

The Nexus Among Trade Volume, Trade Deficit and Real Exchange Rate: An Empirical Evidence from Pakistan

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Abstract

The study estimates the causal nexus among trade volume, trade deficit and real exchange rate in Pakistan by using a time series data from 1985 – 2017. Certain Econometric techniques have also been applied i.e. Unit Root Test has employed to stationeries the data of the selected variables which leads to avoid the Autocorrelation problem in the model. The study uses Johnson Co-integration for long run cointegration. The results confirmed that all the chosen variables are co-integrated in long run. The ordinary least square is employed to examined long run relationship between the variables of interest. The result shows that there is strong robust significant relationship among trade, trade deficit and real exchange rate. Beside the main variable the control variables of infrastructure, Foreign Direct Investment inflow impact significantly on dependent variables which strengthen the causal relationship among the selected variables. It is suggested that the Government should enhance the quality and quantity of infrastructure facility which will leads to favorable balance of trade in Pakistan. It is also suggested that whenever the policy makers providing the policy of trade, especially exports, then adverse effect of Exchange Rate Depreciation is to be quantified and necessary measures be suggested so as to reduce the repercussion.

Keywords: Trade, Trade Deficit, Exchange Rate, Co-integration, Pakistan.

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1- Introduction

Literature shows that International trade plays a key role to address the economic phenomena and can help to earn foreign exchange. The relationship between trade and exchange rate are always remained a debating topic for economists. Classical as well as modern economists are of the view that when export of the country increases that's earns foreign currency as well as decrease the trade deficit. Imports and exports are the two sides of the same coin of international trade. If imports are greater than that of exports, the economy may face deficit financing, deficit balance of payment and trade, which can adversely affect the growth rate of the economy (Idrisov, G. et al. 2016) and (Julie 1994).

Economic theory suggests that there is a long run relationship between exchange rate and trade flows. Exchange rates reflect the evolution of relative prices across countries. Appreciation of a domestic currency makes foreign goods relatively cheaper which leads to an increase in imports in the long run and vice versa (Yaya, E. M. and Lu, X. 2013). Measures engaged by the Economic Monitoring Committee (EMC) and State Bank of Pakistan have acutely failed to decrease import volume of the country. For example, reserves of Pakistan quickly draining government is hard to manage the balance of trade payment that 's why foreign currency against the domestic currency is make stronger which leads to imports of goods and services becoming costlier as compared to exports and cause for devaluing of the home currency and a balance of payments deficit (Atique and Ahmad 2003).

Most of the earlier studies investigated this long-run adjustment between performance of trade and real exchange rates. For example, Bahmani Oskooee (1991) concluded the long-run relationship between exchange rate and trade balance (BOT) in less developed countries (LDCs). He found that exchange rates and BOT are co integrated and he recommended that depreciation in a currency improves the balance of trade of LDCs in the long run, consistent with the economic theory. He also concluded that there is a uni-directional relationship such that exchange rate that influence the position of the trade balance and not the other way around. In recent times, Bahmani-Oskooee (2010) observed a similar association in Middle Eastern countries and supported his previous findings. Moreover, Garcia Herrero and Koivu (2009) found the relationship between the effective exchange rate and trade balance in China. They concluded that trade balance is responsive to the changes in real exchange rate. However, Koivu and reported Garcia-Herrero no strict tests indicating nexus between these variables. Brada et al. (1993) have also suggested the long run association between trade and exchange rate. They examined that real exchange rate influence the level of trade volume but this impact is observed only after one year and recommended that the exchange rate an effective indirect instrument for regulating trade. Auboin, M. and Ruta, M. (2011) found That long-term real exchange rate has a significant negative effect on trade, if exchange rates were to increases by 1 standard deviation in th sample, trade would fall by 7%. Dell'Ariccia (1998) also argued a negative relationship between trade and, exchange rates and that trade would rise up by 3 % to 13 % if this variability were brought downward to 0.

Ismail W. N. and Mahyideen M., J. (2015) argued that infrastructure (i.e. energy, Broad Band and road etc.) also plays an important role in encourage trade and decreasing trade deficit. It seeks to identify the role of infrastructure in decreasing trade costs, thus increasing the trade volume and value of domestic currency, because

of positive relationship between exports and exchange rate. The same view was also given by numerous researchers like, Fujimura & Edmonds (2006), Rojas, et al. (2005) and Yean, et al. (2007).

previous studies have been done on causal relationship between trade and exchange rate by the different researchers like, (Mohammad 2010), (Kumar and Dhawan 1991) and Auboin, M. and Ruta, M. (2011) etc. but trade deficit and infrastructure is hardly considered by the researchers. Constructuation of variables in available literature such as land line and mobile connectivity do not reflect the reality and nature of infrastructure required for trade promotion. Therefore, in this study we constructed a global index for infrastructure on transport, communication, energy and financial (Donaubauer, et al., 2015) to better understand the role of physical infrastructure in external sector and overall development of Pakistan. This paper will try to explore the causal relationship among trade, trade deficit and exchange rate.

Time series data is analysed over period 1983–2014. The present study will use Augmented-Dickey-Fuller (Dickey and Fuller 1979) and Phillips-perron tests to find out the order of integration of the selected variables. We employ Johansen cintegration test (Johansen and Juselius 1990) to examines the long- run tri-causality among the trade, trade deficit and real exchange rate in Pakistan. This is well-known technique when variables are integrated by same order. We use fully modified ordinary least square (OLS) because it provides us efficient consistent and avoid autocorrelation problem.

Rest of the paper is organized is follows. The II-section shows the Trend of Trade trade deficit and exchange rate. The III-section show literature review about the study. Section-IV presents explanation of the Research Methodology and Data Collection also detail about Econometric Techniques used in the study has been elaborated. The IV-section contains Results and Discussions. Conclusions and Recommendations of the study are accommodated in the IV- section.

II- Trend of Trade Volume, Exchange Rate and Trade Deficit in Pakistan:

Pakistan has bilateral and multilateral trade agreements with enormous nations and international organizations. It is a member of the World Trade Organization (WTO), part of the China-Pakistan Free Trade Agreement and the South Asian Free Trade Area agreement. Irregular domestic political uncertainty, world demand for its exports, and the influence of occasional droughts on its production of agricultural have all contributed to inconsistency in Pakistan's trade deficit. The trade deficit for the fiscal year 2016-17 is \$32 million, exports are \$20,422 million in July-November, 2013 and imports are \$52,910 million. Exports of Pakistan continue to be dominated by apparel and cotton textiles. Imports include edible oil, petroleum, petroleum products, fertilizer, chemicals, industrial raw materials, capital goods and consumer products. Moreover, downgrading of the home currency has great effect to trade balance and but the impact may vary, probably due to different level of economic development. One of the important impacts is the Marshall-Lerner condition, which shows that real depreciation leads to favorable trade volume and trade balance i.e. export and imports. There is causality between exchange rate and trade, when trade of the country rises up the exchange rate will also boost up. On the other side when exchange rate of the economy goes up its exports decline. Take the example of Pakistan, in 1951 – 52 Pakistan earned foreign exchange through export of raw jute and secondly in the fiscal year 1972 – 73 when the Zia Bhutto came in power, he imposed high tariff on import of luxury goods and devalued the Pakistan rupee to give the export bonus for local exporter. (Economy of Pakistan 2001- 2002) and (Mohammad 2010). Lets us see the trends during 1985 – 2016 in Exports, imports, trade deficit and exchange rate in Pakistan economy from below table- 1.



Source: State Bank of Pakistan

Examining the exports and imports (see figure 1) performance for the floating period of 1985 to 2016, it is evident that an import rises at a faster rate than the exports of the country. In 1985, a decrease of 10.28% had occurred in the exports of Pakistan against the imports which showed an rise up of 11.09%. After that both the sectors showed a mixed picture for a period of ten years. During 1992, although the exports showed an improvement of 24.19%, yet this growth was smaller than the imports of the country which kept 34.35% growth rate (Malik, et al. 2015). See the table 1 and also figure 1, in 2002, both the exports and imports showed an abrupt and sharp deceleration. However, the exports growth rate only being 4.06%, was larger than the imports growth rate of 1.22%. After that both the exports and imports sectors showed improvements. However, the import sector showed a faster growth than the exports which showed a slowdown. In 2008, the exports growth was only 16.26% as compared to the 35.66% rise in imports of the country. Another reason for that Pakistan exports are mainly consisted of agricultural goods such as Cotton, Textiles, Leather, rice and Sports Goods etc. On the other hand, its imports mostly consist of Machinery, Chemicals, Petroleum Products, Transport equipment's, Steel and Oil etc. Analyzing the percentages of the major exports and imports of Pakistan during the period 1999-2008, it is evident that Pakistan's exports were consisted of 59.1% Cotton, 5.1% Textiles, 6.9% Leather, 6.9% Rice and 3.3% Sports Goods in 1999. However, in 2008 after a period of 10 years, the structure of exports remained the same i.e. 51.9% of Cotton, 2.1% Textiles, 5.8% Leather, 9.8% Rice and 1.6% Sports Goods. Whereas, for the same period, the imports of Pakistan were consisted of 17.9% Machinery, 16.6% Chemicals, 15.5% Petroleum products, 5.7% Transport equipment's, 3.1% Iron & steel, 8.7% Oil, 2.8% Fertilizer and 2.4% Tea. And like the exports, the imports structure of Pakistan remained the same i.e. 18.5% Machinery, 12.3% Chemicals, 28.8 % Petroleum products, 5.5% Transport equipment's, 3.3% Iron & steel, 4.3% Oil, 2.2% Fertilizer and 0.5% Tea during 2008. After 2008 exchange rate of Pakistan with US dollar is decreased day by day, exports decreased and imports increased which led a huge impact on trade deficit. See graph 1, there is so much trade deficit from 2010 to 2016 and exchange rate are very low reached to 104.76, (Government of Pakistan 2015).

Pakistan follows the flexible exchange rate system since 1982. At the initial stage the fluctuation of exchange rate is very nominal. However, exports evolved largely in line with world total imports. The imports of Pakistan were stable during the last 24 years, ranging between a minimum of 0.12 % in 1980 and a highest of 0.18 % in 1992. In 2002/2003 the share was 0.17 percent, see figure 1. This suggests that Pakistan's exports performance was based on the volatility of exchange rate. According to Kumar and Dhawan (1991) estimated the exchange rate volatility on Pakistan exports to the developed world from 1974 – 1985. They concluded that volatility of exchange rate adversely affects on export demand. They also examined the third country effect and suggested that Japan and West Germany act as the alternate market for Pakistan's export to the United States and United Kingdom.

III- Literature Review:

Cushman (1986) examined the third country effect and concluded that the recognition of third world countries in the analytical framework implies that the effect of exchange rate variability on trade flows not only depend upon the exchange rate risk experienced by the country under consideration but also depend upon the correlation of the exchange rate fluctuations by other countries. Akhter and Hilton (1984) popularized the trade between US and West Germany. They found that the real exchange rate has a significant negative impact on the exports and imports of two countries. Chowdhury (1993) investigated the impact of exchange rate on the trade flows of the G-7 countries in context of a multivariate error-correction model. They found that the real exchange rate has a significant negative impact on the volume of exports in each of the G-7 countries. Baak, Mahmood, and Vixathep (2002) investigated the impact of exchange rate on exports in four East Asians countries (Hong Kong, South Korea, Singapore, and Thailand). Their results indicated that exchange rate volatility has negative impacts on exports in both the short run and long run periods.

In Pakistani context the study of Mustafa and Nishat (2004) presented the correlation between exchange rate and trade and the study finds that exchange rate has a negative impact on trade. Study of Grauwe (1998) revealed that there is a negative relationship between exchange rate variability and trade. Akhtar and Hilton (1984) found inverse relationship between exchange rate variability and trade. Ahmad (2000) argued that when there is a decline in the exchange rate eventually the prices of all the exportable as well as importable commodities decrease. Rose (2000) also found that there is negative relationship between trade and exchange rate. Mohammad (2010) examined the short and long run variables of trade deficit in Pakistan. Annual data for the period of 1975 to 2008 is used. For long run Johansen co integration technique is adopted, while VECM is used for short run analysis. Foreign income, domestic consumption, real effective exchange rate and foreign direct investment are the variables tested. The results showed that all the variables have a significant effect on the trade deficit in Pakistan.

Majeed and Ahmed (2006) the determinants of exports, by using panel data during 1970 – 2004 over 75 under developed countries. The exports equation was specified with GDP, FDI real effective exchange rate and labor force are exogenous variables. They use econometric technique i.e. the random effect model. All the factors carry significant magnitudes with accurate sign except FDI which is insignificant although the sign was correct. Shirazi and Lutkepohl (1982) investigated the association between foreign trade and GDP of Pakistan's economy. They

found that on the long term exports where as they neglected the short term export policy. However, it is worth to mention that short run patterns may play a more positive role to create relationship among exports, imports, and economic growth. Hasan and Khan (1994) popularized the relationship between Pakistan exports and the determinants of the exports growth rate. The results presented that the external factors affecting the demand of exports and the internal factors affect the supply of Pakistan's exports. There is a positive relationship between exports demand of Pakistan and negative relationship between exports price variables, and there is a positive relation between nominal exchange rate and exports demand in both cases. Yousif (1999) investigated the association between GDP and exports of the Malaysian Economy. In this study all other variables such as labor force, capital, and exchange rate are allowed to apply their influence on exports and economic growth. Exports led growth show good performance in the short run instead of long run, and it is obvious that, economic growth is mostly depending on the exports performance of the country. Kanayake (1999) examines economic and export growth of eight Asian Emergent countries by using co-integration and error models. He found, the causality between economic and export growth is bi-directional in seven out of eight (7/8) countries. Through this investigation, the Granger Causality running in short run for economic growth to exports are same for all selected countries except Sri Lanka, but in the long run there was strong confirmation of Granger causality running from exports to economic growth is for all countries. This study also highlights that the Granger Causality running between economic growth and exports are the same for other selected countries except Indonesia and Sri Lanka in short run. While (Arratibel and Zdzienicka, 2011) demonstrated that there is negative and significant impact of the volatility of exchange rates on FDI in member countries of the European Union to Central & Eastern Europe. As Mohanan (2007) examined that there is a direct relationship between exchange rate uncertainty and FDI in the US. As (Gottschalk and Hall, 2008) concluded that the uncertainty of exchange rates in Japan is directly related to foreign direct investment (FDI) in the South Asia countries. While (Osinubi and Amaghionyeodiwe, 2009) found that the devaluation of the home currency rises up the real FDI in Nigeria. Atique and Ahmad (2003) examined the growth rate of Pakistan's exports by dividing the exogenous and endogenous variables in the form of export supply function and exports demand function. By using the different techniques of regression with respect to exports demand function, exports of Pakistan is improved, when the real effective exchange rate of Pakistan decline. Pakistan's exports are increased when the world Economic activities would boost up. Ramli and Ismail (2014) found that rail route and paved road significantly decreases trade costs in ASEAN-5. This proves the empirical results that development in basic infrastructure boosts the accessibility of goods from producer to consumer thus, minimizing the trade costs significantly. As a result of notable investments in its infrastructure sectors, fairly rapid expansion of infrastructure for capital stock has been made for the past year. This has allowed the country to augment an extensive network of roads and railways as well as to develop its port and airport facilities. Ahmad et al. (2011) found that infrastructure is significant and positively related to the value of bilateral trade between Malaysia and its trading partners by using mobile and fixed-line telephone subscribers, personal computers, and internet users.

IV-Research Methodology:

3.1-Data Source:

The study based on secondary data from 1985 to 2017. The data of the selected variables are collected from World Development Indicators (WDI). The infrastructure index is made of thirty indicators of quality and quality by applying Unobserved Component Analysis (UCM). The indicators include Transports, telecommunication, energy and financial sectors. Most of the data on these variables are collected from WDI. We make also further sub-indices of main infrastructure but here this study not uses because we take infrastructure is a control variable. The comprehensive detail about this infrastructure index is given by Donaubauer et al, (2015). We devised the index for Real Exchange rate by the following formula and we collected the data for this index from WDI. Following are the detail of this index

$$RER_{it} = \frac{NER_{it} P_i^* P_{Us,t}}{NER_i^* P_{it} P_{Us}^*} \quad \text{-----} \quad \text{(Equation A)}$$

Whereas, P is price index of United States, NER is nominal exchange rate, Pi* is price index in base year and Pi presents price index of Pakistan.

3.2-Unit Root Test:

To examine whether the variables are stationary or integrated of some order. Researchers generally use Augmented Dickey Fuller (ADF) test. The data is said to be stationary in econometrics when the mean, variance & co-variance remain the same in overall observation. Consider the AR (1) model

$$Y_t = \phi Y_{t-1} + \epsilon_t$$

The explanation is as.

Case: 1. $\phi < 1$ therefore the data is stationary.

Case: 2. $\phi > 1$ where in this case the series explodes.

Case: 3. $\phi=1$ where in this case the series contains the unit root is non stationary

3.3-Augmented Dickey – Fuller Test (ADF):

Augmented is the expansion of Dickey-Fuller. It is used to be higher order lack of the dependent variable in order to study the autocorrelation problem. The ADF test was also used by different researchers like, Nishat (2004) and Anam et al. (2014). The three possible kinds of the ADF test are given by the following equations.

$$\begin{aligned} \Delta Y_t &= \gamma Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \epsilon_t \\ \Delta Y &= \alpha_0 + \gamma Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \epsilon_t \\ \Delta Y &= \gamma Y_{t-1} + \alpha_{2t} + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \epsilon_t \end{aligned}$$

3.4-Analytical Techniques:

The analytical techniques include the model and the various econometric tests to be used. First we introduce the model and then use Unit Root Test to investigate and stationeries the time series data of selected variables for the purpose to exclude Autocorrelation problem. Then Vector Error Correction Model (VECM) will be used for short run results and Johnson Co-Integration test will be employ for long run results. Multicollinariaty Test will also be used, to test the independence of the regressive variables.

3.5-The Models:

$$Trade = \beta_0 + \beta_1 Real\ exchange\ rate + \beta_2 FDI\ inflow + \beta_3 infrastructure + U \quad \text{-----} \quad (1)$$

$$Trade\ Deficit = \beta_0 + \beta_1 Real\ Exchange\ rate + \beta_2 FDI\ inflow + \beta_3 infrastructure + U \quad \text{-----} \quad (2)$$

$$Real\ Exchange\ rate = \beta_0 + \beta_1 Trade + \beta_2 Trade\ deficit + \beta_3 FDI\ inflow + \beta_4 infrastructure + U \quad \text{-----} \quad (3)$$

IV-Results and Discussions:

Before to observe and estimate the potential short-run and long-run relationship among Trade, Trade Deficit and Exchange rate, it is essential to found the order of integration among the selected variables, because if the factors are integrated of order I(2) or above the calculated F-statistics and R^2 will be invalid or say spurious regression (Atique and Ahmad 2003). For this reason, Augmented Dickey Fuller (ADF) and Phillips-Perron test is employed to study the order of integration among the selected variables. The results in Table 1 show that most all the selected variables are stationary at 1(1) which support the Johanson co-integration test and fully modified Ordinary least square for long run.

Results of Unit Root Test (ADF):

Table 1: Unit Root Test Results				
Variables	ADF Test with Intercept	ADF Test with Intercept and trend	Phillips-Perron Test with Intercept	Phillips-Perron Test with Intercept and trend
TR	0.501	-1.59	0.511	-1.60
TD	0.624	-1.157	1.53	-0.628
RER	0.553	-1.75	0.519	-1.75
INFRA	-1.563	-0.972	-1.069	-1.037
PGDP	2.14	-0.912	2.33	0.816
FDI	-2.49	-3.00	-1.885	-2.202
ΔTR	-5.18***	-5.301***	-5.201***	-5.301***
ΔTD	-5.25***	-5.81***	-5.216***	-5.423***
ΔRER	-4.98***	-5.216***	-4.987***	-5.194***
$\Delta INFRA$	-1.97	-5.69***	-5.474***	-5.699***
$\Delta PGDP$	-4.51***	-5.41***	-4.492***	-5.430***
ΔFDI	-3.77***	-3.71***	-3.522***	-3.44***

Note: ***, ** & * represents significance level at 1%, 5% and 10% respectively, Δ represents first difference.

Table 2. Johanson Co-integration Test (Long Run Results):

S/no	Hypothesis			Trace statistic			Max-Eigen Value		
	Null	Alternative	NO. OF CE(s)	Estimated value	5% Value	Critical	Estimated value	5% Value	Critical
1	r=0	r=1	None*	433.76 (0.000)**	197.37		132.01 (0.000)	58.43	
2	r<1	r<2	At most 1*	301.74 (0.000)**	159.52		95.19 (0.000)	52.36	
3	r<2	r<3	At most 2*	206.55 (0.000)**	125.61		75.39 (0.000)	46.23	
4	r<3	r<4	At most 3*	131.15 (0.000)**	95.75		39.76 (0.054)	40.07	
5	r<4	r<5	At most 4*	91.39 (0.000)**	69.81		33.25 (0.05)	33.85	

Note: **denotes significance at 5% and figures in the parenthesis are p-values. The ** also denotes the co-integration in the variables.

Estimation of the Model – 1 (long-run results):

Table 3: Ordinary Least Square (Trade is Dependent Variable)

Variables	Co-efficient	Standard error
Constant	8.13***	1.01
RER	-3.75***	0.731
INFRA	4.451***	1.013
FDI	4.45***	1.017

Note: ***, represents significance level at 1%

Estimation of the Model-2 (Long Run Results):

Table 4: Ordinary Least Square (Trade Deficit is Dependent Variable)

Variables	Co-efficient	Standard errors
Constant	1.744***	0.347
RER	1.028***	0.241
INFRA	-1.063***	0.349
FDI	1.064***	0.357

Note: ***, represents significance level at 1%

Estimation of Model – 3 (Long-run results):

Table 5: Ordinary Least Square (Trade Deficit is Dependent Variable)

Variables	Coefficient	Standard Error
Constant	1.31***	0.54
TR	0.199**	0.103
TD	2.05***	0.52
FDI	1.905*	0.348
INFRA	2.621	0.340

Note: ***, ** & * represents significance level at 1%, 5% and 10% respectively,

Table-6. Granger Causality Test Results:

Variables	F-statistics	Probability values
Trade (TR)	4.11400	0.0285
Trade Deficit (TD)	6.81368	0.0043
Real Exchange rate (RER)	4.13388	0.0281

Note: ***, represents significance level at 1%

Table 7. Results of Diagnostic Tests:

Breusch-Godfrey Correlation LM Test	Serial ARCH Test	Heteroscedasticity ARCH Test	Ramsey Reset Test
0.592305 (0.5647)	0.031078 (0.8618)	0.554 (0.7577)	

The value in the braces show probability values and the other values are F-statistics

Table 2 indicates two types of test statistics. The first block reports the so-called *trace* statistics and the second block reports the *maximum eigenvalue* statistics. For each block, the first column is the number of co-integrating relations (Trace-statistics) under the null and alternative hypothesis with 5% critical values, the second column is the ordered eigenvalues of the II matrix with 5% critical values. The (nonstandard distribution) critical values are taken from results are on the line of MacKinnon-Haug-Michelis (1999).

The empirical estimation of Johnson co-integration test (see table 2) shows that there is stable long-run relationship among all the selected variables. As can be seen from the above table of co-integration test results all the selected variables i.e. trade volume, Trade Deficit, Real Exchange Rate, Infrastructure and FDI are significant at 5%, it means that there is strong long run relationship and cointegration among these variables. Furthermore, we reject the null hypotheses and accept the alternative hypothesis on the basis of this co-integration test results, Johansen and Juselius (1990).

As we can have seen from the table 3, that the impact of infrastructure on trade is positive and significant. It means that when the quality and quantity of physical infrastructure¹ i.e. energy, transport, telecommunication and financial sector boost up its lead to enhance trade. The reason behind that, infrastructure play important role in trade because they reduce the cost of trade and ensure the ease of doing business in host economies. Lower trade costs rise the potential for increased export markets (Limao and Venables, 2001; Brooks and Menon, 2008). For example, because of better infrastructure, countries like, China, Singapore, Thailand, and Viet Nam registered strong growth in international trade especially exports² (Ismail and Mahyideen, 2015). The Foreign Direct Investment (FDI) has positive effect on dependent variable and also significant in long run. Pakistan is seventh big economy in the world that has a good potential to develop rapidly, and thus considered to be a better destination for FDI. But Pakistan lags behind to attract reasonable FDI when compared to other developing countries in the region due to the absence quality of institutions and basic infrastructure etc (Shah et al., 2015). The same perception is also presented by Arratibel and Zdzienicka (2011). According to our study Exchange rate (EX) and trade has negative and significant relationship. It indicated that when exchange rate increases compared to the exporting countries, the prices seem to be high. So negative impact occurs on trade. The same results examined by Chowdhury (1993).

In recent decade trade deficit make big issue for developing countries. The existing stock of literature (e.g. Malik et al., 2015; Bahmani-Oskooee, 2010 etc.) argued that this is not only the problem of developing economies but it also faces by developed nation of the world. It can be seen from table 4, that the impact of real exchange rate has significant positive impact on trade deficit. It means that when as the domestic currency value decreases it discourage the imports of home country and vice versa. The same study has been given by Yousif (1999). The impact of infrastructure like energy, transports, communication and financial sector is negative and significant in Pakistan. As mentioned above that better infrastructure decreases the cost of production by decreasing transportation cost. Infrastructure brings market to market and people to people connectivity which off course helps to improve trade. But here infrastructure influence negatively and significantly on trade deficit due the fact that recently Pakistan faces a huge deficit, meaning that the imports are increases in Pakistan as infrastructure increases. The same perception is also presented by Yaya, E., M. and LU, X., (2012); Atique and Ahmad (2003). The impact of Foreign Direct Investment (FDI) on trade deficit is positive and significant at 1 % in long run. It means that is FDI inflow boost up its leads to enhance export, because FDI brings new and modern technology which help the home country to make more sophisticated and diversified products. Recently Pakistan attract very less FDI inflow due to lack of quality of institutions and infrastructure. The same view was presented by Arratibel and Zdzienicka (2011).

It can be seen from table 5 that the impact of Foreign Direct Investments (FDI) on dependent variable i.e. real exchange rate is positive and significant. it means that when foreign direct investments in the economy increases exchange rate increase because FDI inflow increase export which directly enhances real exchange rate of Pakistan. The same perception has been given by Osinubi and Amaghionyeodiwe (2009). The influence of Trade on Real Exchange rate is positive and significant. It means that as trade increases exchange rate also increases. It is due to the fact that as trade share of the economy increases the real exchange rate rises up. The same view was given by Mohammad (2010). The relationship between infrastructure and exchange rate is positive but insignificant. The insignificant is due to indirect effect on dependent variable. The same perception has been given by Ramli and Ismail (2014).

The significant F-statistics in Table 6 unearth the presences of long causality among the variables i.e. Exchange rate, Trade deficit and trade volume. Our results reveal that the reverse causality also holds correct, i.e. higher trade flow positively influence the trade deficit. It means that Pakistan is developing country, the import is greater than export in total trade volume as a result trade impact positive on trade deficit in case of Pakistan. While real exchange rate also positive significantly cointegrated with trade and trade deficit. As

¹ Our devised infrastructure index is made of qualitative and quantitative variables.

² Export ratio in Viet Nam further increased by 42% followed by Thailand (49%), India (55%), and Indonesia (63%) (Ismail and Mahyideen, 2015).

As seen from the table 7 that both p-values of LM Test and ARCH Test are insignificant, so it is concluded that there is no problem of Heteroscedasticity and Serial Correlation. Normally in time series data the Heteroscedasticity problem is not so common, but the sack for surety the researcher this test also employed. Furthermore, the functional form of the model is correct (Gujarati and Porter 2004). The same approach has also used by Mohammad (2010) and Yousif (1999).

Multicollinearity Problem in the Models:

According to Thumb Rule, Multicollinearity problem arises if R^2 of the model is greater than 0.80, the F-test in the most cases will reject the hypothesis that the partial slope co-efficient are simultaneously equal to zero, but the individual t-test shows that none or very few of the partial slope coefficient are statistically different from zero. In our case the there are three model, in the modl-1 R^2 is 0.90, in this model all variables are significant at 1%. so we can conclude from results that there is absence of Multicollinearity problem. In Model-2 and Model-3 the R^2 is less than 0.80. It's quite clear that there is absence of Multicollinearity problem (Gujarati and Porter 2004), (Brendan 1975), (Krishna 1975) and (Robert 1975).

V-Conclusion and Policy Recommendations:

The aim of this study is to examine the short and long-run causal relationship among the trade volume, Trade Deficit and Exchange rate in Pakistan's economy. The study shows that there is significant causal relationship among all these selected variables in short as well as in long run. This study found positive impact of control variables i.e. infrastructure, foreign direct investment on dependent variables like, Trade, Trade deficit and real exchange rate. The overall results show that a stable and depreciating exchange rate policy has to be ensured in order to increase trade volume and especially exports and also enhance the quality and quantity of infrastructure facilitates which will help to decrease the time cost and production cost. Moreover, Government should have made trade policy in the favor of exports, which may promote exports and decrease trade deficit of the country.

Disclosure statement:

Author A declares that he has no conflict of interest. Author B declares that he has no conflict of interest
Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors

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