TESTING RELEVANCE OF TWIN DEFICIT FOR A TRANSITION ECONOMY LIKE PAKISTAN

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Abstract

The relationship between trade deficit and fiscal deficit has remained an important topic in the last decades. The literature reveals many attempts to investigate the relationship between the two deficits, while terminologies like Keynesian Proposition, Ricardian Equivalence, and Targeting Current Account Deficit are used for the relationship between the two deficits. The literature also highlights the possibility of unidirectional or bidirectional causality between these deficits for different countries and different time spans.

These four possibilities have inspired us to investigate these possibilities in the light of many control variables like unemployment, urbanization, money supply, foreign direct investment, and economic development in the case of Pakistan. The findings of the study reveal that fiscal deficit significantly accelerates trade deficit into both long term and short term; hence, it supports the Keynesian Proposition in Pakistan, while a bidirectional causality between fiscal deficit and trade deficit into both long term and short term was also observed. Moreover, the mean and variance of error term were also found to be structurally stable which confirms the absence of structural break for the selected period in Pakistan. In the end, based on these findings, this study has concluded that two possibilities prevail out of four on the relationship between fiscal and trade deficits. The twin deficit is relevant and it does prevail in a transition economy like Pakistan.

Keywords: Pakistan, fiscal and trade deficit (twin deficit), causality, cointegration.

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1. Introduction

The relationship between fiscal and trade deficit can be summarized into the Keynesian Proposition and the Ricardian Equivalence Hypothesis. The Keynesian Proposition states that fiscal deficit will have a significant and positive impact on trade deficit and argues that fiscal deficit comes into being due to expansionary fiscal policy which enhances local expenditures or absorption for imports, therefore, the continuous increase in imports will start increasing the trade deficit. It could be inferred that budget deficit may positively create trade deficit. There are studies which support the Keynesian Proposition, such as: Fleming (1962), Mundell (1963), Volcker (1987), Zaman and DaCosta (1990), Kearney and Monadjemi (1990), Bachman (1992), Smyth and Hsing (1995), Vamvoukas (1999), Aqeel and Nishat (2000), Lau and Haw (2003), Onafowora and Owoye (2006), Corsetti and Muller (2006), Mukhtar, Zakaria and Ahmed (2007), Kim and Roubini (2008), Muller (2008), Beetsma, Giuliodori and Klaassen (2008), Pantelidis *et al.* (2009), Bouhga-Hagbe *et al.* (2010), and Jawaid and Raza (2013). However, the findings of Monacelli and Perotti (2007) revealed that fiscal deficit will have a negative but significant impact on trade deficit. They further stated that as fiscal deficit is becoming the reason of the current account or trade deficit, government regulations must be aimed at bringing the balance between volume of exports and volume of imports. Consequently, trade deficit may decline and may achieve state of balance.

The second view on the relationship between fiscal deficit and trade deficit is recognized as the Ricardian Equivalence Hypothesis and it is proposed by Barro (1989). This view reveals that fiscal deficit is not the cause of trade deficit and simply both deficits are neutral. The advocates stated the transmission mechanism for the neutral relationship between fiscal and trade deficits that because of expansionary fiscal policy government cuts taxes or may increase its expenditures. Consequently, as the disposable income of the masses increases, private savings will be enhanced and in turn this will encourage domestic investment; therefore, overall exports will increase in response to increase in domestic production and exhibiting no external deficit in the country. This view is supported by the findings of Miller and Russek (1989), Rahman and Mishra (1992), Evans and Hasan (1994), Wheeler (1999) and Kaufmann, Scharler and Winckler (2002). Moreover, there is another possibility of the relationship between fiscal deficit and trade deficit: trade deficit may have a significant impact on fiscal deficit or trade deficit may cause fiscal deficit. This relationship between the two deficits is investigated by Summers (1988), Islam (1998), Khalid and Guan (1999), and Alkhatib-Alkswani (2000); they found that unidirectional causality running from current account deficit to budget deficit prevails. The prime reason behind investigating the impact of trade deficit on fiscal deficit is to provide an answer for the question whether targeting current account deficit affects fiscal/budget deficit or not?

Furthermore, the relationship between fiscal deficit and trade deficit could be bidirectional as well, meaning that both deficits could cause each other and may contradict the Keynesian Proposition (Summers, 1988). The studies of Laney (1984), Dar-

rat (1990), Evans (1993), Ibrahim and Kumah (1996), Lau and Baharumshah (2004), Mukhtar, Zakaria and Ahmed (2007), Baharumshah (2007), Jayaraman and Choong (2007), Lau, Abu Mansor and Puah (2010), and Mehrara and Zamanzadeh (2011) have confirmed bidirectional causal relationship between trade and fiscal deficits. The co-existence of both deficits is referred to as twin deficit. The developing countries of the world have been experiencing twin deficit in the past years and the co-movement of both deficits is accelerating with time. Pakistan, as a transition economy, is also experiencing the simultaneous existence of both deficits and these deficits are also accelerating in Pakistan, further exhibiting many macroeconomic ills in the country. In the case of Pakistan, the causal relationship between trade and fiscal deficits has been tested by Burney and Yasmeen (1989), Burney and Akhtar (1992), Kazmi (1992), Aqeel and Nishat (2000), Mukhtar, Zakaria and Ahmed (2007), and Hakro (2009).

This study is an attempt to investigate whether the Keynesian Proposition or Ricardian Equivalence Hypothesis prevails in the case of Pakistan. This study will also test the causal relationship between fiscal deficit and trade deficit and will check which view point is more suitable or most relevant for Pakistan, so that it could help policy advisors in suggesting appropriate policy measures. In the present study we have considered unemployment, urbanization, money supply, foreign direct investment and human development index as explanatory factors of trade deficit along with fiscal deficit. This study is different from the other studies due to its control factors, the time span and the methodological framework used. This study applies Ng-Perron (2001) unit root test, ARDL Bounds Testing Approach, and VECM based Causality Test for investigating the relationship between trade deficit and fiscal deficit in addition to various controlled factors for the dataset ranging from 1972 to 2012.

Section 2 offers a brief review of the previous researches, section 3 presents the methodological framework, section 4 reviews the empirical findings of the study, and the final section 5 reports the conclusions and policy implications.

2. Literature review

Zaman and DaCosta (1990) investigated the causal relationship between budget deficit and current account deficit for the period ranging from 1971(Q1) to 1989 (Q4) and found unidirectional causality running from budget deficit to current account deficit. Bachman (1992), using VAR model on quarterly dataset for the period from 1974 to 1988, explored federal budget deficit as a factor that explained variations into current account deficit and confirmed evidence of twin deficit in the US. Beside Bachman (1992), Vamvoukas (1999) also examined the causal relationship between budget deficit and trade deficit for the Greek economy for the period from 1948 to 1993 and found unidirectional causality running from budget deficit to trade deficit. This study concluded that the Keynesian Proposition prevailed on the long run and short run in the Greek economy.

Aqeel and Nishat (2000) who investigated the twin deficit hypothesis for Pakistan by considering a dataset from 1973 to 1998 found that fiscal deficit positively and

significantly caused a current account deficit into long run, but it inversely caused a current account deficit on the short run. The findings further confirmed the evidences of unidirectional causality running from economic growth to current account deficit, running from money supply to current account deficit, and running from exchange rate to current account deficit in Pakistan. Lau and Haw (2003) also explored the twin deficit for ASEAN economies like Malaysia and Thailand by applying Vector Autoregressive model and Toda Yamamoto technique by covering a sample period for Thailand from 1976 (Q1) to 2000(Q4) and for Malaysia from 1976 (Q1) to 1998 (Q2) and found evidence of unidirectional causality running from budget deficit to trade deficit for the case of Thailand (validating the Keynesian Proposition) but evidence of bidirectional causality was found for the case of Malaysia. The study concluded that the budget deficit consistently affects current account through exchange rate and interest rate channels. Lau and Baharumshah (2004) found evidence of twin deficit in the case of Malaysia for the period from 1976 (Q1) to 2000 (Q4). In another study, Onafowora and Owoye (2006) found positive effects of budget deficit on trade deficit into both long run and short run, and also found an evidence of unidirectional causality running from current account deficit to budget deficit in Nigeria for the period 1970-2001. The findings further exposed that money supply, exchange rate, output growth and interest rate were negatively affecting trade deficit in the long run. Besides this study, Mukhtar, Zakaria and Ahmed (2007) observed that budget deficit increases trade deficit in the long run but declines trade deficit into short run and also found evidence of bidirectional causality between budget and trade deficit for Pakistan for a quarterly dataset from 1975 to 2005. Pantelidis *et al.* (2009) also investigated the twin deficit hypothesis for the case of Greece for the 1960-2007 period and found an evidence of twin deficit; however, this evidence was weak and they relate it with Quintos Terminology, therefore, they remained with Keynesian Proposition for their findings regarding twin deficit. Additionally, they came up with the findings that public expenditures regarding aging will be a serious threat for the long run stability of social security financing.

Ozturkler and Colak (2010) explored the relationship between trade deficit and unemployment and found that trade deficit significantly accelerates unemployment in Turkey for the period from 1960 to 2009. In another study, Waliullah *et al.* (2010) found income and money supply as important determinants of trade balance for both short and long term spans for Pakistan for the period from 1970 to 2005. The findings further exposed that money supply significantly decreases trade balance into both long run and short run. Mohammad (2010) found real effective exchange rate as more important determinants of trade deficit than that of foreign income, domestic consumption and foreign direct investment for Pakistan for the period from 1975 to 2008. Syed, Hasnat and Li (2011) did not find any significant relationship between foreign direct investment and trade deficit in Pakistan for the period from 1990 to 2010, whereas, the relationships between foreign direct investment and exports and between foreign direct investment and imports were found to be signifi-

cant. Aurangzeb and Haq (2012) found the exchange rate, foreign direct investment, economic growth and remittances as significant factors which affect trade deficit in Pakistan in the long run for the period from 1981 to 2010. This study provides evidence of bidirectional causality between foreign direct investment but it also found unidirectional causality running from trade deficit to economic growth in Pakistan. Hassan, Wajid and Ahmet (2012) found negative and significant effect of urbanization on trade openness in the long run but positive and significant effect of urbanization on trade openness in the short run in Pakistan for the period from 1975 to 2010. This study further found bidirectioanal causality between urbanization and trade openness in the short run but unidirectional causality running from urbanization to trade openness in the long run was evident in Pakistan; the authors concluded that urbanization could benefit trade openness in the short run but it could harm trade openess in the long run.

Anas (2013) found evidence of unidirectional causality running from current account deficit to fiscal deficit for Morocco for the data set from 1980 to 2012, and concluded that current account deficit left a negative impact on public deficit in Morocco. Jawaid and Raza (2013) found significant and positive effects of fiscal deficit on trade deficit for both long run and short run in Pakistan for the period from 1976 to 2010, and this study further found evidence of unidirectional causality running from fiscal deficit to trade deficit in the short run in Pakistan. Saysombath and Kyophilavong (2013) found evidence of bidirectional causal relationship between fiscal and trade deficits for Lao PDR for the period from 1980 to 2010. Tufail *et al.* (2014) found a positive and signficant effect of budget deficit on trade deficit and also confirmed bidirectional causality between budget and trade deficits for Pakistan for the sample period from 1972 to 2011.

3. Data source and methodology

This part is designed to demonstrate the means through which the dataset is gathered up. Also, the aim of this section is to develop on the insights of the methodological framework that is going to be applied for the empirical investigation.

3.1. Methodological framework

Many empirical studies were conducted to test Log Linear Models, like Ehrlich (1977), Layson (1983), Bowers and Pierce (1975), Cameron (1994) and Ehrlich (1996). All these studies revealed that the computed results from Log Linear models are more reliable and robust as compared with Linear Form models. Therefore, the objective of this study is to test the Log Linear Model which is given as below:

$$\ln TD = \beta_1 + \beta_2 \ln FD + \beta_3 \ln UN + \beta_4 \ln UB + \beta_5 \ln M +, \text{ whereas:}$$
$$\beta_6 \ln FDI + \beta_7 \ln HDI + \mu$$

Table 1: Variables

Variable Names	Variable Representation	Variable Transformation	Data Source	Sample Period
Trade Deficit	lnTD	ln [(Imports – Exports)/ (Real GDP)]	WDI, World Bank (2014)	1972 – 2012
Fiscal Deficit	lnFD	Log [(Fiscal Expenditures – Fiscal Revenue)/ (Real GDP)]	WDI, World Bank (2014)	1972 – 2012
Unemployment	lnUN	ln [(Unemployment)/ (Total Labour Force)]	WDI, World Bank (2014)	1972 – 2012
Urbanization	lnUB	ln [(Urban Population)/ (Total Population)]	WDI, World Bank (2014)	1972 – 2012
Money Supply	lnM	ln [($M2/R.GDP$ = Monetary Asset as share of GDP)]	WDI, World Bank (2014)	1972 – 2012
Foreign Direct Investment	lnFDI	ln [(Foreign Direct Investment Inflows)/ (Real GDP)]	WDI, World Bank (2014)	1972 – 2012
Economic Development	lnHDI	ln [Human Development Index]	HDR (2009), UNDP	1972 – 2012

The relationship between trade deficit and fiscal deficit have been found in many studies such as Zaman and DaCosta (1990), Bachman (1992), Vamvoukas (1999), Aqeel and Nishat (2000), Lau and Haw (2003), Lau and Baharumshah (2004), Onafowora and Owoye (2006), Mukhtar, Zakaria and Ahmed (2007), Pantelidis *et al* (2009), and Jawaid and Raza (2013). Following the evidence of Ozturkler and Colak (2010), we would like to investigate the relationship between trade deficit and unemployment for Pakistan. Researchers like Aqeel and Nishat (2000), Onafowora and Owoye (2006), and Waliullah *et al.* (2010) have explored the relationship between trade deficit and money supply, and we intend to examine the relationship between trade deficit and money supply in case of Pakistan. Studies conducted by Mohammad (2010), Syed, Hasnat and Li (2011), and Aurangzeb and Haq (2012) support us to test the relationship between trade deficit and foreign direct investment for Pakistan. The relationship between economic growth and trade deficit is also tested for Pakistan by Aurangzeb and Haq (2012). In the present study we will use human development index to represent economic development and we intend to test its impact on trade deficit. We have not come across studies that explain the relationship between urbanization and trade deficit, but, Hassan, Wajid and Ahmet (2012) explored the impact of urbanization on trade openness for Pakistan, therefore, that study prompted us to consider urbanization as a factor which can determine trade deficit.

3.2. Estimation methods

The estimation procedure is divided into four parts: in the first part the problem of Unit Root will be examined by applying Ng-Perron (2001). In the second part the long term cointegrating relation between outcome and predictors of this study will be examined by using ARDL Bounds Testing[1] Approach. This same approach will facil-

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1   The results for ARDL Bounds Testing Approach have been obtained using the Demo Version of Mircofit 5.2 developed by Pesaran, Richard and Shin (2001). For more details on cointegration, please see Bannerjee, Dolado and Mestre (1998) or Engle and Granger (1987).

itate us to find out long run and short run coefficients of the predictors for outcome variable and in the final part the direction of causality for short run and long run will be scrutinized using VECM based causality test. The long run cointegration and long run coefficients will be estimated by using the following equation:

$$\Delta \ln TD_t = \alpha_{C_{10}} + \alpha_{11} \ln TD_{t-1} + \alpha_{12} \ln FD_{t-1} + \alpha_{13} \ln UN_{t-1} + \alpha_{14} \ln UB_{t-1}$$

$$+ \alpha_{15} \ln M_{t-1} + \alpha_{16} \ln FDI_{t-1} + \alpha_{17} \ln FDI_{t-1} + \beta_{11} \sum_{i=1}^{p} \Delta \ln TD_{t-i} + \beta_{12} \sum_{i=0}^{p} \Delta \ln FD_{t-i}$$

$$+ \beta_{13} \sum_{i=0}^{p} \Delta \ln UN_{t-i} + \beta_{14} \sum_{i=0}^{p} \Delta \ln UB_{t-i} + \beta_{15} \sum_{i=0}^{p} \Delta \ln M_{t-i} + \beta_{16} \sum_{i=0}^{p} \Delta \ln FDI_{t-i}$$

$$+ \beta_{17} \sum_{i=0}^{p} \Delta \ln HDI_{t-i} + \eta_{11}$$

The short run coefficients for the selected ARDL model will be estimated using the following equation:

$$\Delta \ln TD_t = \beta_{C_{10}} + \beta_{11} \sum_{i=1}^{p} \Delta \ln TD_{t-i} + \beta_{12} \sum_{i=0}^{p} \Delta \ln FD_{t-i} +$$

$$\beta_{13} \sum_{i=0}^{p} \Delta \ln UN_{t-i} + \beta_{14} \sum_{i=0}^{p} \Delta \ln UB_{t-i} + \beta_{15} \sum_{i=0}^{p} \Delta \ln M_{t-i} +$$

$$\beta_{16} \sum_{i=0}^{p} \Delta \ln FDI_{t-i} + \beta_{17} \sum_{i=0}^{p} \Delta \ln HDI_{t-i} + \psi_{11} ECM_{t-1} + \mu_{11}$$

Moreover, Cumulative Sum of Recursive Residuals (CUSUM) as well as Cumulative Sum of the Squares of Recursive Residuals (CUSUMsq) will be used in order to explore stability of the mean and variance of the error term of the selected ARDL model. After discussing the section of methodology, now we would like to present the estimated results and their discussion in the following section:

4. Results and interpretation

Table 2 reveals the fundamental information regarding the factors of the study. In the following table, the mean, median and standard deviation (among others) are reported. The J.B test was not significant and showed that all the factors taken into this study are normally distributed.

After the descriptive information, the problem of unit root has been addressed by applying the Ng-Perron (2001) unit root test. The results reported in Table 3 demonstrate that among all the variables only fiscal deficit has found to be stationary at the same level, while other variables have found to be stationary at first difference. Therefore, the dataset for this study has integrated order I(0) and I(1) or mixed order of integration. The literature on application of cointegration test has proposed that long term relationship between outcome and predictors can be examined by the Auto Regressive Distributed Lag (ARDL) model if data series are integrated at order I(0) and I(1).

Table 2: Descriptive statistics

	$\ln TD_t$	$\ln FD_t$	$\ln UB_t$	$\ln UN_t$	$\ln FDI_t$	$\ln HDI_t$	$\ln M_t$
Mean	-0.345107	-2.681915	344.6361	1.419921	0.000586	-9.739171	30.35993
Median	-0.260032	-2.790124	344.4257	1.335001	0.000258	-9.838460	30.12166
Maximum	0.287562	-1.126162	364.6201	2.156854	0.003643	-6.805691	48.77433
Minimum	-1.214745	-3.705248	324.6491	0.566228	2.44E-07	-13.09706	11.32993
Std. Dev.	0.430450	0.713870	11.22407	0.386482	0.000831	1.862924	11.11618
Skewness	-0.500117	0.488674	0.022888	0.151717	2.222113	-0.015661	0.020760
Kurtosis	2.046594	2.008387	2.004647	2.390346	7.573392	1.912078	1.805771
Jarque-Bera	3.261979	3.311611	1.696074	0.792240	69.47288	2.023617	2.439339
Probability	0.195736	0.190938	0.428255	0.672926	0.000000	0.363561	0.295328
Sum	-14.14940	-109.9585	14130.08	58.21678	0.024024	-399.3060	1244.757
Sum Sq. Dev.	7.411482	20.38441	5039.186	5.974730	2.76E-05	138.8194	4942.774
Observations	41	41	41	41	41	41	41

Std. = Standard; Sq. = Square, and Dev. = Deviation

Table 3: Unit root test

Ng-Perron Test Statistics									
Variable	**I (0)**				**Variable**	**I (1)**			
	MZ_a	MZ_t	MSB	MPT		MZ_a	MZ_t	MSB	MPT
$\ln TD_t$	-1.68878	-0.72442	0.42896	11.6012	$\Delta \ln TD_t$	-31.5138***	-3.95587	0.12553	0.81888
$\ln FD_t$	-18.6556***	-3.02172	0.16197	1.42978	$\Delta \ln FD_t$	-21.7022***	-3.28005	0.15114	1.17739
$\ln UB_t$	1.69168	1.51875	0.89777	64.9465	$\Delta \ln UB_t$	-7.31139*	-1.89697	0.25945	3.40529
$\ln UN_t$	-3.67021	-1.14572	0.31217	6.71918	$\Delta \ln UN_t$	-19.1433***	-3.05967	0.15983	1.40153
$\ln FDI_t$	-0.39809	-0.35130	0.88245	40.7522	$\Delta \ln FDI_t$	-7.09732*	-1.84147	0.25946	3.60186
$\ln HDI_t$	1.39698	1.40720	1.00731	75.9094	$\Delta \ln HDI_t$	-14.4573***	-2.66714	0.18448	1.77628
$\ln M_t$	0.41748	0.23132	0.55408	23.6233	$\Delta \ln M_t$	-9.64562**	-2.17415	0.22540	2.62522

*; **, and *** reveals significance level of test statistic at 10%, 5% and 1% respectively.

To find a long run relationship we have applied ARDL Bounds Testing Approach and the estimated results reported in Table 4 confirm the existence of long run relationships between trade deficit and its factors as F – statistic has found to be greater than the upper critical bound at 5% level of significance. The results of unit root test and cointegration are reported in Table 3 and Table 4.

The estimated results from Table 4 show that the calculated value of F test is 6.0633 which is greater than its corresponding critical value 4.1892 at 5% level of significance, therefore, this confirms the evidence of long run cointegration between trade deficit and its factors like fiscal deficit, unemployment, urbanization, foreign direct investment, economic development and money supply. The estimated probability values of the chi-square tests for all the diagnostics tests were not found to be significant which revealed that there are no serial correlation and heteroscedasticity problems in this study. Moreover, the error term of the selected ARDL model is

Table 4: ARDL bounds testing approach

Estimated Models		$TD_t = f(FD_t, UB_t, U_t, FDI_t, HDI_t, M_t)$	
Optimal lags		(1,0,0,0,0,1,1)	
F – statistics		6.0633**	
W – statistics		42.4432**	
	Critical Bounds for F – Statistics		Critical Bounds for W – Statistics
Significance Level	Lower Critical Bound	Upper Critical Bound	Lower Critical Bound	Upper Critical Bound
5 per cent	2.7985	4.1892	19.5892	29.3247
10 per cent	2.3499	3.5982	16.4495	25.1874
DIAGNOSTIC TESTS			
R^2	0.9515	Serial Correlation	0.3506 [0.554]
Adjusted - R^2	0.9369	Functional Form	0.0024 [0.961]
F – Statistics	65. 3742	Normality	0.9904 [0.637]
P – Value [F – Statistics]	[000]	Heteroscedasticity	0.0593 [0.808]
DW – Statistic	2.1353	Durbin H – Statistic	-0.5753 [0.565]

*,**, and *** demonstrates significance level at 10%, 5% and 1% respectively.
Also the values within [ ] represents Probability Values.

normally distributed and the functional form of the selected ARDL model is also correctly specified. Afterwards, the long run and short run coefficients of fiscal deficit along with other controls have also been estimated, and the results have been presented in Table 5.

Table 5: Long term and short term dynamics

Estimated Long Term Coefficients using the ARDL Approach		Error Correction Representation for the Selected ARDL Model	
Dependent Variable: LTD_t		Dependent Variable: $\ddot{A}LTD_t$	
Variables	Coefficient [P - Value]	Variables	Coefficient [P - Value]
$lnFD_t$	0.1792 [0.078]	$\Delta lnFD_t$	0.0896 [0.047]
$lnUB_t$	0.4250 [0.002]	$\Delta lnUB_t$	0.2125 [0.000]
$lnUN_t$	0.5145 [0.008]	$\Delta lnUN_t$	0.2573 [0.012]
$lnFDI_t$	-0.11862 [0.999]	$\Delta lnFDI_t$	-0.0593 [0.999]
$lnHDI_t$	-0.9016 [0.065]	$\Delta lnHDI_t$	-0.0778 [0.726]
lnM_t	-0.2469 [0.001]	ΔlnM_t	-0.0097 [0.802]
C	-148.6876 [0.003]	ECM_{t-1}	-0.5001 [0.000]
Diagnostics for ECM Model			
R-squared	0.6289	Mean Dependent Variable	0.0225
Adjusted R-squared	0.5175	S.D. Dependent Variable	0.1559
S.E. of Regression	0.1083	Akaike Information Criterion	27.9132
Sum Squared Residual	0.3518	Schwarz Bayesian Criterion	19.4688
Log Likelihood	37.9132	Durbin-Watson Stat	2.1353
F-statistic	7.2618	Prob. Value (F-statistic)	[0.000]

*, **, and *** reveals significance level of test statistic at 10%, 5% and 1% respectively.

The estimates for long term and short term coefficients reported in Table 5 demonstrate that fiscal deficit has a significant and positive impact on trade deficit in the long term and in the short term in Pakistan. This shows that fiscal deficit begets trade deficit in Pakistan, and hence it also validates the existence of Keynesian Proposition in case of Pakistan. This finding is consistent with Fleming (1962), Mundell (1963), Volcker (1987), Zaman and DaCosta (1990), Kearney and Monadjemi (1990), Smyth and Hsing (1995), Vamvoukas (1999), Aqeel and Nishat (2000), Lau and Haw (2003), Onafowora and Owoye (2006), Corsetti and Muller (2006), Mukhtar, Zakaria and Ahmed (2007), Kim and Roubini (2008), Muller (2008), Beetsma, Giuliodori and Klaassen (2008), Pantelidis *et al.* (2009), Bouhga-Hagbe *et al.* (2010), and Jawaid and Raza (2013).

Table 5 also shows that unemployment and urbanization are significantly increasing the size of trade deficit in both long term and short term. It has been generally observed that the purchasing power of the people declines as unemployment expands; consequently, aggregated demand declines, which reduces overall prices in the country and hence the profits of entrepreneurs. Therefore, decline in the profits of entrepreneurs will make them reduce investments and manufacturing, which diminishes exports and therefore increases the size of trade deficit in the country. Moreover, the increase in the urban population puts pressure on the aggregated demand in the country and induces imports to increase, also stimulating trade deficit in the country.

It is also evident that money supply and economic development are significantly curtailing trade deficit into long term, but the coefficients of money supply and economic development have found to be negative and not significant for short term. The transmission mechanism could be illustrated as that due to increase in money supply in the hands of investors expand, which further induces investments to expand, production activities will flourish and these will further stimulate exports. Hence, it will reduce the trade deficit in the country. The negative coefficient of economic development for trade deficit demonstrates that as economic development takes place it improves infrastructure, the quality of human capital, and the efficiency of the factors of production; as such, production expands due to a decline in the cost of production. The increase in production will ultimately improve the size of exports and hence it will shrink trade deficit in the country. The impact of foreign direct investment on trade deficit was also investigated and the coefficients were not found to be significant for both long term and short term. The coefficient for the first-period lagged term of error was negative and significant, which confirms the evidence of convergence hypothesis in Pakistan, this means that long run and stable equilibrium will be restored by following a 50 percent speed of adjustment and this long run equilibrium will be restored in about 1.9996 (1/0.5001 = 1.9996) years.

4.1. VECM causality test

After finding long term and short term dynamics, we are going to estimate VECM based causal relationship between trade deficit and its factors for both long term and short term (the results are reported in Table 6).

The estimates of the VECM based causality test reported in Table 6 have confirmed the existence of bidirectional causal relationship between fiscal deficit and trade

Table 6: Granger causality test

Dependent Variable	Short Run Causality							Long Run Causality
	$lnTD_t$	$lnFD_t$	$lnUN_t$	$lnUB_t$	lnM_t	$lnFDI_t$	$lnHDI_t$	ECM_{t-1}
$\Delta lnTD_t$	-	2.9328*	2.4733	1.1309	0.2960	0.5076	0.0766	-0.6585***
$\Delta lnFD_t$	3.8625**	-	1.7913	0.8963	0.2087	1.9094	2.7839*	-0.6014***
$\Delta lnUN_t$	3.2018*	1.1417	-	0.5291	1.5054	0.6165	6.9561***	-0.6845**
$\Delta lnUB_t$	0.5962	1.3642	0.4273	-	2.2975	0.2287	0.6660	-0.085784
ΔlnM_t	0.8793	0.4894	0.9885	2.2702	-	1.0157	0.9517	-0.6632***
$\Delta lnFDI_t$	2.0784	2.7897*	1.6307	0.1553	1.6341	-	1.5450	-0.2215**
$\Delta lnHDI_t$	0.7574	1.2601	3.4756**	1.8570	1.2557	0.5445	-	-0.7485**

*; **, and *** reveals significance level of test statistic at 10%, 5% and 1% respectively.

deficit in both short term and long term; thus, both deficits are interdependent in Pakistan. This finding is supported by Laney (1984), Darrat (1990), Evans (1993), Ibrahim and Kumah (1996), Lau and Baharumshah (2004), Mukhtar, Zakaria and Ahmed (2007), Baharumshah (2007), Jayaraman and Choong (2007), Lau, Abu Mansor and Puah (2010), and Mehrara and Zamanzadeh (2011). Moreover, this study has also found bidirectional causal relationship between unemployment and trade deficit in the long run, and unidirectional causality from trade deficit to unemployment in the short run. The findings further show that trade deficit has a bidirectional causal relationship with money supply, foreign direct investment and economic development in the long term. After discussing the estimates of the VECM based causality test, this study has also tested the structural stability of mean and variance of error term of the selected ARDL model and from the plots of CUSUM and CUSUM square we can conclude that both mean and variance of error term were found to be structural stable, therefore, there are no problems of structural break in this study for the selected period (1972 -2012).
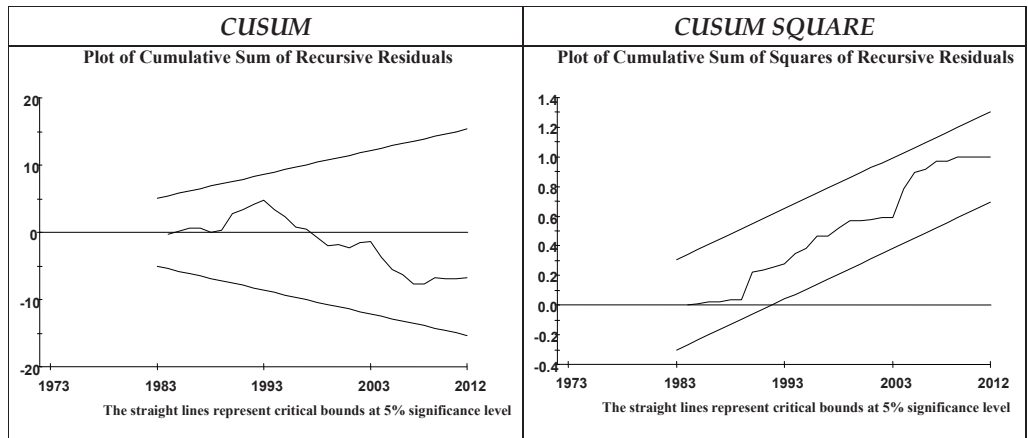

Figure 1: Stability test

5. Conclusion and policy implications

5.1. Conclusion

This article aims at exploring the relationship between trade deficit and fiscal deficit using unemployment, urbanization, money supply, foreign direct investment and economic development as control variables for Pakistan (from 1972 to 2012). The empirical results demonstrate that fiscal deficit, unemployment and urbanization have a significant and positive impact on trade deficit into both long term and short term. However, money supply and economic development have a negative and significant impact on trade deficit only into the long term. Summarizing this, the significant and positive impact of fiscal deficit on trade deficit confirms the evidence of Keynesian Proposition for Pakistan. The empirical results regarding the direction of causality have confirmed bidirectional causality between fiscal deficit and trade deficit in both short run and long run in Pakistan, meaning that both deficits generate each other.

We have also confirmed that unemployment and economic development have a bidirectional relationship to each other into both short and long term in the case of Pakistan. The empirical findings further reveal that in the short run there is unidirectional causality from trade deficit to unemployment, while bidirectional causality prevails in the long run between these factors. Factors like trade deficit, fiscal deficit, unemployment, money supply, foreign direct investment and economic development have found to have a bidirectional causal relationship with each other in the long run, with the exception of urbanization. Unidirectional causality runs from urbanization to other factors like trade deficit, fiscal deficit, unemployment, money supply, foreign direct investment and economic development in the long run. The stability of both CUSUM and CUSUM square plots has confirmed the absence of structural break. In the end, based on the findings, this study confirmed the Keynesian Proposition and twin deficit in Pakistan for the selected sample (from 1972 to 2012).

5.2. Policy implications

The findings show that Pakistan is suffering from twin deficit, meaning that fiscal deficit begets trade deficit and trade deficit begets fiscal deficit. Attaining simultaneous equilibrium into both public and trade finances is a highly difficult job; however, government could use a mix policy tool to deal with this issue.

Firstly, government could curtail its non-development expenditures and should increase the volume of subsided inputs in the market. This attempt will curtail the cost of production but it will enhance domestic production, domestic employment and earnings of both the private sphere and government simultaneously. Moreover, increases in domestic production will also encourage the volume of exports and therefore, on the one side fiscal deficit will come down because of an increase in government income and on the other side trade deficit would be reduced due to an increase in the volume of exports.

Secondly, the government may also encourage an import substitution industry, so that domestic buyers will purchase import substitutes rather than imports. In this

way, the volume of imports will shrink and will decrease trade deficit. The increase in import substitutes in the home country will increase home production, employment and earnings; therefore, it will also encourage home government earnings. A reduction in the volume of imports will deteriorate trade deficit and an increase in government revenues will squeeze fiscal deficit in the country.

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