IJEMD-SS, 5 (6) (2026) https://doi.org/10.54938/ijemd-ss.2026.05.6.890

International Journal of Emerging Multidisciplinaries: Social Science

Research Paper
Journal Homepage: www.ojs.ijemd.com
ISSN (Online): 2958-0277



Twin Deficit Hypothesis Under Different Exchange Rate Regimes in Pakistan: Structural Breaks Approach

1. Farzana Sher Muhammad, 2. Shumaila Ashfaq, 3. Tehmina Hazoor

1. Assistant Professor, Department of Economics, Faculty of Management Science, Sardar Bahadur Khan Women University Balochistan, Quetta, Pakistan

mishalachakzai@yahoo.com (**Corresponding author**)

2. Lecturer, Department of Economics, Faculty of Management Science, Sardar Bahadur Khan Women University, Balochistan, Quetta, Pakistan

shumailaashfaq67@yahoo.com

3. Assistant Professor, Government Girls Postgraduate College, Quetta Cantt, Balochistan, Pakistan

Tehminahazoor1986@gmail.com

Abstract

This study examines Twin Deficit Hypothesis (TDH) in the presence of structural breaks in Pakistan. The Zivot-Andrews (ZA) and Lee-Strazicich (LM) unit root tests are used to test the stationarity, while ARDL and Gregory-Hanson tests are used to test for cointegration. The empirical findings indicate that the conventional cointegration test supports the Ricardian equivalence hypothesis in Pakistan, whereas Gregory-Hanson test supports the twin deficit hypothesis in the presence of one structural break. The break dates reflect the combined effect of the global financial crisis, floods, and fiscal restructuring which plausibly altered the relationship between the budget deficit and the current account deficit. Therefore, to address the twin deficit

dilemma, the government may introduce tax reforms, pursue export-oriented policies, and reduce its expenditures.

Keywords: Twin deficit hypothesis, Structural breaks, Budget deficit, Current account deficit, Cointegration

1. Introduction

Fiscal budget is a financial proclamation that represents the government's proposed revenue and spending for a particular year. Revenue collection depends on an efficient taxation system which is inefficient, inelastic, and unfair in developing countries thus leads to a low tax base (Roy & Gupta, 2013). Therefore, the government faces an imbalance in its expenditure and revenue. Deviation of expenditures from revenues represents budget imbalances. More specifically if the government's current year's expenditure exceeds (less) revenue it represents a deficit (surplus) in its budget (Manzoor et al, 2019). Budget Deficit (BD) is a grave problem faced by most of the developed and developing countries (Ali, 2006). When BD is financed through borrowings, it creates a burden on future generations because it shifts the expenditures from investment to interest payments which further aggravates the problem (Ahmad et al, 2015).

On the other hand, Balance of Payment (BOP) as a representative of external sector stability is a statistical record, which systematically summarizes all the economic transactions of a country with foreign countries during a specific period. BOP is broadly categorized into current account and Financial & capital account. The current account is comprised of all the transactions in the goods market. If a country's import payments exceed exports receipts, then its current account balance shows deficit which may be termed as Current Account Deficit (CAD) (Perera & Liyanage, 2012). A large CAD jeopardizes external stability. Overall deficits in the internal and external sector can threaten the international credit rating of a country, trigger capital flight, and weaken investors' confidence. (Mohanty, 2019).

Fiscal discipline and current account performance are two main determinants of the economy's internal and external sector stability. They play an immense role in macroeconomic stability and sustained economic growth (Fatima et al, 2012). This interlinked relationship is known as the Twin Deficit Hypothesis (TDH) asserts a positive relationship between BD and CAD. Fundamentals

investigating this positive association lies in two approaches proposed by i) Keynes ii) Mundell-Fleming. According to Keynesian Absorption, theory an increased budget deficit causes a high money supply in the economy. An increase in government expenditure increases national income with multiple effects. Some part of increased income is used to make expenditures on the purchase of domestic as well as imported goods which leads to expanding the trade deficit (Bartolini and Lahiri, 2006).

Similarly, Mundell-Fleming's (Fleming, 1962; Mundell, 1963) framework also suggests a positive linkage between them under fixed exchange rate and flexible exchange rate. The transmission mechanism however differs. Under flexible exchange rate system. An expansionary fiscal policy leads to an increased interest rate which attracts foreign capital inflow to the domestic economy. Higher demand by foreigners for domestic currency appreciates its value. A high-worthy currency makes exports expensive, and imports cheaper cause the current account deficit to be widened (Aqeel & Nishat, 2000) and (E.kaiba Njoroge et al, 2014) and (Sakyi & Opoku, 2016). On the other hand, under a fixed exchange rate increase in fiscal expenditures cause price level and real income to increase, which adversely affects the current account balance (Leachman and Francis 2002) and (Zahid, 2018).

On the other hand, Ricardian Equivalence Hypothesis (REH) suggests no correlation between two discrepancies. REH was proposed by Barro (1974) which explains that the public contemplates the possibility of future increase in taxes. This forthcoming increase in taxes will decrease the disposable income of the consumers. Consequently, they restrict their consumption patterns and try to increase the proportion of savings out of income. Hence the decline in public savings due to the expansionary effect of fiscal policy is offset by an increase in private savings. Overall, National savings remain unaffected. In this way, any variations in fiscal policy do not alter the changes in the current account balance (Nickel and Vansteenkiste, 2008) and (Ogbana, 2014).

Apart from the TDH and REH, there can also be a case for Twin Divergence Hypothesis (TDgH). Which explains a negative association between TD and BD i.e an increase in BD improves CAD (Corsetti and Muller, 2006), (Kim and Roubini 2008) and (Tosun et al., 2014). The phenomenon of Crowding out the effect of investment and productivity shocks is consistent with this approach whereby fiscal expansion increases domestic interest rate and crowds out the private investment.

On the other side improvement in savings also discourages the overall aggregate demand and improves CAD. Similarly, during the periods of high unemployment and low aggregate demand, required expansionary fiscal action further decrease the AD and caused CA balance to improve (Cavallo, 2005). TDH got importance after World War II when Miller & Russek (1989) and Abell (1990) found a positive relationship between B.D and CA deficit during the 1980s in the US economy, then in the 1990s, other European economies (Germany and Sweden) also faced the similar situation of mounting budget deficit along with high current account deficit (Ibrahim and Kumah, 1996).

Fluctuation in the exchange rate in the form of continuous depreciation creates an unfavorable environment for domestic investors (Oladipupo, 2011). This uncertainty about the stability of exchange markets further compels capital outflow from the economy and hence declines in the percentage of foreign direct investment, portfolio equity inflows, and gross capital formation (Rizvi et al., 2014). Like current CAD, fiscal policy decisions are also affected by exchange rate regime policy (Khan & Ismail, 2012). Conditional to the existence of high capital mobility, a flexible exchange rate system could lead to deterring rather than attracting foreign capital inflow with pursued interest rate-controlled policy of the government (Killick, 1993). On the other hand, fixed exchange rate policies allowed current consumptions to increase following increased income for expansionary fiscal shocks (Schuknecht, 1999). Hence, it can be concluded that two deficits are mutually interdependent conditional upon the degree of capital mobility, type of exchange rate regime, and openness of the economies (Trachanas & Katrakilidis, 2013).

Developing countries that face a deficit in their budgetary policies heavily relied upon foreign resources to finance their expenditure. Pakistan being a developing country has always been trying to foster its economic growth. To speed the process of growth, usually economy must follow expansionary fiscal policies which enhance government expenditure while revenue collection has always been in deficiencies. Consistence budget deficits have always been problematic for Pakistan (Shah, 2023). A high-budget deficit serves as a root cause of further evils like mounting inflation rate, the deficit in the current account, and slowed economic growth. (Nayab, 2015). Twin deficit has very important implications for the economy because if budget consistently remains in deficit, it will impose a burden on future generations through internal and external borrowing (Rahman et al., 2012).

This study will be useful to the government of Pakistan since it will depict that external sector instability is threatened because of internal imbalances while formulating national policies. It will help policymakers to implement various fiscal measures to control BD for correcting CAD. It provides valuable insights to pursue such policies which enhance the domestic saving rate and ensure political and economic stability so that over-dependence on foreign resources can be eliminated. Policies to increase domestic saving rates may include efficient tax reform in line with more efficient tax administration and tax collection. This study helps to identify measures that could be used to rectify the external disequilibrium like import substitution strategies, export promotion, and attracting foreign direct investment.

2. Objectives

The main objectives of this study are

- To investigate the long run relationship between budget deficit and current account deficit.
- To determine if different exchange rates cause any structural shock in relationships between current account deficit and budget deficit.

3. Hypotheses

The hypotheses to achieve the above-mentioned objectives of this study are as follows.

- **Ho:** There is no long run relationship between budget deficit and current account deficit in Pakistan
- **H1:** There is long run relationship between budget deficit and current account deficit in Pakistan
- **Ho:** Structural breaks do not affect the validity of TDH in Pakistan
- **H1:** Structural break affect the validity of TDH in Pakistan

4. Framework of the Study

Economic approaches describe that income level (Absorption approach), money supply (Monetarist approach), and exchange rate (Elasticity approach) are the main determinants of CAB (Higgins & Klitgaard., 1998; Hashemzadeh & Wilson., 2006). Theoretical framework of this study

will be extended by incorporating an open economy model postulated by Mundel and Fleming which incorporate the effect of different exchange rate regime on the relationship between budget deficit and current account deficit.

The link between net exports (external imbalances) and budget balance (internal imbalance) can be explained through Mundell's (1963) and Fleming's (1962) approach. Which states that an increase in budget deficit causes the interest rate to increase. (Mukhtar and Zakaria, 2008; Herbert and Saher, 2010). A capital inflow in the form of foreign investment puts upward pressure on the real exchange rate through either nominal exchange rate appreciation or changes in the price level. Hence an appreciated domestic currency leads to broadening the trade deficit. (Miller and Russek, 1989), Thus analysis can be extended by incorporating exchange rate as important variables we get

$$CAD = BB + Y + RIR + REXR \text{---------- (1).}$$

Where CAD is current account deficit, BD is budget deficit, Y is income level (real Gross Domestic Product), RIR is the real interest rate and $REER$ is the real effective exchange rate. Following (Tang, 2015; Opoku et al., 2016; & Akorli, 2017) interest rate, income level, and exchange rate is incorporated as behavioral variables in the model. For the econometric analysis equation 1 can be written as follows

$$CAD = \alpha_0 + \alpha_1 BB + \alpha_2 Y + \alpha_3 REER + \alpha_4 RIR + \varepsilon \text{ ---------- (2)}$$

Where $\boldsymbol{\alpha_0}$ is the intercept term, $\boldsymbol{\alpha_1, \alpha_2, \alpha_3}$ and $\boldsymbol{\alpha_4}$ are the slope coefficients of BB, income level, REEXR, and RIR. According to this equation, an increase in public expenditures could be funded by an increase in national saving, a fall in National investment, or an increase in foreign sector deficit. Ceterius Paribus, BD and CAD will move in the same direction (Baharumsha et al., 2006). Nevertheless, if the changes in BD are fully offset by the changes in saving, then BD and CAD do not move together and REH holds.

5. Data

5.1. Description of data

This study explores the relationship between budget deficit and current account deficit under different exchange rate regimes. The time span of this study spans from 1990-2026 for Pakistan. Data is taken from the state bank of Pakistan (SBP), IFS, and WB data sources.

Dependent Variable of this study is current account deficit, while budget deficit, real GDP, real interest rate, and real effective exchange rate are independent variables. BD and CAD are taken as a percentage of GDP while all the other variables are in real terms. Nominal data of GDP at current prices are deflated by GDP deflator while the real interest rate is calculated by using fisher's equation (i.e. $r = n - i$) where r, n and i represent real interest rate, nominal interest rate, and inflation rate respectively). Muhammad et al, 2013). Many of the previous studies have also used these variables see, (Tallman and Rosenweig, 1991; Mukhtar., 2007; Tang, 2013; Sakyi & Opoku 2016; and Akorli, 2017).

- **Current account Deficit (CAD)** denotes deficit in current account balance. CAB is the sum of net difference between exports and imports i.e. balance of trade, net factor income, and net transfer payments. CAD shows deficit in its equilibrium when import payments exceed exports receipt or if there is more capital outflow in the form of interest payments. CAD is expressed as a percentage of Gross Domestic Product (GDP) which is the total income earned through the production of goods and services in an economic territory during an accounting period.
- **Budget Deficit (BD)** is measured by the excess of government spending over its revenue collection
- **Real Effective Exchange Rate (REER):** Real effective exchange rate is deflated nominal effective exchange rate deflated by GDP deflator and is expressed in logarithmic form. Whereas nominal effective rate of exchange measures the price/value of a currency against the weighted average of several other trading countries currency.
- **Real Interest Rate (RIR)** is the lending interest rate adjusted for inflation as measured by the GDP deflator.

- **Real Gross Domestic Product (RGDP)** is the measures of national income and national production of a country. GDP calculates the aggregate expenditures on all the final goods and services produced in a country for one year. RGDP is expressed in current prices over time.

Table 1: Description of variables

No.	Factor Input Name	Definition	Abbreviations	Data source
Dependent variable				
1	Current account Deficit	The deficit in current account balance when import payments exceeds exports receipt	CAD	WB
Independent variable				
2	Budget deficit	Excess of government spending over its revenue collection	BD	WB
3	Real effective exchange rate	Deflated nominal effective exchange rate	REER	WB
4	Real Interest rate	The rate at which short-term funds are borrowed and lent in the money market is deflated by GDP deflator.	RIR	SBP
5	Real Gross Domestic Product	Real aggregate expenditure on all the final goods and services produced in a country for one yea	RGDP	WB

6. Methodology

6.1. Conventional test for stationarity

Time series exhibit a property of stationarity if their mean, variances, and autocovariance remain constant over the relevant period under consideration. However, almost all macroeconomic time series variables are non-stationary and estimation of such model could produce unauthentic outcomes. In testing for the stationary property of the variables in equation no 2, we employ two alternative approaches; (i) Augmented Dickey Fuller Test and (ii) Phillip Peron Test.

Dicky-Fuller test (1979, 1981) is sufficient only for the first-order autocorrelation and suffered by the low power of the test. To remove the problem of high order autocorrelation, this test was augmented with high order lagged terms of dependent variables. However, Philip and Perron

(1988) test performs better concerning the small data sets and addresses the issues of heteroskedasticity, serial correlation, and endogeneity in the regressors.

6.2. Conventional cointegration analysis: Autoregressive Distributed Lag Testing Approach (ARDL)

Autoregressive Distributed Lag (ARDL) approach was developed by Pesaran et al. (2001) for testing cointegration among variables. The Advantage of this test over other approaches of cointegration is that it can be used in a case where variables are integrated of different order. It also performs well in case of a small data size. Pesaran et al, 2001).

An ARDL representation of the model can be given as follows.

$$CAD_t = \alpha_0 + \sum_{i=1}^{\rho} \alpha_1 \Delta BD_{t-1} + \sum_{i=1}^{\rho} \alpha_2 \Delta REER_{t-1} + \sum_{i=1}^{\rho} \alpha_3 \Delta Y_{t-1} + + \sum_{i=1}^{\rho} \alpha_4 \Delta RIR_{t-1} + \sigma_1 BD_{t-1} + \sigma_2 REER_{t-1} + \sigma_3 Y_{t-1} + \sigma_4 RIR_{t-1} + \theta EC_{t-1} + \varepsilon_t \text{ ----------(3)}$$

Where Δ denote the first difference operator , α_0 represents constant, ε_t is the white noise error term. The long-run relationship is represented by $\alpha_1, --, \alpha_4$ coefficients while the short-run relationship is presented by $\sigma_{1,} --\sigma_4$, θ represents the speed of adjustments, and EC denotes the residual achieved from estimated cointegration in equation (Saah et al, 2016)

The decision for the rejection or acceptance of the null hypothesis of no cointegration is based on the value of F statistics. ARDL approach provides the range of critical values i.e lower bound critical value and upper bound critical value. If F-statistics is greater than the upper bound critical value then we can reject the null hypothesis and conclude the existence of cointegration. Similarly, if F computed value lies in between the two critical bound values, the cointegration becomes inconclusive.

6.3. Unit root analysis in the presence of structural breaks

Conventional unit root testing procedures i.e ADF and PP are of low power and may produce misleading/biased results in the presence of structural breaks (Trachanas &Katrakilidis, 2013). It is necessary to consider the effect of structural shocks in determining the relationship between aforesaid for this study whose sample size covers the period of different exchange rate regimes

(Bagnai, 2006). Therefore, unit root tests with endogenously determined break dates are used in this study i.e "Zivot and Andrews (1992) test and Lagrange Multiplier (LM) test"

The ZA test is an ADF test that incorporates the effect of an endogenous (unknown) break date in the time series. The null hypothesis that the series has a unit root without a structural break, against the alternative hypothesis that the series is stationary with the structural break of an unknown break date is tested.

In the presence of multiple structural breaks, use of one break tests can lead to the spurious conclusions Ben-David et al (2003). So, the minimum Lagrange Multiplier (LM) is used which was proposed by Lee & Strazicich (2003). LM unit root test allows for two endogenous structural breaks and is more power full Maddala and Kim (2003). The LM unit root test is presented in the following regression form.

$$\Delta Z_t = \delta' \Delta X_t + \varphi \hat{V}_{t-1} + \sum_{i=1}^{k} \gamma_i \Delta \hat{V}_{t-1} + \in_t \quad \text{----------} \quad (4)$$

where $\hat{V}_{t-1} = z_t - \dot{U}'_x - X_t \hat{\delta}$, t=2……. T, δ' are coefficient in the regression of ΔZ_t on ΔX. Augmented term of lags $\Delta \hat{V}_{t-i}$ is included in the model to correct the auto serial correlation problem. $\dot{U}'_x$ is restricted MLE of $\dot{U}_x$ and given by $Z_1 - X_1 \hat{\delta}$. Z_1 and X_1 are the first observations of Z_t and X_t respectively. X_t is the vector of exogenous variables. In the presence of one break point $X_t = \{1, t, D_{1t}, DT_{1t}\}'$ while with two break points stationarity test $X_t = \{1, t, D_{1t}, D_{2t} DT_{1t}, DT_{2t}\}'$ where, $D_{jt=1}, DT_{jt} = t - T_{BJ}$ for $t \geq T_{BJ} + 1, j = 1, 2,$ and "0" otherwise. T_{BJ} is the period of the structural shock and $\delta' = \delta_1, \delta_2, \delta_3$. The LM unit root test is calculated by $\tau = t - statistics$ for testing the null hypothesis of a unit root $\varphi = 0$. The location of structural change T_{BJ} is determined by selecting breakpoints for the minimum statistics as

$$lnf\,\tilde{\tau}(\tilde{\lambda}_i) = lnf_{\lambda}\tilde{\tau}(\lambda) \quad \text{----------} \quad (5)$$

Where $\lambda = T_B/\mathrm{T}$

6.4. Gregory and Hansen Methodology

Conventional cointegration tests i.e Engel-Granger (1987), Johansen and Juselius (1990) and the ARDL bounds tests do not consider the effect of a structural break. Analogous to these tests

Gregory and Hansen's (1996) cointegration procedure accounts for the possible existence of significant structural shocks in the examined cointegration. The Gregory and Hansen test is an extension of unit root tests with the structural break, for example, by Perron (1989) and Zivot and Andrews (1992). Gregory and Hansen (1996) proposed four model specifications of structural change: (i) Level shift (L) ; (ii) Level shift with trend (L/T) ; (iii) Regime shift (both level shift and slope coefficients can change (R/L/S) and (iv) Full structural break i.e a trend as well as a regime shift (R/L/S/T) . The null hypothesis of no cointegration is tested against the alternative hypothesis of cointegration with one structural break. The period of structural change is endogenously determined. The specific forms for the above mentioned four models, with structural breaks, are as follows:

G-H 1: Level Shift

$$CAD_t = \mu_1 + \mu_2 f_{tk} + \alpha_1 BD_t + \alpha_2 REXR_t + \alpha_3 Y_t + \alpha_4 RIR_t + \varepsilon_t \text{----------} \quad (6)$$

G-H II: Level Shift with the trend

$$CAD_t = \mu_1 + \mu_2 f_{tk} + \beta_1 t + \alpha_1 BD_t + \alpha_2 REXR_t + \alpha_3 Y_t + \alpha_4 RIR_t + \varepsilon_t \text{----------} \quad (6a)$$

G-H III: Regime Shift where intercept and slopes coefficient change

$$CAD_t = \mu_1 + \mu_2 f_{tk} + \beta_1 t + \alpha_1 BD_t + \alpha_{11} BD_t f_{tk} + \alpha_2 REXR_t + \alpha_{22} REXR_t f_{tk} + \alpha_3 Y_t + \alpha_{33} Y_t f_{tk} + \alpha_4 RIR_t + \alpha_{44} RIR_t f_{tk} + \varepsilon_t \text{----------} \quad (6b)$$

G-H IV: Regime Shift where Intercept, Slope coefficients, and Trend change.

$$CAD_t = \mu_1 + \mu_2 f_{tk} + \beta_1 t + \beta_2 t f_{tk} + \alpha_1 BD_t + \alpha_{11} BD_t f_{tk} + \alpha_2 REXR_t + \alpha_{22} REXR_t f_{tk} + \alpha_3 Y_t + \alpha_{33} Y_t f_{tk} + \alpha_4 RIR_t + \alpha_{44} RIR_t f_{tk} + \varepsilon_t \text{----------} \quad (6c)$$

Where CAD_t is current account deficit, BD_t is the budget deficit, $REXR_t$ is the real effective exchange rate, Y_t is real GDP, RIR_t is the real interest rate and ε_t is the white noise error term.

7. Results and Discussion

7.1. Descriptive Statistics

It is purposive to conduct a preliminary test on the observed economic variables to analyze the behavior of each data series employed. The descriptive statistics of CAD, BD, REEXR, RIR, and RGDP for Pakistan is presented in table no 2.

Mean as a measure of central tendency acts as a demonstrative of the entire data set (Singh et al; 2019). On average BD in Pakistan during 1980-2026 has been at 5.8% of RGDP with a range of -0.8% to -5.8%. Similarly, on average TD is -2.7% of RGDP with the range of 0.12 to -7.7.

Skewness generally refers to the lopsidedness of a normally distributed curve. The longevity of the long right side tail represents positively skewed data while long left tail represents negatively skewed distribution. The third moment of the variables is depicting normal and symmetric distribution; furthermore mean and median are also coinciding with each other.

Kurtosis measures the peakedness of a normally distributed curve. A value of kurtosis greater than 3 represents leptokurtic distribution while kurtosis less than 3 represents platykurtic distribution. RIR has leptokurtic distribution while CAD, BD, REER, and RGDP are characterized by platykurtic distribution. Furthermore, normality is verified by the Jarque Bera test, which incorporates the combined measure of the last two moments. The insignificant probability value of the Jarque Bera normality test implies that CAD, BD, and RGDP are normally distributed while RIR rejects the hypothesis of normal distribution.

Table 2: Descriptive statistic summary of the variables

Statistic	CAD	BD	RGDP	REER	RIR
Mean	-2.7736	-5.8250	20.7290	4.6701	4.0932
Median	-2.7042	-5.8500	21.0329	4.6377	3.3032
Maximum	0.1249	-0.8000	21.9063	4.8422	22.0000
Minimum	-7.7419	-8.9000	19.2346	4.5054	-1.7110
Std. Dev.	2.0049	1.8976	0.8276	0.0910	4.7561
Skewness	-0.5083	0.3656	-0.4003	0.3341	1.9968

Kurtosis	2.6627	2.8565	1.8190	1.8266	7.7766
Jarque-Bera	1.7207	0.8330	3.0533	2.7349	58.1455
Probability	0.4230	0.6594	0.2173	0.2548	0.0000

Source: Author's calculation estimated using EViews

7.2. Pearson correlations coefficient

The correlation matrix in table 3 explains the association of the CAD with a BD and other variables. The correlation matrix is used to check the multicollinearity among the variables. Results indicate that for most of the variable values of Coefficients are less than 0.5 represent weak correlation among variables. The coefficients on the main diagonal show perfect collinearity, there for each variable have a perfect and positive correlation with itself.

Table 3: Pearson correlation coefficient

	CAD	**BD**	**RGDP**	**REER**	**RIR**
CAD	1				
BD	0.0103	1			
RGDP	0.1690	0.1614	1		
REER	-0.3519	-0.1143	-0.5929	1	
RIR	0.3441	0.0766	0.2146	-0.1664	1

Source: Author's calculation estimated using EViews

7.3. Conventional Test Results

The results of the ADF and PP test for both models i) random walk with drift and ii) random walk with drift and constant are reported in table 4. Results from t-statistics of ADF and PP have shown that all the variables except RIR are non-stationary at 1%, 5% and 10% level of significance. BD, CAD, REER, and RGDP become stationary after taking their first difference while RIR is stationary at level or I(0). Our results are in line with see e.g. {(Khan & Saeed, 2012), (Saidam & Sarmidi, 2017)}. Hence, it is concluded that all variables have mixed order of integration.

Table 4: Augmented Dickey-Fuller Test and Phillip peron test Results

	ADF		**PP**	
	intercept	Intercept and trend	intercept	Intercept and trend
CAD (I_0)	-3.373	-5.042***	-3.355	-3.749**
CAD (I_1)	-6.150***	-6.074***	-7.035***	-6.951***
BD (I_0)	-3.570	-3.504*	-3.576	-3.495*
BD (I_1)	-7.912***	-7.814***	-8.042***	-7.950***
REER (I_0)	-2.240	-2.153	-2.260	-2.236
REER (I_1)	-5.128***	-5.128***	-5.087***	-5.083***
RGDP (I_0)	-1.788	-1.454	-1.788	-1.659
RGDP (I_1)	-5.752***	-5.993***	-5.757***	-5.990***
RIR (I_0)	-2.262**	-3.673**	-2.266**	-2.889
RIR (I_1)	-4.916***	-5.155***	-6.144***	-6.233***

Source: Author's calculation estimated using EViews

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels. The null hypothesis is a unit root. Stars show critical values.

To find out the long-run relationship between the time series variables ARDL bound test is used. First step in finding out the cointegration relationship is to check the stationarity of the data. Results of unit root tests confirm that the ARDL bound test can be used. Second step involved in the ARDL testing procedure is the determination of optimal lag length and that is obtained through VAR specifications. Optimal lag is selected on the basis of different criteria i.e AIC, SIC, and HQ which is 1 (Ncanywa & Letsoalo, 2018).

The empirical results of the ARDL bound test are given in table 5. The decision for the rejection of the null hypothesis is based on F statistics. The value of F Statistic greater the upper bound critical value implies the rejection of the null hypothesis of no cointegration and if its value lies below the lower bound critical value then the null hypothesis cannot be rejected. Results have shown that the calculated F statistic is 2.36, which is less than lower critical bound values of 3.74, 2.86, and 2.45 by Pesaran et al, (2001) and Narayan, (2005), at 1%, 5%, and 10% level of significance. Therefore, the null hypothesis is not rejected, and we conclude that there is no evidence of a long-run relationship (cointegration) between CAD and BD, RGDP, REER and RIR. Empirical provision of no long-run relationship is supported by the Ricardian equivalence hypothesis in the case of Pakistan against TDH. Our results are in line with [(Belguith, 2016), (Ncanywa & Letsoala 2018), (Ogbonna, 2014), (Lyidonan & Telatar, 2014) and (Oyeranti et al.,

2002)] and in contrast with [Banday & Aneja, 2019), (Badinger et al., 2017), (Bhat & Sharma, 2018),]

Table 5: ARDL Bound Test

Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	2.36	4
Critical Bound Value		
Significance	**Lower Critical Bound**	**Upper Critical Bound**
10%	2.45	3.52
5%	2.86	4.01
1%	3.74	5.06

Source: Author's calculation estimated using EViews

While the short-run estimates of ARDL are given in table 6. The estimated coefficient of BD with an insignificant probability value indicates that it is not statistically different from zero at any level of significance. These results suggest that even in the short-run there does not exist any significant relationship between BD and CAD and violates the assumption of TDH in Pakistan during the short run. This result is in line with (Ogbonna, 2014). The Coefficients of all other variables have shown that they have a significant and positive impact on CAD except REER and RGDP. An increase in the exchange rate would improve the CAB position of the economy.

Table 6: Short Run Estimated Results of ARDL

Selected Model: ARDL(1, 0, 0, 0, 0)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
CA(−1)	0.569400	0.13300	4.2690	0.0002
BD	0.077500	0.17900	0.4320	0.6690
REER	−11.788200	4.36900	−2.6980	0.0110
RIR	0.103200	0.06700	1.5490	0.1320
RGDP	−1.055200	0.47400	−2.2280	0.0340
C	76.043800	26.87300	2.8300	0.0080
R-squared 0.58		**Durbin-Watson stat** 1.75		
Adjusted R-squared 0.51		**F-statistic** 8.02 (0.0001)		

Source: Author's calculation estimated using EViews

Results of short run diagnostic tests are reported in table 7. Insignificant P values (greater than 5%) for all the basic diagnostic tests of autocorrelation, heteroscedasticity, model miss specification, and non-normality are implying that we cannot reject the null hypothesis of no autocorrelation, no heteroscedasticity, no model miss specification, and normality distribution. It means the model is free from all specification biasedness.

Table 7: Short-run Diagnostic tests

Short-run Diagnostic tests			
Serial Correlation LM	F= 1.527(0.466)	Ramsey RESET test	F = 4.693 (0.0981)
Normality J-B value,	J-B=2.038 (0.361)	Heteroscedasticity test	F = 5.538(0.477)

Source: Author's calculation estimated using EViews
Note: Values in Parenthesis represent p values

7.4. Structural Breaks Test Results

Conventional tests failed to determine the impact of structural breaks/regime shift and cause the biased decision of accepting false unit root hypothesis (Sakyi & Opoku,2016). Therefore, Zivot and Andrews's (1992) unit root test is used to check the stationarity of the data with one endogenous structural shock. The null hypothesis of unit root at the level in the presence of one structural shock for all the series is tested against the alternative hypothesis of no unit root at the level with one structural change. Results of the Z-A test are reported in table no 8.

Results have shown that calculated t statistics for CAD, BD, RIR, and REER are less than the critical values at 1%, 5%, and 10% level of significance for constant, and constant & trend. While t-statistic is greater than critical values for all the variables at first difference. Hence, it can be concluded that CAD, BD, RGDP, RIR, and REER all are stationary in the presence of one structural break.

Table 8: Zivot Andrews test results

Series	**Level (constant)**	**Break Date**	**1st Difference (constant)**	**Break Date**	**Result**
CAD	−3.2136	1998	−6.3444***	2002	I(1)
BD	−4.1395	2007	−8.1625***	2013	I(1)

REER	−3.0054	1998	−5.8992***	2017	I(1)
RIR	−3.7659	2006	−6.3581***	2020	I(1)
RGDP	−3.6495	2001	−6.7675***	1999	I(1)
Series	**Level (constant &Trend)**	**Break Date**	**1st Difference (constant & Trend)**	**Break Date**	**Result**
CAD	−3.8135	2010	−6.5250***	2002	I(1)
BD	−4.2753	2007	−8.5995***	2017	I(1)
REER	−3.0070	2013	−7.3867***	2017	I(1)
RIR	−6.1852***	2019	−7.4348***	2019	I(0)
RGDP	−3.6198	2001	−7.0914***	1999	I(1)

Source: All results have been estimated using RATS software.
Notes: " Critical Values when including the structural break in intercept: 1 %: -5.34000; 5 %:-4.80000. Critical Values when including the structural break in trend 1 %: -4.9300, 5 %: -4.42000. Critical Values when including the structural break in constant and trend at 1 %: -5.57; 5 %: -5.08000".

Z-A unit root test shows low power of the test in the presence of a break which maybe leads to rejection of true null hypothesis (Kuan et al., 1997). Therefore, to avoid the problem of spurious rejection and size distortion in the presence of unit root with two breaks L-M unit root test is used (Lee & Strazicich 2004). It also incorporates/accommodates up to two structural breaks. (Ahmad & Aworinde, 2015)

The null hypothesis of a unit root in the presence of two structural breaks is tested against the alternative hypothesis of no unit root in the presence of two structural breaks. The results of the L-M test for all the series at the level and first differences are given in table 10. Results have shown that the value of t statistics is less than critical values for all variables except RIR at a level and becomes stationary after taking the first difference.

Table 9: L-M Unit root results with two structural breaks

Series	Level (constant)	Break Dates (Level)	1st Difference (constant)	Break Dates (1st difference)	Result
CAD	−4.7098	1998 & 2007	−5.8645	2002 & 2006	I(0)
BD	−4.0774	2007 & 2019	−7.8241	2003 & 2006	I(0)
REER	−3.3495	2000 & 2016	−6.4176	2015 & 2018	I(1)

RIR	−4.3822	1999 & 2010	−3.7597	2004 & 2017	I(0)
RGDP	−3.3208	2001 & 2007	−6.0664	2004 & 2018	I(1)
Series	**Level (constant &Trend)**	**Break Date (Level)**	**1st Difference (constant & Trend)**	**Break Date (1st difference)**	**Result**
CAD	−4.6861	1998 & 2010	−6.3772	2001 & 2005	I(1)
BD	−6.4774	2007 & 2016	−8.5297	2013 & 2019	I(0)
REER	−4.6710	1999 & 2016	−7.0108	2012 & 2018	I(1)
RIR	−5.8158	2010 & 2016	−5.9698	2010 & 2019	I(0)
RGDP	−4.5957	2007 & 2014	−6.9464	2014 & 2017	I(1)

Source: Source: All results have been estimated using RATS soft ware
Notes: Critical Values for intercept: 1 %: -4.073 ; 5 %: -3.563; 10%: -3.296. Critical Values for trend & constant 1 %: -6.978, 5 %: -6.288, 10 %: -5.998.

Conventional cointegration techniques do not accommodate the impact of any structural change in the determination of long-run relationships (Ndoricimpa, 2013). Moreover, standard cointegration techniques might provide misleading results for cointegration in the presence of structural breaks (Voronkova, 2004). To account for the possible structural breaks, along with the traditional cointegration test, Gregory and Hansen (1996a, 1996b) cointegration is also used.

G-H test assumes the Null hypothesis of no cointegration against the alternative hypothesis of cointegration with one structural break. A period of structural change is endogenously determined. G-H proposed three model's specifications; i) level shift; ii) level shift with the trend; iii) regime and trend shift. Results of G-H cointegration are reported in table 10.

Results have shown that the value of t statistics for two models i.e i) level shift (L) and ii) level shift with the trend (L/T) is less than the critical value, while the t statistics is greater than the critical value for full trend & regime shift model (R/L/S) at 1%, 5%, and 10%. Hence, it can be concluded that the null hypothesis is rejected for the full structural break model and confirms the existence of the twin deficit hypothesis in the presence of one structural break. Results of this study are in line with (Ahmad & Aworinde, 2015) and (Samotu & Orisadare, 2020). The break date for full trend regime shift model is 2010, which is the most repeated date. It coincides with the aftermath of the 2008–09 global financial crisis, the 2010 floods, and the 7th National Finance commission (NFC) Award and 18th Amendment, which changed fiscal sharing between the federal and provincial governments. A shift in how the budget deficit and the current account relate

to each other around this time is plausible. The break date of 1998 matches the nuclear tests and the sanctions along capital-flow disruption that followed.

Table 10: Gregory and Hansen's cointegration test results

	Gregory and Hanson's Cointegration test results			
	significance level	(L)	(L /T)	(R/L/S)
	Break date	2000	1998	2010
	t-statistics	-5.45	-5.48	-11.21
Model significance	**critical values**			
	1%	-6.05	-6.92	-7.31
	5%	-5.56	-6.41	-6.84
	10%	-5.31	-6.17	-6.58

Source: Source: All results have been estimated using RATS software.

8. Discussion

Previous studies have provided mixed results regarding the validity of TDH. In this section findings of this study are compared with the findings of previous economic literature. Results of this study are categorized in two parts 1) conventional test results and 2) structural break test results.

Conventional test results provided evidence against the TDH and in favor of REH which suggests no cointegration between the BD and CAD. These results align with (Oyeranti et al 2002). (Ogbonna, 2014), (Lyidonan, Telatar, 2014), (Belguith, 2016) and (Ncanywa & Letsoala, 2018). REH explains that any shift in government policies does not affect the aggregate level of saving in the economy. Consumers act rationally and decrease private savings to compensate themselves for the future expected increase in taxes. Any amendments in internal balances do not fluctuate economic activity by leaving aggregate savings unaffected. Unaltered economic activities represent aggregate demand which encompasses the domestic and foreign demand component as well. Belguith (2016) found evidence in support of the REH for the countries like Morocco, Jordan, and Iran.

In contrast to this study previous literature has also provided evidence in favor of TDH. See for example (Ito., 2009) conducted a panel study for industrialized countries, less developed and emerging economies, [(Jackenson & Jabbie, 2020) for Siera Leone, (Mohanty, 2019) for India, (Forte & Magazzino, 2013) for European countries, (Ravinthirakumaran et al, 2015) for Pakistan and Sri Lanka, (Acaravci & Ozturk, 2008) & (Altintas &Taban, 2011) for the Turkish economy, (Njoroge et al, 2014) for Kenya, (Lau et al.,2010) for Malaysia, Philippine, and Thailand, (Vamvoukas, 1999) for Greece , (Abell, 1990) for the USA, (Bagheri et al, 2012) for Iran, and (Banday & Aneja, 2019) for China.

For objective two, this study incorporates the effect of structural break on the relationship between BD and CAD. In the presence of regime shifts, the ADF unit root test does not capture the structural breakpoint and may yield biased results. So, Zivot-Andrews (1992) with one endogenous structural breakpoint and Lee & Stazicich (2004) Lagrange multiplier with two endogenous structural breakpoints are used to check the level of integration. Break dates identified under ZA and LM unit root test are 1996, 1998, and 2007 which are also identified by (Hoque & Banerjee, 2014) and (Raza & Afshan, 2017). During 1998 managed floating exchange rate was replaced by multiple exchange rates only for two quarters after the nuclear test. In this time period multiple exchange rate system was followed to overcome the BoP crises and weak financial position of a country (Zubairi, 2018). Afterwards, exchange rate was switched to dirty float during 1999 and finally started to follow a fully floating exchange rate since 2000. While in 2007 Pakistan switched its policy from fully floating-FOF (fear of floating) to fully floating-BN (being neglected) (Rizvi, 2014). Under "float-FOF" the exchange rate remained constant despite being operating under a free-floating exchange rate policy while after 2007 Pakistani currency is continuously losing its value against the dollar. Break dates of 1998 and 2010 also coincides with structural shocks of nuclear test and Asian financial crises (Shah, 2023).

After incorporating the structural break in the cointegration analysis results of this study have shown that BD and CAD are cointegrated and confirms the evidence of TDH in case of Pakistan. This Result is in line with (Ahmad & Aworinde, 2015) and (Samotu & Orisadare, 2020). The break date identified with the full trend and regime shift is 2000, which coincides with the regime shift of the exchange rate policy of Pakistan from dirty float (1999) to floating exchange rate policy (2000) (Hussain 2015). The 2009-10 break reflects the combined effect of the global financial

crisis, the 2010 floods, and fiscal restructuring under the 7th NFC Award and 18th Amendment, which plausibly altered the link between the budget deficit and the current account. The 1998 break aligns with the nuclear tests and the resulting sanctions and capital-flow disruptions.

Existence of cointegration between BD and TD in Pakistan may be explained through the transmission mechanism explained by the Keynesian absorption approach or through the indirect channel explained by M-F model. Some other factors like the high growth rate of population (Jaffri et al, 2012), household consumption expenditure (Muhammad 2010) and increased oil prices since 2003 have been affecting the trade balance of Pakistan (Hassan & Zaman 2012). Similarly developing countries also lack an efficient revenue collection system (low tax / GDP) ratio, along with unsophisticated domestic capital markets. To finance their budgetary requirements, they heavily relied on foreign resources. These foreign resources in the form of debt burden cause imbalances in CAD.

9. Conclusion

This study aimed at investigating the long-run relationship between budget deficit and current account deficit under different exchange rate regimes during 1982-2017 in Pakistan. Previous studies (Tahir et al., 2016), (Somia et all, 2011), (Saeed & Khan, 2012), (Yasmin, 2015), (Saeed et al., 2017), (Khan et all., 2018) (Arif et al., 2010) have found mixed results regarding the validity of TDH based on varying econometric methodologies, time spans, and the inclusion of transforming variables. Recent theoretical and empirical studies of the relation between the current account and the government budget balance suggest that the "twin deficit" relation is subject to structural changes (Grier and Ye, 2009) and (Bagnai, 2006). The long-run relation appears to be weak or subject to structural breaks and appears more clearly once these breaks are taken into account. Factors that could substantially affect the validity of TDH are exchange rate policy, interest rate, and growth rate of income (Trachanas & Katrakilidis 2013).

This study has examined TDH with and without the incorporation of structural breaks. First of all, through conventional testing procedures, i.e ADF and PP time-varying properties of series are examined. Results of both procedures are in line with each other, and variables are found to be integrated of a different order. Further ARDL cointegration is used to find out about the long-run

relationship. Results from cointegration suggest that no long-run cointegration between budget deficit and current account deficit are found in the case of Pakistan thus validating the existence of the Ricardian Equivalence Hypothesis.

For the robustness of the study, further analysis is extended by incorporating the effects of structural breaks. To this end, Zivot-Andrews (1992) and Lagrange Multiplier (2004) are used to check the stationarity of the variables. All the variables are found to be integrated in the same order. For cointegration analysis, Gregory and Hansen's (G-H, 1996) test is applied. G-H test accommodates the effect of one endogenous structural break.

Break dates identified under ZA and LM unit root test are 1996, 1998, and 2007 which are also identified by (Hoque & Banerjee, 2014) and (Raza & Afshan, 2017). During 1998 managed floating exchange rate was replaced by multiple exchange rates only for two quarters after the nuclear test. During 2007 Pakistani currency has continuously lost its value against the dollar. Break dates of 1998 and 2007 also coincides with structural shocks of nuclear test and Asian financial crises (Shah, 2023). Results conclude that budget deficit and current deficit are surely interlinked in the presence of structural breaks and confirmed the existence of TDH in Pakistan.

10. Policy Recommendations

This study has provided evidence in favor of TDH i.e. BD substantially influences the CA deficit in the presence of structural breaks. Therefore, Pakistan needs drastic fiscal and trade sector reforms along with exchange rate policies to ensure macroeconomic stability. To eliminate the dilemma of twin deficits government may bring tax reforms, follow exports-oriented policies, decrease its expenditures and bring reforms in labor and capital markets. Likewise, unnecessary current consumption expenditures may be curtailed. Moreover, the government may directly pursue debt reduction policies to avoid debt accumulation.

Furthermore, the over-dependence of Pakistan on borrowing from donor agencies, a high growth rate of population, and an ever-increasing demand for imports put upward pressure on CAD. On the other hand, the stagnant export sector of Pakistan is also flourished with structural problems that give rise to the deteriorating trade balance.

The rise in government expenditure through expansionary fiscal policy induces a deficit in fiscal balance. This increase in govt expenditures (internal deficit) rise external balance of the economy in many ways; the resulting increase in income increase the aggregate demand by increasing the import capacity (Marinheiro, 2008), it causes the interest rate to rise which enhance the capital inflow in the form of increased demand for domestic currency and hence appreciate the exchange rate which negatively affects the BoP. Lastly increased expenditures are maintained through external borrowing in case of short domestic savings which directly broadens current account deficit. Therefore, fiscal discipline is helpful to stabilize the current account balance.

References

[1] Abell, J. D. (1990). Twin deficits during the 1980s: An empirical investigation. Journal of macroeconomics, 12(1), 81–96.

[2] Acaravci, A., & Ozturk, I. (2008). Twin deficits phenomenon: Empirical evidence from the ARDL bound test approach for Turkey. Bulletin of Statistics and Economics, 2(A08), 57–64.

[3] Ahmad, A. H., & Aworinde, O. B. (2015). Structural breaks and twin deficits hypothesis in African countries. Economic Change and Restructuring, 48(1), 1–35.

[4] Ahmad, I., Hassan, M. U., & Nawaz, M. A. (2021). Twin deficit Hypothesis in Pakistan: a Non-linear Approach with Structural Break. Elementary Educ. Online, 20(5), 5888–5900.

[5] Akroli, J. (2017). General equilibrium perspective on twin deficits hypothesis: Further empirical results. Journal of Macroeconomics, 52, 112–125.

[6] Ali, S. S. (2006). Long Run Linkage between Budget Deficit and Trade Deficit in Lebanon: Results UECM and Bound Tests. IIUM Journal of Economics and Management, 14(1), 29–48.

[7] Alkswani, M. A. (2000, October). The twin deficits phenomenon in petroleum economy: evidence from Saudi Arabia. In seventh annual conference, economic research forum (ERF) (pp. 26–29).

[8] Altintas, H., & Taban, S. (2011). Twin deficit problem and Feldstein-Horioka hypothesis in Turkey: ARDL bound testing approach and investigation of causality. International Research Journal of Finance and Economics, 74, 30–45.

[9] Anoruo, E., & Ramchander, S. (1998). Current account and fiscal deficits: Evidence from five developing economies of Asia. Journal of Asian Economics, 9(3), 487–501.

[10] Aqeel, A. and NIshat.(2000). The Twin Deficit Phenomenon: The Evidence from Pakistan, Pakistan Development Review 39:4 pp535-550

[11] Badinger, H., Fichet de Clairfontaine, A., & Reuter, W. H. (2017). Fiscal rules and twin deficits: The link between fiscal and external balances. The World Economy, 40(1), 21–35.

[12] Bagheri, F., Piraee, K., & Keshtkaran, S. (2012). Testing for twin deficits and Ricardian equivalence hypotheses: Evidence from Iran. Journal of Social and Development Sciences, 3(3), 77–84.

[13] Bagnai, A. (2006). Structural breaks and the twin deficits hypothesis. Journal of Post Keynesian Economics, 28(4), 629–655.

[14] Banday, U. J., & Aneja, R. (2019). Twin deficit hypothesis and reverse causality: a case study of China. Palgrave Communications, 5(1), 1–10.

[15] Barro, R. J. (1974). 'Are Government Bonds Net Wealth?,' Journal of Political Economy, vol. 82, pp. 1095–1117.

[16] Bartolini, Leonardo and Lahiri, Amartya. 2006, ―Twin Deficits, Twenty Years Later,‖ Current Issues in Economics and Finance, Federal Reserve Bank of New York, Vol. 12, No. 7 October

[17] BELGUITH, S. O. (2016). Twin deficit in MENA countries: an empirical investigation. Romanian Economic Journal, 19(60).

[18] Ben-David, D., Lumsdaine, R. L., & Papell, D. H. (2003). Unit roots, postwar slowdowns and long-run growth: Evidence from two structural breaks. Empirical Economics, 28(2), 303–319.

[19] Bhat, J. A., & Sharma, N. K. (2018). The twin-deficit hypothesis: Revisiting Indian economy in a nonlinear framework. Journal of Financial Economic Policy, 10(3), 386–405.

[20] Cavallo, M. (2005). Understanding the twin deficits: new approaches, new results. FRBSF Economic Letter. November 2005-16

[21] Cerrato, M., & Sarantis, N. (2003). Does the Purchasing Power Parity Hold in Emerging Markets? Evidence from Black Market Exchange Rates (Discussion Paper No. 40). Royal Economic Society Annual Conference.

[22] Corsetti, G., & Müller, G. J. (2006). Twin deficits: squaring theory, evidence and common sense. Economic Policy, 21(48), 598–638.

[23] Egwaikhide, F. O., Oyeranti, O. A., Ayodele, O. A., & Tchokote, J. (2002). Causality between budget deficit and the current account balance in African countries. West African journal of monetary and economic integration, 2(2), 1–28.

[24] Fatima, G., Ahmed, M., & Rehman, W. (2012). Consequential effects of budget deficit on economic growth of Pakistan. International Journal of Business and Social Science, 3(7).

[25] W., & Hansen, B. E. (1996). Residual-based tests for cointegration in models with regime shifts. Journal of econometrics, 70(1), 99–126.

[26] Gregory, A.W., Hansen, B.E., 1996b. Tests for cointegration in models with regime and trend shifts. Oxford Bulletin of Economics and Statistics 58, 555–560.

[27] Grier, K., Ye, H., 2009. Twin sons of different mothers: the long and short of the twin deficits debate. Economic Inquiry 47, 625–638.

[28] Hashemzadeh, N., & Wilson, L. (2006). The dynamics of current account and budget deficits in selected countries if the Middle East and North Africa.

[29] Hassan, S. A., & Zaman, K. (2012). RETRACTED: Effect of oil prices on trade balance: New insights into the cointegration relationship from Pakistan. Economic Modelling, 29(6), 2125–2143.

[30] Herbert, M., & SAHER, N. (2010). Response of long-term interest rate to fiscal imbalance: Evidence from Pakistan. SBP Research Bulletin, 6, 43–49.

[31] Higgins, M., & Klitgaard, T. (1998). Viewing the current account deficit as a capital inflow. Current Issues in Economics and Finance, 4(13).

[32] Hoque, A., & Banerjee, R. (2014). The stationarity of South Asian real exchange rates allowing for structural breaks. Australasian Accounting, Business and Finance Journal, 8(3), 45–54.

[33] Hussain, S. B., Hussain, S., & Hussain, F. (2015). Exchange rate volatility during different exchange rate regimes and its relationship with exports of Pakistan. The journal of Governance and public policy, 7(2), 75–96.

[34] Ibrahim, S. B., & Kumah, F. Y. (1996). Comovements in budget deficits, money, interest rates, exchange rates and the current account balance: some empirical evidence. Applied Economics, 28(1), 117–130.

[35] Jackson, E., & Jabbie, M. (2019). Twin Deficits Hypothesis as an Indication of Government Failure in Sierra Leone: An Empirical Investigation (1980-2018). İktisat Politikası Araştırmaları Dergisi, 7(1), 43–68.

[36] Jaffri, A. A., Naveed, T. A., Asjed, R., & Khatoon, I. (2012). Impact of Population Growth on Current Account Balance of Pakistan. Journal of Managerial Sciences, 6(2), 177–189

[37] Javid, A. Y., Javid, M., Arif, U., & Sabir, M. (2010). Fiscal Policy and Current Account Dynamics in the Case of Pakistan [with Comments]. The Pakistan Development Review, 577–592.

[38] Khan, M. A., & Saeed, S. (2012). Twin deficits and saving-investment nexus in Pakistan: sevidence from Feldstein-Horioka puzzle. Journal of Economic Cooperation & Development, 33(3), 1.

[39] Khan, U. (2018). A Dynamic Analysis of the Twin-Deficit Hypothesis: The Case of a Developing Economy. Journal of Economic Structures, 7(1), 14–29.

[40] Killick, T., 1993. The adaptive economy: Adjustment policies in small, low-income countries. The World Bank, Washington D.C.

[41] Kim, S., & Roubini, N. (2008). Twin deficit or twin divergence? Fiscal policy, current account, and real exchange rate in the US. Journal of international Economics, 74(2), 362–383.

[42] Lau, E., & Baharumshah, A. Z. (2006). Twin deficits hypothesis in SEACEN countries: A panel data analysis of relationships between public budget and current account deficits. Applied Econometrics and International Development, 6(2).

[43] Leachman, L. L., & Francis, B. (2002). Twin deficits: apparition or reality?. Applied Economics, 34(9), 1121–1132.

[44] Lee, J., & Strazicich, M. (1999). Minimum LM unit root test with two structural breaks. Department of Economics, University of Central Florida Working Paper Series.

[45] Maddala, G. S., & Kim, I. M. (1998). Unit roots, cointegration, and structural change. Cambridge University Press.

[46] Makin, A. J., & Narayan, P. K. (2013). Re-examining the "twin deficits" hypothesis: evidence from Australia. Empirical Economics, 45(2), 817–829.

[47] Malik, A. (2013). Private investment and fiscal policy in Pakistan. Journal of Economic

[48] Manzoor, H., Younas, M. Z., Mahmood, R., and Rizwan, M. A. (2019). A Twin Deficit Hypothesis: The Case Study of Pakistan. Bulletin of Business and Economics, 8(3), 117–131

[49] Marinheiro, C. F. (2008). Ricardian equivalence, twin deficits, and the Feldstein–Horioka puzzle in Egypt. Journal of Policy Modeling, 30(6), 1041–1056.

[50] Miller, Stephen M., and Frank S. Russek. "Are the Twin Deficits Really Related?" Contemporary Policy Issues, vol. 7, no. 4, 1989, pp. 91–115.

[51] Mohanty, R. K. (2019). An empirical investigation of twin deficits hypothesis: Evidence from India. Journal of Quantitative Economics, 17(3), 579–601.

[52] Muhammad, S. D. (2010). Determinant of Balance of Trade: Case Study of Pakistan. European Journal of Scientific Research, 41(1), 13–20

[53] Muhammad, S. D., Hussain, A., Ali, A., & Ahmad, I. (2013). Rate of interest and its impact on investment to the extent of Pakistan. Pakistan Journal of Commerce and Social Sciences, 7(1), 91–101.

[54] Mukhtar, T., & Zakaria, M. (2008). Budget deficits and interest rates: an empirical analysis for Pakistan. Journal of economic cooperation, 29(2), 1–14.

[55] Mukhtar, T., Zakaria, M., & Ahmed, M. (2007). An empirical investigation for the twin deficits hypothesis in pakistan. Journal of Economic Cooperation Among Islamic Countries, 28(4).

[56] Mundell, R. A., & Fleming, M. (1963). Capital mobility and stabilization policy under fixed and flexible exchange rates. The Canadian Journal of Economics and Political Science, 29(4), 475–485.

[57] Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. Applied Economics, 37(17), 1979–1990.

[58] Nayab, H. (2015). The relationship between budget deficit and economic growth of Pakistan. Journal of Economics and Sustainable Development, 6(11), 85–90.

[59] Ncanywa, T., & Letsoalo, T. E. (2019). Which among twin deficits hypothesis, twin divergence, and Ricardian's equivalence hold in a developing country?. Journal of Public Affairs, 19(2), e1904.

[60] Ndoricimpa, A. (2013). Budget and Current Account Deficits in Burundi: Empirical Evidence from Threshold Cointegration with Asymmetric Adjustment. Journal of Economics and Sustainable Development, 4(17), 114–123.

[61] Nickel, C., & Vansteenkiste, I. (2008). Fiscal policies, the current account and Ricardian equivalence.

[62] Njoroge, E. K., Kosimbei, G., & Korir, J. (2014). Testing twin deficit hypothesis for Kenya 1970-2012. International Journal of Business and Economics Research, 3(5), 160–169.

[63] Nunes, L., P. Newbold, and C. Kuan, 1997, “Testing for Unit Roots with Breaks: Evidence on the Great Crash and the Unit Root Hypothesis Reconsidered.” Oxford Bulletin of Economics and Statistics, 59, 435–448.

[64] Obadan, M. I. (1994). "Real Exchange Rates in Nigeria: A Preliminary Study." NCEMA Monograph Series, No. 5

[65] Ogbonna, B. C. (2014). Investigating for twin deficits hypothesis in South Africa. Developing Country Studies, 4(10), 142–162.

[66] Oladipupo, A. O. (2011). Impact of exchange rate on balance of payment in Nigeria. African Research Review, 5(4).

[67] Perera, A., & Liyanage, E. (2012). An empirical investigation of the twin deficit hypothesis: Evidence from Sri Lanka. Staff Studies, 41(1).

[68] Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289–326.

[69] Ravinthirakumaran, N., Selvanathan, S., & Selvanathan, E. A. (2016). The twin deficits hypothesis in the SAARC countries: an empirical investigation. Journal of the Asia Pacific Economy, 21(1), 77–90.

[70] Raza, S. A., & Afshan, S. (2017). Determinants of exchange rate in Pakistan: Revisited with structural break testing. Global Business Review, 18(4), 825–848

[71] Rehman, H. U., & Saeed, S. (2017). Twin Deficit Hypothesis Validation: A case study of Pakistan. International Journal of Scientific Studies in Education, 2(1).

[72] Rizvi, S. K. A., Naqvi, B., & Mirza, N. (2014). From Fear of Floating to Benign Neglect: The Exchange Rate Regime Roller Coaster in Pakistan. The Lahore Journal of Economics, 19, 17.

[73] Rosensweig, J. A., & Tallman, E. W. (1991). Investigating U.S. government and trade deficits. Economic Review - Federal Reserve Bank of Atlanta, 76(3), 1–11.

[74] Sadiku, L., Bexheti, A., Bexheti, G., & Bilic, S. (2018). Empirical Analyses of the Relationship between Trade and Budget Deficit of FYR of Macedonia. KnE Social Sciences, 1–15.

[75] Saeed, S., & Khan, M. A. (2012). Twin deficits hypothesis: The case of Pakistan 1972-2008. Academic Research International, 3(2), 155.

[76] Saidam, A. M., & Sarmidi, T. Reexamine of Twin Deficit Hypothesis: Malaysia case study.

[77] Sakyi, D., & Opoku, E. E. O. (2016). The twin deficits hypothesis in developing countries: Empirical evidence for Ghana. International Growth Centre, London School of Economic and Political Science, London.

[78] Schuknecht, L. (1999). Fiscal policy cycles and the exchange rate regime in developing countries. European Journal of Political Economy, 15(3), 569–580.

[79] Seane, S., Mah, G., & Saah, P. (2016). Risk, opportunities and reasons of the household debt changes: The case of an emerging economy. Risk Governance and Control: Financial Markets & Institutions, 6(4), 517–523.

[80] Shah, S. S. A., Jadoon, S., & Afridi, M. A. (2023). Relevance of twin deficit hypothesis in the presence of structural breaks: an evidence from Pakistan. Quality & Quantity, 57(4), 3305–3320.

[81] Tahir Mukhtar and Aliya H. Khan, (2016), The Current Account Deficit Sustainability: An Empirical Investigation for Pakistan, The Pakistan Development Review, 55, (4), 397–419.

[82] Tang, T. C. (2015). General equilibrium perspective on twin deficits hypothesis: An empirical study with US results. Global Economic Review, 44(2), 173–184.

[83] Tosun, M. U., Iyidogan, P. V., & Telatar, E. (2014). The twin deficits in selected Central and Eastern European economies: Bounds testing approach with causality analysis. Romanian Journal of Economic Forecasting, 17(2), 141–160.

[84] Trachanas, E., & Katrakilidis, C. (2013). The dynamic linkages of fiscal and current account deficits: New evidence from five highly indebted European countries accounting for regime shifts and asymmetries. Economic Modelling, 31, 502–510. https://doi.org/10.1016/j.econmod.2012.12.026

[85] Voronkova, E. (2004). Equity market integration in Central European emerging markets: A cointegration analysis with shifting regimes. International Review of Financial Analysis, 13(5), 633–655.

[86] Yasmin, F. (2015). Twin deficit Hypothesis: A case of Pakistan. Sukkur IBA Journal of Management and Business, 2(1), 71–84.

[87] Zahid, A. (2018). Ricardian Equivalence, Twin Deficits and Feldstein-Horioka Hypotheses: Empirical Analysis form Pakistan. Kashmir Economic Review, 27(2).

[88] Zubairi, H. (2018). Weak financial condition and macroeconomic structural constraints in Pakistan. Journal of Economic Studies, 45(2), 210–225.