ARE TWIN DEFICITS REALLY TWINS?

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Abstract

The currents study objects to ascertain the twin deficit hypothesis in case of Pakistan from the period of 1989-2020 covering 32 years. Annual secondary data has been employed for the analysis. To evaluate the current twin deficit phenomenon two equations has been used. To check the long run co=integration Engel Granger Causality test has been employed. To check the stationarity of the variable Augmented Dickey Fuller test is used, and stationarity has been checked for each variable. The study result confirms the Recardian View of no causality found between the two deficits, hence changing the fiscal deficit will not cause any change in the trade deficit. Future researchers are encouraged to use a multivariate model and work on the coming period to confirm the results of the current study.

Keywords: Fiscal Deficit, Trade Deficit, Twin Deficit, Recardian View

INTRODUCTION

The concept of twin deficit phenomenon was pioneered by Fleming (1967) concluding a positive link between the two deficits. Keynesian approach has been employed saying the fiscal deficit cause trade deficit, while some other studies confirm the Recardian view indicating that there is no causality found in the fiscal and trade deficit (Mugo, 2022). Although we know that while countering the trade deficit contractionary fiscal policy uses which cause fiscal surplus as government reduces the expenditures.

Twin deficit hypothesis have always been the interest of the researchers. Several researchers have confirmed the presence of relationship between fiscal and trade deficit (Dey and Tareque, 2022). The research findings of Banday and Aneja (2019) concludes that the causality is from fiscal deficit to trade deficit. Whereas in case of Tufail et al. (2014) two way relationship between the two deficit is found. In other studies that re conducted for India Basu and Datta, (2005), kundu and Goyal (2020) no causality found in the two deficits hence confirming the Recardian View.

In the past few years, economy of Pakistan is suffering from different types of problems although economy performed well in covid-19 duration, due to expansionary and loose policies; and in this time duration, trade deficit was at low, on the other hand in 2018 Pakistan were facing the largest trade deficit of $ 20 billion (George, 2023). Researchers in this study find that the twin deficits are not twins. Some economies like India which are fast growing are having this twin deficit which we think is caused by the huge size of the economy with multidirectional economic policies. The current study has been done taking the secondary data from the period of 1989-2020. The model consists of two equations to check the two-way relationship between the twin deficits. The research aims to check the twin deficit phenomenon. The findings of the result show that there is no long run co-integration found in the two deficits in the case of Pakistan for the current study period. Policy makers and economists use tighten fiscal policies to cure the trade deficit, contractionary fiscal policy decreases the aggregate demand which reduces the imports and clears the gap between exports and imports (Erceg et al., 2023). The study is divided into 5 parts. First section include introduction, proceeding with literature review, in the next section

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methodology of the study is discussed, in the next section results are reported and in the final section conclusion and recommendation are given. Several studies have been conducted to find out the causal link between the trade deficit and budget deficit for different countries all over the world. Twin deficit phenomenon has been an interest of researchers from 1960s (Dey and Tareque, 2022). The researcher of the underlying study has inquired into the literature on twin deficit phenomenon which is being described in this section.

Looking at the previous literature there is a theory explaining the twin deficit relationship. Traditional Keynesian approach explain that the unidirectional causality is found in the relationship from fiscal to trade deficit (Banday and Aneja, 2019). Whereas Recardian View is that the twin deficit phenomenon does not exist. The fiscal deficit do not cause trade deficit (Awan et al., 2020). Latif-Zaman and DaCosta (1990) analyzed the relationship between trade deficit and budget deficit, using quarterly data from 1971 to 1989 for the United States. Bi-variate granger causality approach was applied to find out the existence of the relationship between budget deficit and trade deficit. The researcher found the existence of the relationship and concludes that high trade deficit is caused by high budget deficit.

Basu and Datta, (2005) commence a research to find out the impact of fiscal deficit on trade deficit for Indian economy, after the analysis determine that for Indian economy no association is found in the twin deficit hence, accepting Recardian view.

Kundu and Goyal (2020) undertakes a study to find the relationship holding by two deficits. This study was conducted for Indian economy from the period of 1990 to 2018. Variance decomposition has been employed to check the cointegration between the two, the conclusion support Recardian view of no causality (Dogan and Saykal, 2022). The results show that for Indian economy no co-integration was found. Altintas and Taban, (2011) worked in Turkey for taking annual secondary data starting from 1974-2010 to check the phenomenon of twin deficit. The study confirms the log run relationship between trade deficit and budget deficit by using ARDL approach. Granger causality was used to test the directional and concluded that causality is uni-directional therefore from investment of fiscal deficit and form trade deficit to investment. Tufail et al. (2014) look into the trade deficit-fiscal deficit linkage and worked on secondary data from the period 1972-2011 of Pakistan. Johanson Co-integration was employed to determine the relationship and concluded that the relationship between the two deficits i.e., trade and budget deficit is bi-directional in Pakistan. Shastri et al. (2017) conducted a panel study. Twin deficit hypothesis was check for eight economies for the period from 1985-2014. The researchers used four variables, named fiscal deficit, exchange rate, interest rate and current account balance. The results show that there is a long run co-integration between all the variables.

Rehman, (2020) look over the association between macroeconomic constructs and the twin deficit taking data from the period of 1992-2018 of Pakistan. Johanson co-integration technique was employed, to get the understanding of the relationship. Results of the study indicate the positive link between the two deficits. Awan et al.(2020) used a simultaneous model to find out the twin deficit relationship. Used two directional model having two equations to check whether the phenomenon is bidirectional or not. 3SLS estimation technique has been used. The results of the research strongly support that fiscal and trade deficit have a two directional relationship in Pakistan. Afonso and Coelho (2021) explored the relationship of trade deficit and budget deficit in Portugal. They concluded with the knowledge that the relationship between the two is bi-directional. Abbasi et al. (2021) shed a light on twin deficit hypothesis for Turkey and Iran. The researchers aim to find out both short run and long run relationship. The variables of the study were GDP, interest rate, foreign direct investment and money supply. ARDL testing

approach the study concludes that no co-integration found in Turkey, whereas in Iran twin deficit existence is conformed.

Looking at the past literature the relationship has been the focus of the researchers, and result has indicated different conclusions depending on the economic condition of the country. Thus, this research is being done to find out more about the subject matter to get insight on the twin deficit in Pakistan and reevaluation of the previous studies on twin deficit link.

METHODOLOGY

The research aims at finding the relationship between twin deficits using the secondary data of Pakistan. Two find out the relationship between fiscal deficit and the trade deficit two equation models has been employed. Data is taken for the period of 1989-2020.

Model Specification

The following study has the below given two structural equations t get knowledge of twin deficit behavior in Pakistan.

Trade deficit equation

$$TD/GDP = \alpha + \beta 1 FD/GDP + \varepsilon \quad (1)$$

Budget deficit equation

$$BD/GDP = \alpha + \beta 1 TD + \varepsilon \quad (2)$$

Where:

TD/GDP= Trade deficit as a percentage of GDP

FD/GDP= Fiscal deficit as a percentage of GDP.

ε = error term

In equation 1 trade deficit is a dependent variable given on left side, white at the right side fiscal deficit acts as an independent variable. In equation 2 left side variables therefore fiscal deficit is the dependent variables and trade deficit is the independent variable here. The two equations have an intercept α while slope coefficients are shown by β. Intercept is a takeoff point while slope give the extent of relationship.

Variables of the Study

For Equation 1

Dependant Variable: Trade Deficit

Independent Variables: Fiscal deficit

For Equation 2

Dependant Variable: Fiscal Deficit

Independent Variables: Trade deficit

Trade Deficit

Trade deficit in a country occurs when imports of the country are more than its exports.

Fiscal Deficit

Fiscal deficit occurs when government expenditure exceeds government revenues.

Research Strategy

The researcher of the study aims to find out the existence and direction of twin deficits in case of Pakistan for the period of 1989-2020. To check the causal effect, regression analysis was done. Regression techniques minimize error and give information about the long and short run co-integration among the variables. The researcher has used time series data, and time series data tends to be non-stationary having a trend. Non-stationary data creates meaningless regression results for this reason Augmented Dicky Fuller (ADF) test was used to check the stationarity of the data. ADF test was used on both the variables, therefore on fiscal and trade deficit. Since, Engel Granger test is used to check the relationship between two variables. So long run co-integration is checked by Augmented Dicky Fuller and Engel Granger Causality test.

Measures

Data of fiscal deficit and trade deficit has been taken from Pakistan Economic Survey. The data is taken as fiscal deficit as a percentage of GDP and Trade Deficit as a percentage of GDP for Pakistan from the period of 1989-2020.

Hypotheses

The researcher has used simultaneous equation model to find out the direction of the relationship, the hypotheses of this research are given below:

H1= Trade deficit effects fiscal deficit.

H2= Fiscal deficit effects trade deficit.

RESULTS

Augmented Dickey Fuller Test

Table 1

Stationarity check of Fiscal Deficit at level

Null Hypothesis: FD has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.278539	0.4325
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

Table 2
Stationarity check of Trade Deficit at level

Null Hypothesis: TD has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.246336	0.4490
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

Null hypothesis: The data series is non-stationary
Alternate Hypothesis: The data series is stationary

Augmented Dickey Fuller test is employed to check stationarity of the variables. ADF test is applied on both the variables of our model and after looking at the output given in table 4.1 the probability is 0.432 so we cannot reject null hypothesis and conclude that our data series of fiscal deficit is non-stationary. Table 2 infers the probability of 0.449 so we cannot reject null hypothesis and conclude that our data series of trade deficit is non-stationary at level at 0 lag.

Table 3
Stationarity check of Trade Deficit at 1ST Difference

Null Hypothesis: D(TD) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.625660	0.0046
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

Table 4
Stationarity check of Fiscal Deficit at 1ST Difference

Null Hypothesis: D(FD) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.669552	0.0000
Test critical values:	1% level	-4.296729	

5% level	-3.568379
10% level	-3.218382

ADF test is applied on both the variables again at 1st difference and 0 lag the inferences says table 4.3 the probability is 0.004 so we reject null hypothesis and conclude that our data series of trade deficit is stationary at 1st difference. Table 4.4 infers the probability of 0.000 so we reject null hypothesis and conclude that our data series of fiscal deficit is stationary at 1st difference at 0 lag.

Engel-Granger Causality test

Equation (1)

Table 5

OLS Regression

Dependent Variable: TD
Method: Least Squares
Date: 01/09/22 Time: 18:55
Sample: 1989 2020
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.892320	1.536956	0.580577	0.5659
FD	0.758693	0.243722	3.112938	0.0040
R-squared	0.244149	Mean dependent var		5.503750
Adjusted R-squared	0.218954	S.D. dependent var		2.621686
S.E. of regression	2.316962	Akaike info criterion		4.578852
Sum squared resid	161.0493	Schwarz criterion		4.670460
Log likelihood	-71.26163	Hannan-Quinn criter.		4.609218
F-statistic	9.690385	Durbin-Watson stat		0.426193
Prob(F-statistic)	0.004049			

Looking at the above regression results, following inferences are drawn. When Fiscal deficit is 0, trade deficit will be 0.892. One unit increase in the level of fiscal deficit as a percentage of GDP will bring 0.758 unit increase in trade deficit as a percentage of GDP, Keeping all other variables constant. The stats show the R^2 that is the coefficient of determination is 0.244 that is 24.4% showing 24.4% change in trade deficit is explained by our model. For the significance of overall model, F-value is highly significant showing that model is statistically fit.

Table 6

Augmented Dickey Fuller Test

Null Hypothesis: ERR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.427942	0.3591
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

Probability is 0.359 hence show that ERR is non-stationary concluding that no long run co-integration is found in trade deficit and fiscal deficit.

Table 7
Error Correction Mechanism

Dependent Variable: D(TD)
Method: Least Squares
Date: 01/09/22 Time: 19:12
Sample (adjusted): 1990 2020
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.007944	0.260746	0.030467	0.9759
D(FD)	0.545368	0.202974	2.686893	0.0120
ERR(-1)	-0.160896	0.124707	-1.290191	0.2075
R-squared	0.206275	Mean dependent var		0.020323
Adjusted R-squared	0.149581	S.D. dependent var		1.574034
S.E. of regression	1.451545	Akaike info criterion		3.674900
Sum squared resid	58.99556	Schwarz criterion		3.813673
Log likelihood	-53.96096	Hannan-Quinn criter.		3.720137
F-statistic	3.638361	Durbin-Watson stat		1.555867
Prob(F-statistic)	0.039389			

The stats show that the lag of error is insignificant hence conclude that no long run relationship is found in between trade and fiscal deficit.

Engel-Granger Causality test
Equation (2)

Table 8
OLS Regression

Dependent Variable: FD
Method: Least Squares
Date: 01/09/22 Time: 19:17
Sample: 1989 2020
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.307003	0.628383	6.854100	0.0000
TD	0.321803	0.103376	3.112938	0.0040

R-squared	0.244149	Mean dependent var	6.078125
Adjusted R-squared	0.218954	S.D. dependent var	1.707429
S.E. of regression	1.508970	Akaike info criterion	3.721194
Sum squared resid	68.30976	Schwarz criterion	3.812802
Log likelihood	-57.53910	Hannan-Quinn criter.	3.751559
F-statistic	9.690385	Durbin-Watson stat	0.750158
Prob(F-statistic)	0.004049		

Looking at the above regression results, following inferences are drawn. When trade deficit is 0, fiscal deficit will be 4.307. One unit increase in the level of trade deficit as a percentage of GDP will bring 0.321 unit increase in fiscal deficit as a percentage of GDP, Keeping all other variables constant. The stats show the R^2 that is the coefficient of determination is 0.244 that is 24.4% showing 24.4% change in fiscal deficit is explained by our model. For the significance of overall model, F-value is highly significant showing that model is statistically fit

Table 9

Augmented Dickey Fuller Test

Null Hypothesis: ERR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.459564	0.3443
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

Probability is 0.3443 hence show that ERR is non-stationary concluding that no long run co-integration is found in fiscal deficit and trade deficit.

Table 10

Error Correction Mechanism

Dependent Variable: D(FD)
Method: Least Squares
Date: 01/09/22 Time: 19:35
Sample (adjusted): 1990 2020
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-0.002920	0.216255	-0.013503	0.9893
D(TD)	0.178744	0.154976	1.153369	0.2585
ERR(-1)	-0.444744	0.164573	-2.702412	0.0116

R-squared	0.333046	Mean dependent var	0.022581
Adjusted R-squared	0.285406	S.D. dependent var	1.423542
S.E. of regression	1.203373	Akaike info criterion	3.299899
Sum squared resid	40.54696	Schwarz criterion	3.438672
Log likelihood	-48.14843	Hannan-Quinn criter.	3.345136
F-statistic	6.990939	Durbin-Watson stat	2.036118
Prob(F-statistic)	0.003446		

The stats show that the lag of error is significant hence conclude that long run relationship is found from fiscal deficit to trade deficit.

Model Specification Test

Table 11
Ramsey RESET Test

Ramsey RESET Test
Equation: UNTITLED
Specification: FD C TD
Omitted Variables: Powers of fitted values from 2 to 3

	Value	Df	Probability
F-statistic	0.954609	(2, 28)	0.3971
Likelihood ratio	2.110792	2	0.3481

Null Hypothesis: Model is not mis-specified
Alternate hypothesis: Model is mis-specified

F-stats probability is 0.3971 so the null hypothesis is accepted and concludes that model is not mis-specified.

CONCLUSION

This study empirically identifies the relationship between trade deficit and budget deficit. The data was taken from the period of 1989 to 2020 for Pakistan. The study has a greater significance as the research has use two equations to know the causality of twin deficit in the Pakistani economy. Engel-Granger causality test has been employed for the relationship and all the effect has been reported. The research findings conclude that the trade deficit and the budget deficit do not have a long run co-integration during the time period of the research.

Results of equation 1 shows that there is no co-integration in trade and fiscal deficit and similar results are shown in equation 2. Two-way relationship was not confirmed from our model. Thus the researcher concludes that any variation in one deficit will not cause the other. So we accept Recardian

View of no causality found in the two deficits. Current study has studied the relationship using only two variables and the direct effect has been checked. This could create biasness in the results; future researchers are encouraged to take multivariate model into consideration to evaluate a two-way relationship of twin deficit phenomenon. Also in the coming period, future researchers are encouraged to check the presence of absence of co-integration in the two deficits to confirm this study results.

In the case of Pakistan policy makers should focus on expansionary fiscal policy for better economic growth although it will increase the aggregate demand which increases the import bill but in long run domestic market will be able to fulfill the demand as it stays longer. To counter the trade deficit in short-run government can impose tariffs.

REFERENCES

Abbasi, M. A., Amran, A., Rrehman, N. A., Ali A., & others. (2021). Twin Deficit and Macroeconomic Indicators in Emerging Economies: A Comparative Study of Iran and Turkey. *The Journal of Asian Finance, Economics and Business*, *8*(5), 617–626.

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.

Awan, A., Nasim, I., & Raza, K. (2020). Examining Twin Deficit Hypothesis Using Simultaneous Model in Pakistan. *Pakistan Journal of Social Sciences (PJSS)*, *40*(4),121-133.

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

Basu, S., & Datta, D. (2005). Does fiscal deficit influence trade deficit?: An econometric enquiry. *Economic and Political Weekly*, 3311–3318.

Dey, S. R., & Tareque, M. (2022). Twin deficits hypothesis in Bangladesh: an empirical investigation. *International Journal of Emerging Markets*, *17*(9), 2350-2379.

Dogan, B., & Saykal, B. (2022). Relationship between the Twin Deficit Hypothesis and the Inflation: Case of Turkey (2010-2019). *International Journal of Business and Social Science Research*, *3*(3), 8-25.

Erceg, C., Prestipino, A., & Raffo, A. (2023). Trade policies and fiscal devaluations. *American Economic Journal: Macroeconomics*, *15*(4), 104-140.

George, A. S. (2023). Causes and Consequences of Pakistan's Economic Crisis. *Partners Universal International Innovation Journal*, *1*(5), 1-20.

Kundu, A. M. I. T., & Goyal, A. K. (2020). Twin deficit or twin divergence in India: An econometric enquiry. *Finance India*, *34*(2), 527-540.

Latif-Zaman, N., & DaCosta, M. N. (1990). The budget deficit and the trade deficit: insights into this relationship. *Eastern Economic Journal*, *16*(4), 349–354

Mugo, P. M. (2022). *Effects of Budget and External Deficits on Economic Growth Evidence From Kenya* (Doctoral dissertation, University of Nairobi).

Rehman, N. S. A. (2020). Correlation of Macroeconomic Variables with Twin Deficit in Pakistan. *IBT Journal of Business Studies (IBTJBS)*, *16*(1),333-341.

Shastri, S., Giri, A. K., & Mohapatra, G. (2017). An empirical investigation of the twin deficit hypothesis: Panel evidence from selected Asian economies. *Journal of Economic Research*, *22*, 1–22.

Tufail, M. K., Anwar, S., Raza, S. H., & Abbas, K. (2014). Effect of budget deficit on trade deficit in Pakistan (a time series analysis). *Journal of Finance and Economics*, *2*(5), 145–148.