in different directions i.e. cointegration, vector error correction model, causality, variance decomposition, impulse response function etc. These supplements were used as per need of the study as mentioned in scholarly literature related to VAR methodology for exploring TDH. Evidence showed a mix response for TDH. Enders & Lee (1990), Rosensweig & Tallman (1993), Dibooglu(1997) and Baharumshah et al.(2006) confirmed the hypothesis while Kaufmann et al. (2002), Jobert& Zeyneloglu (2006) and Algieri (2013) confirmed Ricardian Equivalence Hypothesis.

Muller (2008) explored the relationship between government spending and current account balance and also gave equivalent wettage to the relationship between government spending and relative prices. It concluded that government spending improved current account balance and simultaneous response of relative price might diminish the improvement but was not capable to reverse it.
ARDL estimation withToda & Yamamato (1995) granger causality test showed that twin deficit hypothesis along with Feldstein-Horioka puzzle is the phenomenon observed in Turkish economy (Altintas, Taban 2011). In panel data analysis for investigating TDH, deductions led mix evidence. Panel data techniques producedsometimes confirmation(Funke, Nickle 2006; Beetsma et al. 2008 and Bussiere et al. 2010) but sometimes contradicted unidirectional relationship among the two (Forte, Magazzino 2013; Nickel, Tudyka 2014 andKatircioglu et al. 2009). Recently, it is recognized that structural break in time series data could cause spuriousness to cointegration and forecasting analyses (Gregory,Hansen 1996; Fidrmuc 2003; Bagnai 2006 and Daly,Siddiki 2009), therefore, it is suggested that whenever investigating the long run relationship careful attention should have been paid to structural break in data. Whe specifically focus the research on TDH in case of Pakistan a causal relationship between CAD and FD for a sample of developing and developed countries was investigated wherein Pakistan was included in the sample and causality from CAD to FD was deteced on account of high indebtedness (Khalid, Guan 1999). Cointegration, ECM and causality framework on a data about Pakistan from 1973 to 1998 described confimation of TDH in the long run but refuted it in the short run (Aqeel,Nishat 2000). Mukhtar et al. (2007) even discovered long run relationship between CAD and FD but pointed out that in case of Pakistan single equaion model was not effective for investigating causlaity in TDH and a simultaneous equation model was required.Intertemporal approach to current account defict was not supported in case of Pakistan economy (Mukhtar, Khan 2011). On a data from 1976 to 2010for Pakistan the TDH was revealed and Feldstein-Horioka puzzel was also supported in the short run (Khan,Saeed 2012). In a time-series framework bidirectional relationship was found for Pakistan on data form 1972 to 2011 (Tufail et al. 2014). Rehman & Saeed(2017) used data from 1972 to 2015 and employed Engel-Granger, Johansen and ARDL estimations for exploring TDH and validated the hypothesis. Research on Pakistan shows that cointegration is the base of analysis investigating TDH but yet no study attempts to check structural break in the time series data of Pakistan. This may causeconclusions to be spurious because structural break in data may produce misleading estimations in cointegration analysis. This study attempts to fill this gap while taking into consideration the structural break in data regarding Pakistan and contributes positively in this area of research.

III. DATA AND METHODOLOGY

For this study time-series data from 1980 to 2017 is collected from World Development Indicators (WDI) and International Financial Statistics (IFS). Variables and their definitions are explained here:

CAB = Current account balance measured as ratio of exports to imports in local currency units (LCU)
FB = Fiscal balance measured as ratio of revenue to expenditures in LCU
GR = Gross Domestic Product (GDP) growth rate
FIMP = Fuel imports as percentage of merchandised imports
[Source: WDI]
REER = Real effective exchange rate
[Source: IFS]

Transmission mechanism behind TDH is explained in two dimensions; first is Feldstein-Chain, which is explained by Mundell-Fleming Model (Mundell 1963 andFleming 1962) in extended version of Keynesian approach to macroeconomics. It links fiscal deficits to imports demand while in view of Mundell-Fleming in response to fiscal deficit, it is interest rate to cause appreciation in exchange rate which in turn deteriorates current account balance and vice versa. In other dimension the transmission mechanism is explained by Feldstein-Horioka puzzle (Feldstein,Horioka 1980) which raised question on perfect mobility of capital in Feldstein-Chain and prsented a positive link between domestic savings and domestic investment. In these two mechanisms interest rate, real effective excnage rate and domestic investment play an important role for exaplaining TDH. Hence, these variables are important in the relationship between FD and CAD. In case of Pakistan,comprehensiveness infinancial systemis started to evolve after 2000 and earlier then that neither eifficient financial markests were operating nor international investments were attracted towards Pakistan. Feldstein-Horioka Puzzle is also not observed in case of Pakistan economyfor the long run (Khan, Saeed 2012).

It is also very important to point out other determinants of CAD in the perspective of Pakistan economy. In Pakistan, arguments for catching up effect of economic growth to current account deficits (Blanchard, Giavazzi 2002; Campa, Gavilan 2011 and Schmitz,Hagen 2011) is time and again presented by the policy makers for defending CADs. Positive relationship between net oil trade (in trade balance) and current account balance is also evident in recent literature (Musau,Steinar 2018) and burden of fuel imports in trade balance of Pakista on average is observed to be 24 percent of merchandise imports which clearly shows its importace as independent variable in a TDH modeling.

In this way following model of TDH is found to beappropriate specifically within the perspective of Pakistan economy and same is utilized in this study.

$$CAB = f(FB, GR, REER, FIMP)$$

In generalized form the model could be described as:

$Y_t = \alpha_i + \sum_{i=1}^{p} \beta_i X_{it} + e_t$; and $t = 1,2,3, \ldots\ldots n$

As per methodology explained by Gregory & Hansen(1996),Y_t is dependent variable and X_{it} is a vector of independent variables. e_t represents the error term. It is consideredastandard cointegrated modelin the framework of Engle & Granger(1987)whereY_t and X_{it}represents inconsistent integration orders, however, e_t is necessary to have an integration order of zero i.e. I(0). It is assumed that parameters of the model α_i and β_i are time invariant but in case of a structural break assumption of time-invariance could not hold and model produces more than one equilibriums on the basis of time at unknown points. Such a structural break could be captured with the help of parameters in the model while assumption of time invariance will not hold in the parameters. For capturing the structural break following dummy is utilized:

$\gamma_{\delta t} = \begin{cases} 0 \; if \; t \leq [n\delta] \\ 1 \; if \; t > [n\delta] \end{cases}$,where $\delta \in (0,1)$is the parameter for capturing break pointtime

With the help of this dummy variable a structural break could be easily modeled and Gregory & Hansen (1996) modeled three different scenarios known as 'change in level', 'change in level and trend' and "change in regime'. When there is parallel shift in equilibrium then dummy is used for intercept only and slopes remain the same which then is able to show the intercept before break time and intercept after break time. This model is mentioned as 'change in level' and represented as:

$Y_t = \alpha_{1i} + \alpha_{2i}\gamma_{\delta t} + \sum_{i=1}^{p} \beta_i X_{it} + e_t$

In the next model which is known as 'change in level and trend', along with parallel shift in intercept a time trend (θ) is also introdced as shown in following representation:

$Y_t = \alpha_{1i} + \alpha_{2i}\gamma_{\delta t} + \theta t + \sum_{i=1}^{p} \beta_i X_{it} + e_t$

In third representation it is assumed that along with change in level there is also a change in direction of relationship i.e. slope and this model is known as 'change in regime'. This model is represented as:

$Y_t = \alpha_{1i} + \alpha_{2i}\gamma_{\delta t} + \sum_{i=1}^{p} (\beta_{1i} + \beta_{2i}\gamma_{\delta t}) X_{it} + e_t$

Gregory & Hansen(1996) is the extension of standard Engle-Granger cointegration test whicih requires priori information of break point time for testing stationarity of residual series in null hypothesis. But it is not easy to determine breakpoint time a priori, therefore, Gregory & Hansen(1996) introduced extended procedure for testing of null hypothesis where no priori information of break point time was necessary and also established alternative ADF and Phillips statistics along with asymptotic distributions to test null hypothesis. In this way it could be possible to apply cointegration in the presence of structural break.

IV. Results and Discussion

First of all in Table: 1 descriptive analysis of the variables of the model is presented. Mean value of all the variables i.e. current account balance, fiscal balance, growth rate, real effective exchange rate, and fuel imports are as per expectations. Current account balance and fiscal balance are the ratio variables as defined in last section, average growth rate of Pakistan is found to be nearly 5 percent, real effective exchange rate on average is Rs.125 and fuel import as percentage of merchandise imports is 24. Similarly, dispersion of the data as shown by standard deviations in Column: 3 is also found to be realistic and no abnormality is observed. However, normality tests show that data of fiscal balance and real effective exchange rate are not distributed normally while all other variables are distributed normally. Non-normality in individual variables creates no problem; however, in such cases it is better to inspect the variables graphically on time scale.

Table:1

Descriptive Statistics

Variable	Mean	Standard Deviation	Normality Test	
			Jarque-Bera	Probability
CAB	0.709	0.171	2.200	0.332
FB	0.745	0.100	10.170	0.006
GR	4.900	2.100	0.403	0.810
REER	125.590	37.667	14.757	0.000
FIMP	24.124	6.278	1.890	0.389

Estimated by Authors

Figure: 1 is corresponding to the graphical analysis of the dependent variable while those of independent variables are depicted in Figure: 2. It is apparent in graph relating to current account balance that there is a break in trend between years 2003 to 2008.

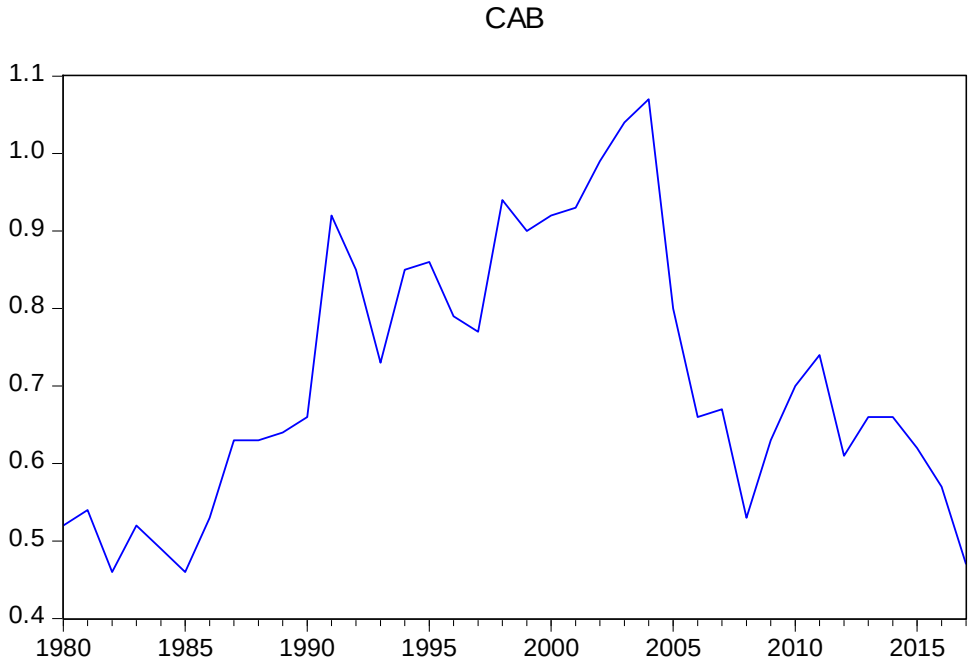

Figure: 1

In Figure: 2 it is evident that even there is no structural break in trends of the datum related to fiscal balance, growth rate, real effective exchange rate and fuel imports, though, intercept and trends are apparently observed in all cases except fiscal balance. The graph of fiscal balance only demonstrates intercept and lacks trend. After perusing graphs, it seems necessary to go for tests of stationary so as to move forward for an analysis devoid of spuriousness.

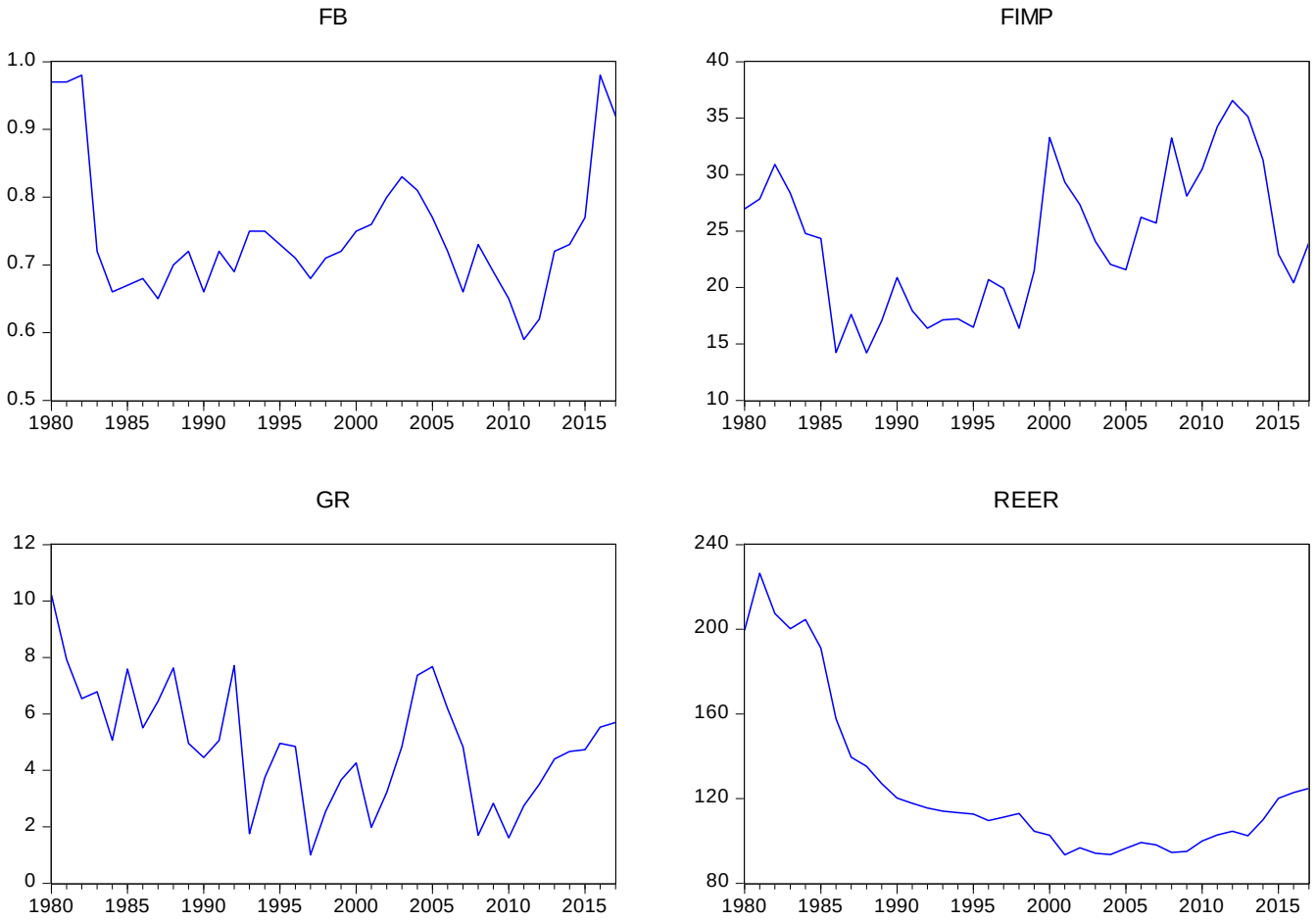

Figure: 2

Augmented Dickey Fuller (ADF) test of stationarity is applied in this study to explore the hypothesis related to unit roots. Results are mentioned in Table: 2. Even then that trends and intercept are obvious in graphical analysis but for the sake of reliability this study calculates results for the three models of ADF test (intercept, intercept & trend and none) and decides on behalf of ample information in this regard. When a variable is found to be stationary at level then there is no need to calculate the results for first difference. Growth rate is found to be stationary at level and all the other variables including dependent variable, confirms the hypothesis of unit root in levels and are found to be stationary at first difference. In case of real exchange rate, it is observed that hypothesis of unit root is rejected for models of 'intercept' and 'none' but that is confirmed for 'intercept and trend' model. But from graph in Figure: 2, it is apparent that not only there exists downward trend in the series but also the intercept is evident. In this scenario it is better to test for stationarity at first difference which ultimately rejects the null hypothesis with intercept and trend. Hence, its integration order is decided to be I(1).

Table:2

Unit Root Tests

Variable		Level			First Difference			Integration Order
	Statistics	Intercept	Intercept and trend	None	Intercept	Intercept and trend	None	
CAB	ADF	-1.629	-1.323	-0.44	-5.871	-6.071	-5.95	I(1)
	Prob	0.458	0.866	0.514	0.000	0.000	0.000	
FB	ADF	-2.595	-2.343	-0.42	-5.554	-5.999	-5.63	I(1)
	Prob	0.103	0.402	0.523	0.000	0.000	0.000	
GR	ADF	-3.884	-3.817	-1.71	-	-	-	I(0)
	Prob	0.005	0.027	0.081	-	-	-	
FIMP	ADF	-2.136	-2.446	-0.62	-6.001	-5.914	-6.08	I(1)

	Prob	0.232	0.352	0.43	0.000	0.000	0.00	
REER	ADF	-4.627	-0.515	-2.89	-5.541	-8.007	-5.14	I(1)
	Prob	0.001	0.978	0.005	0.000	0.000	0.000	

Estimated by Authors

To explore the long run relationship among the variables of the model, in next step it is to decide that which test of cointegration is appropriate in this analysis. Nonetheless, whichever may be the case is about integration order of real effective exchange rate, overall it is found out that integration orders of the variables of the model are not of same order, no variable shows an integration order of two or more and integration order of dependent variable is one. Therefore, it is perfect case for Autoregressive Distributed Lags (ARDL) model. But the aspect of structural break is not yet clear because structural break is marked in graphical analysis of dependent variable. Then it is also possible that structural break may also exist in linear relationship of all the variables of the model which is in contrast with the assumption of linear relationship in cointegration modeling. In this case Gregory-Hansen test of cointegration is suitable for analysis purpose.

Table:3

Gregory-Hansen Test for Cointegration with Regime Shifts

Model Change in Level

Lag 1

Test	Statistics	BP Date	Critical Values		
			1%	5%	10%
ADF	-5.89	2005	-6.05	-5.56	-5.31
Z_t	-5.95	2005	-6.05	-5.56	-5.31
Z_a	-37.85	2005	-70.18	-59.4	-54.38

Estimated by Authors

Gregory & Hansen (1996)proposes a residual based test of cointegration for models where there is a structural break in the model. The model detects cointegration and break point time in three scenarios i.e. change in level, change in level and trend and change in regime. In case that all the three scenarios point out cointegration with structural break then there is no doubt that cointegration exists in the model and all of the variables are found to be in the long run relationship.

Results for Gregory-Hansen test for scenario of change in level is presented in Table: 3 and it is crystal clear that Z_t statistics is greater than its respective critical value at five percent level of significance which is a robust evidence of cointegration among the variables of the model in the presence of structural break. So far as time of structural break is concerned it could be observed in column of Break Point (BP) Date and in this case, there is a structural break in the year 2005.

Table:4

Gregory-Hansen Test for Cointegration with Regime Shifts

Model Change in Level and Trend

Lag 1

Test	Statistics	BP Date	Critical Values		
			1%	5%	10%
ADF	-6.45	2005	-6.36	-5.83	-5.59
Z_t	-6.18	2005	-6.36	-5.83	-5.59
Z_a	-40.1	2005	-76.95	-65.44	-60.12

Estimated by Authors

In Table: 4, results for similar analysis are shown for the scenario of 'change in level and trend'. ADF and Z_t statistics are found to be greater than respective critical values at five percent significance level and break point time is observed to be happened in year 2005.

Table:5

Gregory-Hansen Test for Cointegration with Regime Shifts

Model	Change in Regime				
Lag	0				
Test	Statistics	BP Date	Critical Values		
			1%	5%	10%
ADF	-6.66	2005	-6.92	-6.41	-6.17
Z_t	-6.75	2005	-6.92	-6.41	-6.17
Z_a	-42.17	2005	-90.35	-78.52	-75.56

Estimated by Authors

Results,as presented in Table: 5, for the scenario of 'change in regime', also confirm cointegration and break point time as detected in previous tables. Taken as a whole, all the scenarios confirm the cointegration in the model in the presence of structural break. Therefore, it could be concluded that there exists long run relationship among the variables of the model in the presence of a structural break for the year 2005. Now, this information is sufficient to find out the long run and short run results in the framework of ARDL. For this purpose dummy variable Z is introduced in the model whose value is equal to one if year is equal to or greater than 2005 otherwise its value is zero. Thereafter, interaction terms of all the independent variables are found out as Z_FB, Z_GR, Z_REER, Z_FIMP. Afterwards, ARDL cointegration analysis is applied on all the independent variables including dummy variable with all its interaction terms in the model and results are presented in Table: 6.

Table:6

ARDL Regression in Presence of Structural Break

Equilibrium			
Variable	Coefficient	T-Statistics	Probability
Adjustment Term	-0.762	-6.35	0.00
Long Run			
FB	0.475	2.05	0.05
GR	-0.013	-1.08	0.29
REER	-0.004	-7.05	0.00
FIMP	0.003	0.93	0.36
Z	0.58	1.44	0.16
Z_FB	-0.857	-2.04	0.05
Z_GR	0.014	0.76	0.45
Z_REER	-0.001	-0.36	0.72
Z_FIMP	-0.007	-1	0.32

Estimated By Authors

It is obvious in Table: 6 that the adjustment term, in framework of error correction mechanism, is negative and significant at 1 percent level. This information is sufficient to affirm that all the variables are interacting in the long run in such a way that model is converging towards equilibrium. Then, it could be inferred that causality between variables of the model is even existed but direction of causality is not clear. For direction of causality coefficients and their significance levels are to be interrogated. In this estimation long run results show that there is significant positive relationship between fiscal balance and current account balance which is in line with TDH. Along with this it is also marked in the results that dummy variable with interaction in fiscal balance is also significant at margin. This piece of information shows that in the long run causality runs from fiscal balance to current account balance in case of

Pakistan economy. It is also important to mention here that this analysis also considers the presence of structural break in the sample to be analyzed for cointegration analysis and ARDL estimation and then results are produced and presented.

Stability Test for ARDL in Presence of Structural Break

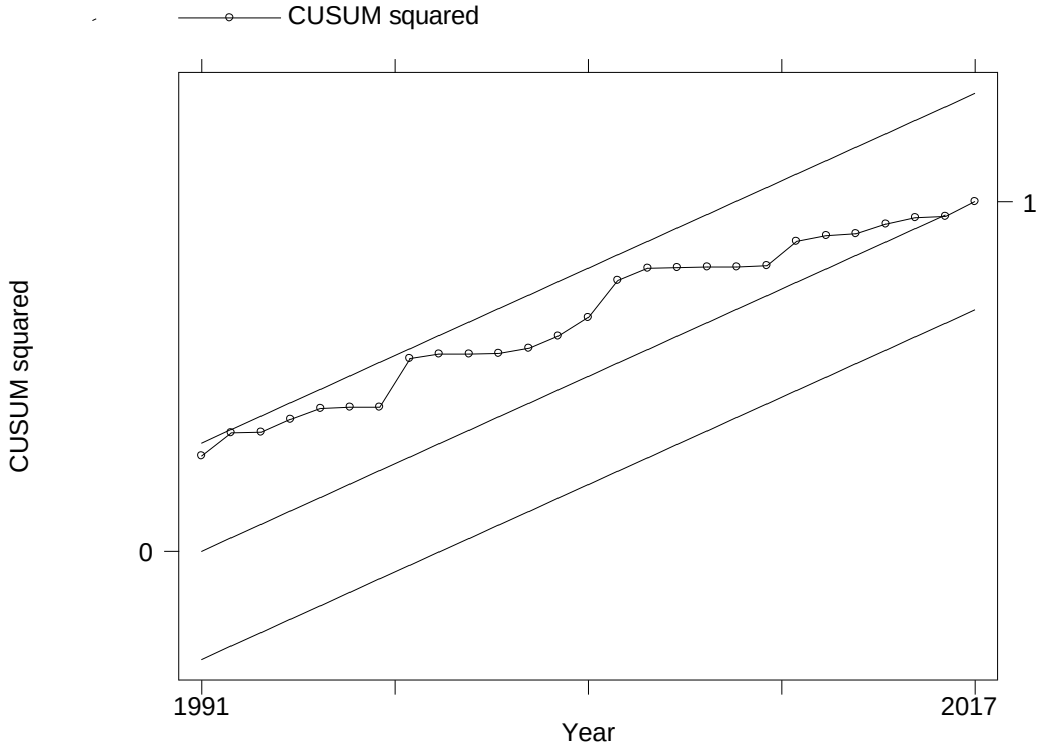

Figure: 3

Negative sign for the variable of growth is also not alarming because in case of developing countries it is hypothesized that in the early stages of growth and development there is bright chance of current account deficit (Faruqee, Debelle 1996; Kandil, Greene 2002 and Calderon et al. 2002) as is the case of Pakistan economy. But this result is found to be statistically insignificant. Increase in real effective exchange rate demonstrates depreciation in local currency which consequently enhances demand for exports and contracts demand for imports and a resultant improvement in current account balance. As Pakistan is chronically a case of current account deficits, hence; deficits will reduce. Therefore, the sign of real effective exchange rate is rightly negative and on statistical grounds this relationship is also significantly proved at one percent level.

Fuel imports as percentage of merchandised imports is kept in the model on the ground that significant proportion of merchandise imports is comprised of fuel. This fact is also apparent in descriptive statistics where average value of this variable is 24 which means one fourth part of merchandise imports is related to fuel items. Along with this, prices of fuel also play an important role in current account balance. The analysis shows that there is a positive relationship between fuel imports and current account deficit which is expected because as fuel imports increases, burden on payments side will increase which increase current account deficits or deteriorates current account balance. However, this relationship is not significant. Along with this, dummies of real exchange rate and fuel imports are also not significant. Lastly, question about reliability of ARDL results will be found out by stability test which is shown in Figure: 3 and CUSUM squared graph remains between bounds which imply reliability of the test.

One further test will also prove helpful in checking reliability of analysis whereby results of ARDL in presence of structural break are compared with results of ARDL without structural break. ARDL results without introducing structural break dummies is presented in Table: 7. It is observed that adjustment term along with all the coefficients of the model is not found to be statistically significant, however, theoretical relationships are same in both the cases. This analysis highlights that if there is structural break in the model and the analysis is conducted without including structural break, then results could not be termed as reliable.

Figure: 4 also indicates that graph of CUSUM square crossed the lower bound, hence; raises serious concerns over reliability of ARDL analysis without structural break.

Table:7

ARDL Regression Without Structural Break

Short Run			
Variable	Coefficient	T-Statistics	Probability
Adjustment Term	-0.200	-1.69	0.10
Long Run			
FB	0.250	0.27	0.79
GR	-0.158	-1.39	0.17
REER	0.001	0.46	0.64
FIMP	-0.022	-1.38	0.17

Estimated By Authors

Stability Test for ARDL Without Structural Break

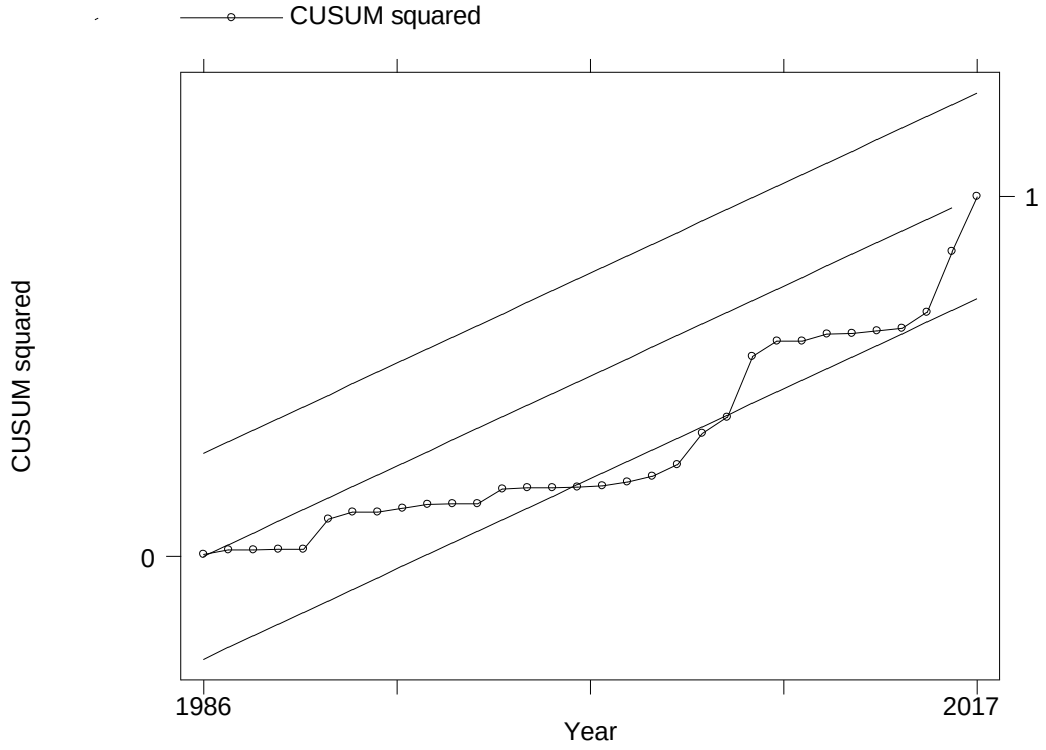

Figure: 4

V. CONCLUSIONS AND RECOMMENDATIONS

This study could be termed as pioneer to explore the TDH in perspective of Pakistan economy while considering the element of structural break in the dataset. Earlier studies investigating TDH in Pakistan have not considered structural break while utilizing co-integration analysis. Co-integration analysis without considering structural break could lead to spurious analysis. A remedy to such problem is the Gregory-Hansentest of cointegrationwhich is specifically employed in this study for validating the TDH as regards economy of Pakistan in the presence of structural break. Data employed in this study starts from 1980 and uses up to 2017. Descriptive analysis points out structural break in the data which is then confirmed by Gregory-Hansen test. Then ARDL methodology is applied in the presence of dummy variables capturing break point time whichis discovered in cointegration analysis. Results of the study are presented and discussed in last section and now consequent conclusions and implications are drawn and presented in the followings.

Within the perspective of Pakistan economy and in the presence of structural break, the analysis of this study confirms not only the association of fiscal deficit and current account deficit in the long run but also finds that change in fiscal deficit has the force to change in current account deficit positively. Therefore, in case of Pakistan economy fiscal deficit is found to be the determinant of current account deficit. This fact is further strengthened by the confirmation of an inverse relationship between real effective exchange rate and current account deficit. Along with this it is also concluded in this study that a long run relationship between variables of the model including catch up effect of the economyand fuel imports is established in this study but role of these variables is not still clear. Evidence in this study falls within the ambit of Feldstein-Chain and partially acknowledges proclaims of policy makers in Pakistan for fiscal deficits.

This study suggeststaking into consideration unprecedented deficits in budget orientation of the economy for sustainability in current account deficits. So far as managing the problem of budget deficit is concerned itrequires either increase in revenues or decrease in expenditures. But expenditures could not be curtailed on account of need for developmental issues of the country, however; revenues could be enhanced on the basis of two reasons: firstly resource base is not optimum in line with the potential resource base of the country; and secondly, direct taxes could be enhanced in relation to indirect taxes because proportional share of direct taxation is bleakly low in resource base. Considering review in budget orientation may lead towards sustainability in current account deficits.

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