Impact of Financial Development on Trade Balance: An ARDL Cointegration and Causality Approach for Pakistan.

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Abstract: This paper aim to examine the relationship between financial development, trade balance, exchange rate and inflation by using time series data from 1972 to 2014 for Pakistan. We have tested the unit root properties of variables by using Augmented Dickey-Fuller, Phillips-Perron and Breakpoint unit root tests. The ARDL approach is applied to examine the cointegration between variables due to mixed orders of integration between series *I(0)/I(1)*. The ARDL findings suggested that long run relationship exists between financial development, trade balance, exchange rate and inflation. Error Correction Mechanism (ECM) is applied to analyze short run relationship. The lagged value of the Error Correction Term (ECM_{t-1}) is negative and significant at 1% level of significance. The value of ECM_{t-1} is -0.91 which states that digression from the short run towards long run is corrected by almost 91 percent by every year. Financial development, exchange rate and inflation have significant impact on trade balance in the long run. But in the short run, only exchange rate and inflation have statistically significant impact on trade balance. Diagnostic statistics have confirmed the characteristics of model in the short run as well as in the long run. The causal relationship between variables are examined by VECM Granger causality and robustness of causal analysis is tested by Variance Decomposition Approach (VDA). The results of VECM have predicted that unidirectional causality from financial development to trade balance exist in the long run. The results of Variance Decomposition Approach explained that 19 percent of trade balance is explained by shocks stimulating in financial development. Government should enhance financial development by managing lending interest rates to improve trade balance.

Keywords: Financial Development, Trade Balance, ARDL Cointegration, Causality, Pakistan

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I. Introduction:

Balance of Trade (BOT) of an economy is very important for its good economic health. It is the difference between the country's export and import. If the exports of a country are greater than the imports of a country, the balance of trade of a country will be in surplus. Similarly, if imports are greater than exports, the balance of trade will be in the deficits. The trade deficit is not good for the long economic growth. It forces a country to take loans from International Monitory Funds (IMF) or World Bank to maintain its trade balance. Due to high interest payments on loans, country has less money to invest in the new projects that creates pressure on the growth of the economy. On the other hand, when current account goes into deficit, it could be financed by multinational corporations. It might be possible that a country's best asset could be purchased by foreign investors and clam on them in future. It might be a possibility of occurrence of bankruptcy in economy and it causes investors to lose their confidence and remove its investment from the country. Further, it causes a big fall in value of a currency that decrease the living standard and confidence of new investment. It reduces the income level for a long time. Similarly, if deficit of trade balance accrues due to deficit in current account, a country has to depend on consumer spending. The growth of export sector reduces due to less competitiveness of goods. It will abolish the industry of a country that will put the limit on the growth of country's economy.

Pakistan is an emerging economy continuously facing deficit in trade balance from the era of globalization. The trade balance deficit is too much dangerous for the Pakistan economy. Economist and policy makers need to take some steps to resolve this issue (Mohammad, 2010). The better way to handle trade deficit or current account balance deficit is to raise the exports (Aurangzeb and Asif, 2012). Exchange rate plays an important role to determine trade balance because exchange rate depreciation improves the value of exports (Nazeer et al, 2015). In case of Pakistan, income and money supply are main determinants that have strong impact on the behavior of trade balance both in short and long run and Exchange rate devaluation has weak impact on the trade then the monetary policy (Waliullah et al, 2010). Similarly, exchange rate does not help to maintain trade balance for Pakistan (Khan, 1995). The exchange rate shows positive impact on Trade balance and have strong relationship by deprecating exchange rate trade balance may goes toward the surplus (Mohammad, 2010). The exchange rate of Pakistan affects the balance of trade significantly while other variables like money supply, domestic consumption and FDI do not have the significant impact on trade balance (Shah, 2015).

The trade balance in the period of 1972 to 1974 was in deficit from 0.48 billion dollars to 0.68 billion dollars. In 1975 it went into surplus to 1.3 billion dollars. From 1976 to 2003, trade balance was in deficit from 1.2 billion dollars to 1.1 billion dollars respectively. After 2003, high trade balance deficit seemed to be very high. In 2008, it was 24.7 billion dollars. In 2009, an improvement accrued in trade balance deficit to 14.1 billion dollars but in 2010, it had increased to 22.3. Trade balance deficit was 32.5 billion dollars in 2014.

This study is highly important as it aims to fill the gap in the Literature. It fills the gap in numerous ways. First, this study provides relatively more comprehensive measures of trade balance in scope and methodology. Second, this study uses a most appropriate estimation methodology to quantify the linkages between financial development and trade balance such as cointegration and causality tests Lastly, this study explores the channels through which financial development exerts an impact on trade balance. Section 2 covers the review of literature. Section 3 covers the data collection and

estimation strategy. Section 4 covers empirical analysis and results of estimation. In last, section 5 covers conclusion and recommendations.

II. Review of Literature:

There are many studies that have investigated the determinants of trade balance such as Khan, (1995) studied the impact of the devaluation of the exchange rate on the trade balance for Pakistan. The results of Cochrane-Orcutt iterative method concluded that devaluation of the exchange rate has a positive effect on the external balance. Waliullah et al., (2010) examined the long run and the short run relationship between trade balances, real exchange rate, money supply and income for Pakistan. This study used the ARDL approach by using time series data from 1970 to 2005. The results of this study indicated that money supply has negative impact on the trade balance and depreciation of the exchange rate has a positive impact on trade balance. Similarly, Nazeer et al., (2015) analyzed the determinants of balance of trade and checked the impact of these determinants on exchange rate for Pakistan. The time series data and linear regression model use for this study. This study concluded that there is the significant strong positive relationship between the balance of trade, exchange rate and balance of payment and both balances of payment and balance of trade have strong impact on the exchange rate. Mohammad, (2010) analyzed the determinants of trade deficit for Pakistan by using error correction model and Johansen cointegration method over the period from 1975 to 2008.The study concluded that household spending has negative impact on the trade balance and, the effective exchange rate in real term, FDI and foreign income have a positive impact on the balance of trade.

Duasa, (2007) explored the long run and short run link between trade balance, money supply, income and real exchange rate in Malaysia. This study took data from 1974 to 2003 and used ARDL method for analysis. Findings confirmed the existence of the long run relationship between trade balance, money supply and income, but find no relationship between exchange rate and trade balance. Shawa and Shen, (2013) analyzed the impact of trade liberalization, foreign income, real exchange rate, natural resource availability, inflation, government expenditure, household consumption expenditure, human capital development and FDI on the trade balance for Tanzania. This study used OLS technique for analysis over the period 1980 to 2012. The results reveal that FDI, human capital development, natural resource availability, trade liberalization and foreign income have a positive impact and remaining variables have negative impact on trade balance. The real exchange rate has an insignificant impact on trade balance. Akbostancı, (2002) scrutinized the short and long run behavior of real exchange rate and trade balance of Turkey. The ECM and Johansen cointegration have used for a time period from 1987 to 2000.The results confirmed the existence of J-curve behavior for long run only. Stučka, (2004) examined the link between domestic currency permanent depreciation and trade balance by using reduced-form model approach in Croatia's. Quarterly data has used since 1994 (1) to 2002 (4). They concluded that 1 percent increase of permanent depreciation moves, trades balance towards equilibrium from 0.94 to 1.3 percent and a new equilibrium will be established after 2.5 years approximately. The behavior of permanent depreciation on trade balance also found like J-curve.

Kiendrebeogo, (2012) investigated the impact of financial sector development on the manufacturing trade level by incorporating the role of institutions for 75 countries. The panel and cross sectional data from 1971 to 2010 have used to analyze OLS and GMM method. They concluded that financial development has a strong positive impact on the manufacturing export

after controlling banking crises and institutional quality has a positive role in the growth of the trade by improving financial development. Similarly, Samba and Yan, (2009) probed the relationship between international trade in the presence of comparative advantage and financial development for East Asian seven countries in which Thailand, Indonesia, Singapore, Philippines, Malaysia, Korea and China are included. The VAR approach has applied to the time period from 1978-2001. The results suggested that in most of the countries for manufacturing goods, international trade enhances the financial development of a country. Vergil, (2002) investigated the impact of real exchange rate changes on export movements for Turkey and US by incorporating their majour trading partners such as France, Italy and Germany. Error Correction Mechanism, Johansen cointegration and Juselius approach have been used over the period of 1990:1-2000:12. The results showed that change in real exchange rate has significant negative impact on the real export.

Wilamoski and Tinkler (1999) explored the impact of FDI on import and export of U.S. and Mexico. The OLS, VAR and Granger causality have used to analysis the relationship over the period 1977 to 1994. The results suggested that at first, that FDI explains a substantial portion of the rapid increase in trade between the two nations and, second, small positive effect on the U.S. trade balance with Mexico resulting from new FDI will diminish over time. Aurangzeb and Asif, (2012) compared Asian and European current account balance income, inflation, export, import, exchange rate and GDP) using data from 1980 to 2010. By using Grangar causality and cointegration analysis, they concluded that these determinants are not best predictor in the case of European countries but it is more usable in case of Bangladesh, India and Pakistan. Similarly, Onafowora, (2003) analyzed the short run and long run impact of exchange rate on trade balances for three ASEAN countries (Thailand, Malaysia and Indonesia) that have bilateral trade with Japan and US. The VECM and cointegration approaches have used over the period 1980:1-2001:4. The finding suggested that depreciation of currencies in East Asia against Japan and US helps to improve balance of trade with Japan and US.

Beck, (2002) examined the relationship between trade of manufacturing and financial development. This study has used time period from 1966 to 1995 to investigate GMM methodology. This study concluded that financial development provides a significant impact on trade balance, level of industrial goods and the level of export. Hur et al. (2006) studied the relationship between Exports, property rights, tangible assets and financial development by using industry level data of 23 different industries of 52 countries. By using a time period from 1980 to 1989, the results concluded that the countries with more financial development have greater shares in those industries who have intangible assets and these shares will be increased when industries use external finance. They also concluded that higher property rights lead to higher export shares in industries that have more intangible assets. Beck, (2003) checked the impact of comparative advantage of the industries that use extra external finance in financial development by using 56 countries and 36 different industry data. The methodological approach that they have used is developed by Zingales and Rajan (1998) The Results showed that the countries that have well developed financial system use higher external finance and they have more trade balance and more export shares in industries.

Ogbonn, (2009) explored the relationship between trade balance and exchange rate in the long run for Nigeria by using data period from 1960 to 2005. By using Error correction model and Johansen cointegration method, they concluded that the exchange rate in Nigeria measures the week long

run behavior of trade balance. If Nigeria uses contractionary monetary and fiscal policies, then devaluation of exchange rate improves the trade balance in Nigeria. Ökonomie, (2013) investigated new trade determinants such as trade direction, infrastructure, institution, culture and geographical areas that affect the trade in the European countries. The fixed effect approach has used to analysis the relationship over the period 1992 to 2008. Results showed that the infrastructure has larger impact on trade than the former group. Similarly, institutional quality has a positive effect on trade. Common currency impact on trade rather than common language and free trade area in Europe is the key of trade development and the movement of trade from east to west and west to east in European Union member countries is more important for trade development. Frankel and Rose, (2002) checked the consequence of common currencies on income and trade by using 200 countries data from 1970 to 1995 by five year intervals. The results revealed that when a country belongs currency unions, its trade increase three times with the other union currency members. An increase in 1 % increase in trade leads to increase in per capita income by 0.33 %.

By reviewing the previous literature, we concluded that existing literature does not provide any evidence regarding impact of financial development on trade balance in case of Pakistan. Financial development that is a potential determinant of trade balance for Pakistan has been ignored by previous studies. This study fills that gap and improves the existing literature by investigating the impact of financial development on trade balance over the period of 1972-2014 for Pakistan. Developed financial sector countries have more comparative advantage in the industrial sector that helps to increase their exports that lead to decrease the trade deficits (Kiendrebeogo, 2012).

Better financial system provides the better transfer of funds between borrower and savers that also provides the equal better opportunity to grow big and small firms. It causes to increase in intermediate goods that further cause an increase in demand for final goods. (Shahbaz and Rahman, 2012). Improvement in industrial sector helps to increase in production for both domestic consumption and export purposes (Samba and Yan, 2009). Similarly, developed financial system has significant positive impact on share of exports rather than imports that improves balance of trade (Beck, 2002). When financial development reform takes place, it raises the external finance level to private enterprises in the presence of contract enforcement and strengthening of credits right and by judicial reforms. An increase in external finance helps a country to face competition with other less developed financial system countries. It causes to increase in exports by enhancing shares of exports that helps to improve trade balance (Beck, 2003).

III. Data Collection and Estimation Strategy:

We explore the relationship between financial development and trade balance by incorporating exchange rate and inflation using time series data from 1972 to 2014 for Pakistan. The general discussion leads us to use a general elasticity demand function:

$$TB_t = f(Fd_t, Ex\_r_t, CPI_t) \quad (1)$$

We have transformed all variables into logarithmic form because it provides consistent and reliable empirical estimations. The logarithmic formation of empirical model is given below:

$$\text{Ln } TB_t = \beta_0 + \beta_1 \ln Fd_t + \beta_2 \ln Ex\_r_t + \beta_3 \ln CPI_t + \mu_t \quad (2)$$

Here, Ln TB_t is the natural log of balance of trade, ln Fd_t is the natural log of real domestic credit to private sector per capita proxy for financial development, ln Ex_r_t is the natural log of real exchange rate, ln CPI_t is the natural log of consumer price index proxy for inflation and μ_t is error term. The data on domestic credit to private sectors is collected from World Development Indicator (WDI, 2015). International Financial Statistics (IFS, 2015) is used to collect the data on trade balance, exchange rate and consumer price index.

In econometric analysis, series are said to be integrated if two or more series are integrated individually. To address the phenomena of cointegration, several techniques have been developed. These techniques include Engle and Granger, (1987) cointegration approach, Johansen (1991) Johansen maximum Eigen value test, Phillips and Ouliaris (1990) Phillips–Ouliaris cointegration test and Error Correction Model (ECM) based F-test of Peter Boswijk (1994), the ECM based t-test of Banerjee et al. (1998) and Bayer-Hanck (2013) combined cointegration. These tests require that all series of data should be integrated on same order. This study has applied an ARDL bound test (Pesaran et al. 2001) to investigate the long run relationship between financial development, trade balance, exchange rate and inflation. The ARDL bound test (Pesaran et al. 2001) is more appropriate by comparing other cointegration techniques because it seems flexible regarding unit root properties of variables. This technique is more suitable when variables are cointegrated at *I(0)/I(1).* Haug (2002) has argued that ARDL approach to cointegration provides better results for small sample data set such as in our case.

The Autoregressive Distributive Lag model (ARDL) can be applicable without investigating the order of integration (Pesaran and Pesaran, 1997). Another advantage of ARDL bounds testing is that unrestricted model of ECM seems to take satisfactory lags that captures the data generating process in a general-to-specific framework of specification (Laurenceson and Chai, 2003). The equation of unrestricted error correction method is being displayed as:

$$\Delta LTB = \alpha_0 + \alpha_T T + \alpha_{TB} LTB_{t-1} + \alpha_{FD} LFD_{t-1} + \alpha_{Ex\_r} LER - R_{t-1} + \alpha_{CPI} LCPI_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta LTB_{t-i} + \sum_{j=0}^{q} \alpha_j \Delta LFD_{t-j} + \sum_{k=0}^{n} \alpha_k \Delta LEX\_R_{t-k} + \sum_{l=0}^{m} \alpha_l \Delta LCPI_{t-l} \quad (3)$$

The null hypothesis no cointegration is H_o: $\alpha_{TB} = \alpha_{FD} = \alpha_{Ex\_r} = \alpha_{CPI} = 0$ and alternative hypothesis of cointegration among the variables is H_1: $\alpha_{TB} \neq \alpha_{FD} \neq \alpha_{Ex\_r} \neq \alpha_{CPI} \neq 0$. The decision about rejection or acceptance of hypothesis based on the calculated F-statistics. The upper critical bound (UCB) assumes that all variables are integrating at 1^{st} difference. The lower critical bounds (LCB) assume that all variables are integrating at level. These critical bounds have been calculated by Pesaran et al. (2001). If calculated F-statistics is greater than UCB, we may say that cointegration exists or series relates in long run. If LCB is greater than calculated F-statistics, then there is no cointegration. The result will be inconclusive if calculated F-statistics lies between LCB and UCB. In this situation, we have to depend on the lagged error correction term to determine long run relationship. Further, we have applied Error Correction Mechanism (ECM) for short run relationship, VECM Granger causality for direction of causality and Variance Decomposition Approach (VDA) for robustness of causality.

IV. Empirical Analysis and Result Discussion:

Table-1 displays the results of descriptive statistics and pairwise correlation. Jarque-Bera confirms that series are normally distributed. It means that series have zero mean and constant variance. Financial development and trade balance is positively correlated with trade balance. Exchange rate is also positively correlated with trade balance and financial development. Similarly, inflation is also positively correlated with trade balance, exchange rate and financial development. Before we go on cointegration, we need to check whether all variables are cointegrated at *I(0) or I(1) or I(0)/I(1)* or not. In economic literature, ADF by Dicky and Fuller (1981), P-P by Phillips and Perron (1990), DF-GLS by Elliote et al. (1996) and Ng-Perron (2001). ADF and PP unit root tests are used in this study to ensure that no variable is integrated at *I(2).* The results of ADF and PP are reported in table-2. The results have confirmed that variables are integrated at *I(0)/I(1).* According to ADF, trade balance, financial development and exchange rate have unit root problem at *I(0)* they are stationary at *I(1).* Similarly, inflation is stationary at *I(0).* These results have also confirmed by PP unit root test.

Table-1: Descriptive statistics and Pairwise correlation

Variables	$\ln TB_t$	$\ln Fd_t$	$\ln Ex\_r_t$	$\ln CPI_t$
Mean	21.85304	4.303923	3.336725	3.176647
Median	21.58940	4.190261	3.336025	3.179229
Maximum	24.20514	6.129116	4.621328	4.953729
Minimum	18.98389	2.788708	2.161181	1.158555
Std. Dev.	1.219246	1.040894	0.824805	1.024543
Skewness	0.452836	0.347663	0.020434	-0.036849
Kurtosis	2.804156	1.895840	1.536260	2.028042
Jarque-Bera	1.538315	3.050576	3.841702	1.702324
Probability	0.463403	0.217558	0.146482	0.426919
$\ln TB_t$	1.000000			
$\ln Fd_t$	0.8160	1.000000		
$\ln Ex\_r_t$	0.6819	0.9675	1.000000	
$\ln CPI_t$	0.7777	0.9745	0.9805	1.000000
Source: Author's Calculations.				

Table-2: ADF and PP Unit Root Analysis

Variables	ADF Unit Root Test			Phillips-Perron Test		
	T-statistic "Intercept and trend"	Prob. Values	Decision	T-statistic "Intercept and trend"	Prob. Values	Decision
$ln\ TB_t$	-2.0353	0.5655	Non-Stationery	-1.9642	0.6033	Non-Stationery
$\ln Fd_t$	-2.8332	0.1943	Non-Stationery	-2.7003	0.2417	Non-Stationery
$ln\ Ex\_r_t$	-1.8700	0.6521	Non-Stationery	-2.1095	0.5257	Non-Stationery

ln CPI_t	-3.5165	0.0518***	Stationery	-3.6432	0.0380**	Stationery
Δln *TBt*	-7.8664	0.0000*	Stationery	-7.7723	0.0000*	Stationery
Δln *Fdt*	-4.3013	0.0077*	Stationery	-4.2622	0.0085*	Stationery
Δ ln *Ex _ rt*	-4.7590	0.0023*	Stationery	-4.8091	0.0020*	Stationery

Source: Authors' estimation.

Note: significance at 1% and 5% is shown by *and ** respectively.

However, as Perron (1989) points out, structural change and unit roots are closely related. Conventional unit root tests are biased toward a false unit root null when the data are trend stationary with a structural break. The results of breakpoint unit root test by Perron (1989) are reported in table-3. The results have confirmed that variables are stationary at both level and first difference. It shows mixed order of integration between series [*I(0)/I(1)*]. After confirming the order of integration, we estimate the VAR lag length critera to select an optimal lag length. Table-4 reports the results of optimal lag selection criteria. This paper follows Akaike Information Criterion (AIC) due to its superior power properties. Akaike information criterion provides efficient and consistent results as compared to final prediction error (FPE), Schwarz information criterion (SBC) and HannanQuinn Information criterion (HQ). According to results of AIC, there are 2 optimal lag for annual data series from 1972 to 2014 for Pakistan.

Table-3: Breakpoint Unit Root Test

Variables	**At level**		**At 1st Difference**	
	T-Statistics	Time break	T-statistics	Time Break
ln TB_t	-4.9706***	2000	-9.1094*	2002
ln Fd_t	-6.333*	2000	-5.4025**	2003
ln Ex_r_t	-3.7040	2003	-5.8930*	2001
ln CPI_t	-5.8430*	2007	-4.9921***	2007

Note: *, ** and *** represents significant at 1%, 5% and 10 % level of significance. AIC criterion has used for lag selection.

Source: Author's Calculations.

Table-4: lag length criteria

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-21.12412	NA	4.13e-05	1.256206	1.425094	1.317271
1	195.6470	379.3495	1.81e-09	-8.782352	-7.937913*	-8.477030*
2	216.0617	31.64264*	1.49e-09*	-9.003083*	-7.483091	-8.453502
3	230.7581	19.84024	1.70e-09	-8.937907	-6.742363	-8.144067
* indicates lag order selected by the criterion.						
LR: sequential modified LR test statistic (each test at 5% level) FPE: Final prediction error AIC: Akaike information criterion SC: Schwarz information criterion HQ: Hannan-Quinn information criterion **Source:** Author's Calculations.						

Table-5 explains the results of ARDL bound testing approach. This study is using a sample period of 43 observations (1972-2014). So, critical values from Pesaran et al[3]. (2001) are inappropriate. This study chose to use upper and lower critical bound values generated by Narayan, (2005). The results reveal that calculated F-statistics i.e. 9.564, 16.94, 18.46 and 18.12 are greater than upper critical bound values at 5% and 1% level of significance when trade balance, financial development, exchange rate and inflation are used as dependent variables. These four cointegration vectors have confirmed the presence of long run relationship between trade balance, financial development, exchange rate and inflation over the period 1972-2014 for Pakistan. Now, this study checks the marginal impact of financial development, exchange rate and inflation on trade balance in long run as well as in short run.

Table-5: ARDL-Bound testing for cointegration

Model for Estimation	**Optimal Lag length**	**F-statistics**	**Lag**
(TB_t / FD_t, Ex_r_t, CPI_t)	(1,0,0,2)	9.564**	2
(FD_t /TB_t, Ex_r_t, CPI_t)	(1,2,1,1)	16.94*	2
(Ex_r_t / FD_t, TB_t, CPI_t)	(1,2,0,0)	18.46*	2
(CPI_t / FD_t, Ex_r_t, TB_t)	(2,0,1,1)	18.12*	2
Significance level	**Narayan, (2005)**		
	Lower Bound Value	Uper Bound Value	
1 %	10.150	11.130	
5 %	7.135	7.980	
10 %	7.980	6.680	
Note: We use critical bounds generated by Narayan, (2005). Akaike Information Criterion for Lag selection, * represents significant at 1% level of significance.			

[3] The critical values of bounds from Pesaran et al. (2001) are suitable for large sample size (T = 500 to T = 40, 000). Narayan and Narayan (2005) argue that the critical values of bounds from Pesaran et al. (2001) are smaller, so may produce biased results for large sample size. Narayan's (2005) values are more appropriate for small samples of size T = 30 to T = 80.

Source: Author's Calculations.

The results of long run are reported in table-6. The results showed that financial development and inflation have positive significant impact on trade balance and exchange rate has negative significant impact on trade balance. In detail, 1 % increase in financial development leads to improvement in trade balance by 2.09 % in long run. Development of financial sector improves the security of lender and borrower to have money and better transfer of money from one hand to another hand. Development of financial sectors help to increase in investment that increase the productivity of the firms to produce more goods for exports. An increase in exports alternatively improve trade balance. In other worlds, countries with better-developed financial systems have higher export shares and trade balances in industries that use more external finance (Beck, 2003; Kiendrebeogo, 2012). Coefficient of inflation shows that 1 % increase in inflation also leads to improve in trade balance by 1.94 %. Due to negative relationship of exchange rate with trade balance, 1% increase in exchange rate leads trade balance towards deficit because, in case of Pakistan, exchange rate depreciation cause to increase in value of exports due to low price of exports in international market. It helps to move trade balance from deficit to surplus (Vergil, 2002; Waliullah et al, 2010).

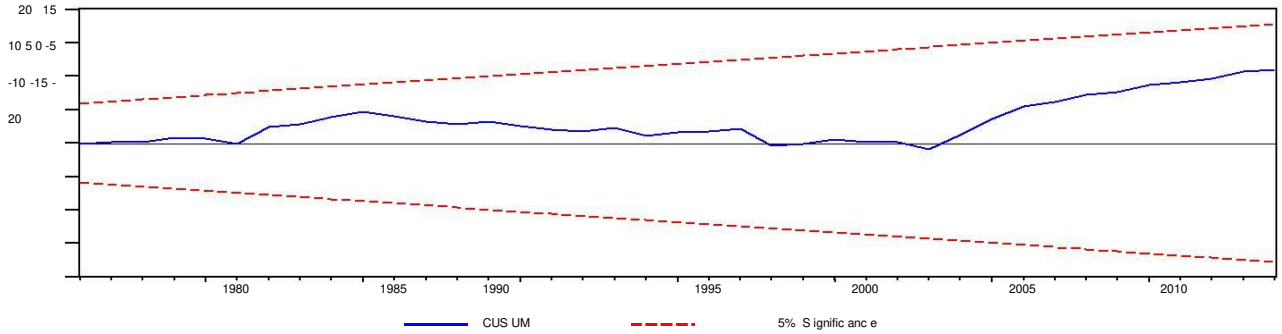
The value of F-statistics is statistical significant at 1%. It shows that overall model is significant. The value of Durbin Watson has confirmed the absence of autocorrelation. The value of R-squared shows that 92% of dependent variable is explaining by independent variables. The sensitivity analysis such as LM test for serial correlation, normality of residual term and white heteroscedasticity provide no evidence of serial correlation, autoregressive conditional heteroscedasticity and white heteroscedasticity. We have applied cumulative sum and cumulative sum of square tests to inspect the stability of long run parameters. Based on the results of figure 1 and 2, we may accept the hypothesis of correct specification of regression model because the plot of CUSUM and CUSUM of square lie with in critical bounds at 5% significant level.

Table-6: Long Run Analysis

Dependent Variable: ln TB_t			
Constant	Coefficient	Std. error	T-statistics
$ln\ Fd_t$	2.0914*	0.2419	8.6450
ln Ex_r_t	-3.9190*	0.3489	-11.231
ln CPI_t	1.9485*	0.3167	6.1508
R-squared	0.9225		
Durbin-Watson	1.9041		
F-statistic	154.91*		
Prob.	0.0000		
Diagnostic tests:			
	Statistics	Prob.	
Breusch-Godfrey LM test	0.1558	0.8563	
ARCH test	0.1231	0.8845	

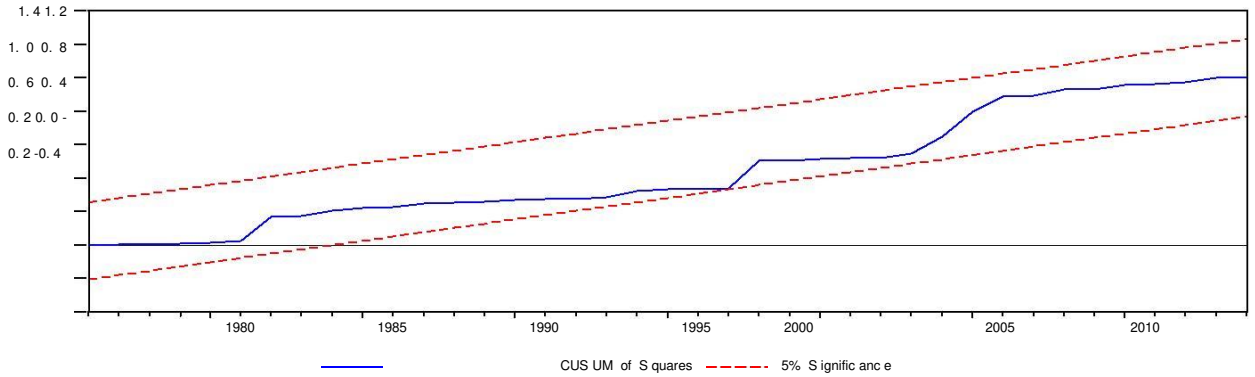
White Heteroscedisticity test	1.5402	0.1750
Ramsey RESET test	7.0601	0.015
J-B Normality test	3.3368	0.1885
CUSUM	Stable (5 %)	---
CUSUM of Square	Stable (5 %)	---
Note: significance at 1% has shown by *. **Source:** Author's Calculations.		

Figur-1: Plot of Cumulative Sum of Recursive Residuals



Straight lines represent critical bounds at 5% significant level
Source: Author's Calculations.

Figure-2: Plot of Cumulative Sum of Squares of Recursive Residuals



Straight lines represent critical bounds at 5% significant level
Source: Author's Calculations.

The results of short run analysis are reported in table-7. In short run, exchange rate and inflation have negative and positive significant impact on trade balance respectively. we find that a 4.29 % increase in trade balance is linked with 1 % decrease in exchange rate in short run. Similarly, a

2.55 % increase in trade balance is due to 1 % increase in inflation. The value of lagged ECM is negative and statistically significant at 1% level of significance. The lagged value of ECM shows the speed of adjustment from disequilibrium to equilibrium from short run to long run. The value of lagged ECM is -0.91 which shows the speed of convergent toward equilibrium. The diagnostic tests have confirmed that there is no autocorrelation, no heteroscedasticity and no serial correlation in short run. The CUSUM and CUSUM of Square have also confirmed that parameters are stable in short run because the graph of CUSUM and CUSUM of square also lie with is the critical bounds at 5% level of significant.

Table-7: Short Run Analysis

Dependent Variable: ln TB_t			
Constant	Coefficient	Std. error	T-statistics
ln Fd_t	1.1230	0.7695	1.4592
ln Ex_r_t	-4.2942*	0.9769	-4.3954
ln CPI_t	2.5510**	0.1606	1.9052
ECM_{t-1}	-0.9136*	0.1606	-5.6872
R-squared	0.5958		
Durbin-Watson	1.8815		
F-statistics	13.638		
Prob.	0.0000		
Diagnostic Tests:			
	Statistics	Prob.	
Breusch-Godfrey LM test	0.6585	0.5239	
ARCH test	0.4037	0.6707	
White Heteroscedisticity test	1.4066	0.2164	
RamseyRESET test	0.1666	0.6855	
Normality test	6.7639	0.0339	
CUSUM	Stable (5 %)	---	
CUSUM of square	Stable (5 %)	---	
Note: significance at 1%, 5% and 10 % is shown by *, ** and *** respectively. **Source:** Author's Calculations.			

The existence of cointegration between trade balance, financial development, exchange rate and inflation lead us to apply Granger causality test to determine the clear picture of causality relationship among variables. Granger causality test imagines that, X causes Y when the past values of X helps to predict changes of Y. Similarly, Y causes X when the changes of Y is predicted by the past value of X. The Vector Autoregressive model is likely to be used for this purpose.

Engle-Granger (1987) noted that if variables are cointegrated, there are short run and long run causality information exist. The results of VECM granger causality are reported in table-8. The direction of causality can be divided into short run and long run causality. The results predict that exchange rate and inflation cause trade balance in short run but when we incorporate financial development with these variables then these variables cause trade balance collectively in long run. Inflation causes financial development and financial development also causes inflation in short run. We may say that bidirectional casualty exit between inflation and financial development. Similarly, unidirectional causality exists from exchange rate to inflation. Only trade balance causes exchange rate in short run. Similarly, trade balance, financial development and inflation cause exchange rate only in long run.

Table-8: VECM Granger causality analysis

Dependent variables	Short Run				Long Run
	$\ln TB_t$	$\ln Fd_t$	$\ln Ex\_r_t$	$\ln CPI_t$	ECM_{t-1}
$\ln TB_t$	---	0.9939 (0.3813)	7.8903* (0.0016)	3.4060** (0.0456)	-4.2476* (0.0002)
$\ln Fd_t$	2.3438 (0.1122)	---	0.2620 (0.7711)	3.2988** (0.0498)	-0.9878 (0.3306)
$ln\ Ex\_r_t$	8.0143* (0.0015)	0.3283 (0.7225)	---	0.0199 (0.9802)	-3.8070* (0.0006)
$\ln CPI_t$	3.6553** (0.0372)	3.0972*** (0.0589)	0.2276 (0.7964)	---	-1.0438 (0.3044)

Note: *, ** and *** show significant at 1%, 5% and 10% level respectively.

Source: Author's Calculations.

To determine the causality relationship between 1972-2014 periods, innovative accounting approach in better than VECM Granger causality approach, because VECM Granger causality informs us only direction of causality by ignoring the effect of shocks and magnitude of causality. The innovative accounting approach includes variance decomposition and impulse response function. The variance decomposition approach indicates the magnitude of predicted error variance for a series accounted for by innovations from each of the independent variable over different time-horizons beyond the selected time period. It is pointed by Pesaran and Shin, (1999) that generalized forecast error variance decomposition method shows the proportional contribution in one variable due to innovative shocks stemming in other variables.

Further, the generalized forecast error variance decomposition approach estimates the simultaneous shock effects. Engle and Granger, (1987) and Ibrahim, (2005) argued that with VAR framework, variance decomposition approach produces better results as compared to other traditional approaches. Table-9 has incorporated results of Variance Decomposition Approach (VDA). The results show that fraction of trade balance forecast error variance powers to variations in financial development, exchange rate and inflation are 0.00% and 0.00% respectively for 1st year time horizon. From 2-year horizon to 10-year horizon, the impact of financial development, exchange rate and inflation is continuously increasing. 60 % portion of trade balance is explaining by its own innovative shocks.

Financial development explains 19% portion of trade balance which is the highest share in the explaining trade balance. Exchange rate explains 9.9 % portion of trade balance and inflation explains 10% portion of trade balance till 10-year time horizon. Similarly, 59% share of financial development is explaining by its own innovative shocks, 36 % portion of financial development is explaining by trade balance, 2.3 % portion of financial development is explaining by exchange rate and 2.1% portion of financial development is explaining by inflation till 10-year time horizon. Trade balance, financial development and inflation is explaining exchange rate by 31%, 7% and 32% respectively till 10-year horizon. 28.8 % of exchange rate is explaining by its own innovative shocks. Trade balance and financial development are explaining inflation by 11% and 51% respectively. More than 37 % of portion of inflation is explaining by its own innovative shocks till 10-year horizon. Exchange rate is explaining inflation by 0.5 % which is very low.

Table-9: Variance decomposition Approach

Variance Decomposition of $ln\ TB_t$					
Period	S.E.	ln TB_t	ln Fd_t	ln Ex_r_t	ln CPI_t
1	0.358635	100.0000	0.000000	0.000000	0.000000
2	0.494257	73.82200	9.433224	16.70442	0.040351
3	0.604812	65.33989	16.76282	16.88928	1.008015
4	0.700080	64.35856	18.49122	13.96270	3.187525
5	0.768861	63.73155	18.93822	12.04811	5.282117
6	0.814022	63.02695	19.08725	10.81213	7.073675
7	0.842100	62.37220	19.07639	10.11231	8.439102
8	0.857984	61.78111	19.04795	9.833166	9.337770
9	0.866075	61.29862	19.03937	9.824202	9.837807
10	0.869834	60.95090	19.04038	9.957251	10.05147

Variance Decomposition of $\ln Fd_t$					
Period	S.E.	$ln\ TB_t$	$ln\ Fd_t$	$ln\ Ex\_r_t$	$ln\ CPI_t$
1	0.068738	14.43148	85.56852	0.000000	0.000000
2	0.114635	30.12444	68.91149	0.427840	0.536223
3	0.145588	35.04925	62.77928	1.087756	1.083708
4	0.165183	37.76987	59.63768	0.968252	1.624201
5	0.177377	39.17199	58.02691	0.864176	1.936915
6	0.184945	39.38798	57.62765	0.989818	1.994550
7	0.189941	38.91693	57.86614	1.294839	1.922089
8	0.193598	38.14079	58.31699	1.683158	1.859056
9	0.196591	37.25306	58.76495	2.065777	1.916213
10	0.199301	36.33696	59.11295	2.393290	2.156798
Variance Decomposition of $\ln Ex\_r_t$					
Period	S.E.	$ln\ TB_t$	$\ln Fd_t$	$\ln Ex\_r_t$	$\ln CPI_t$
1	0.050411	20.47849	2.866314	76.65520	0.000000
2	0.074396	26.30570	1.926968	69.43867	2.328658
3	0.091001	34.51361	1.332898	56.75381	7.399683
4	0.103426	38.04758	1.341261	47.81224	12.79891
5	0.112561	38.58221	1.538530	41.86172	18.01753
6	0.119594	37.76154	1.924648	37.57383	22.73998
7	0.125128	36.26571	2.607233	34.46194	26.66511
8	0.129581	34.48976	3.689113	32.16158	29.65954
9	0.133352	32.70732	5.219857	30.36950	31.70332
10	0.136763	31.09621	7.159753	28.87471	32.86933
Variance Decomposition of $ln\ CPI_t$					

Period	S.E.	ln TB_t	ln Fd_t	ln Ex_r_t	ln CPI_t
1	0.024929	0.043101	2.988432	0.128548	96.83992
2	0.042042	1.163967	1.511696	0.197918	97.12642
3	0.055493	1.118136	7.448913	0.347091	91.08586
4	0.066735	0.904631	17.43248	0.487346	81.17555
5	0.077029	2.019041	27.43573	0.639912	69.90532
6	0.086579	4.156851	35.41866	0.691844	59.73265
7	0.095258	6.549002	41.21400	0.634446	51.60255
8	0.102997	8.620909	45.39873	0.546003	45.43436
9	0.109839	10.14263	48.54055	0.492826	40.82400
10	0.115891	11.11899	51.00467	0.504021	37.37231

Source: Author's Calculations.

V. Conclusion and Recommendations:

The contribution of this paper is to find out the impact of financial development on trade balance by incorporating the exchange rate and inflation for Pakistan over the period of 1972-2014. We have applied ADF, PP and Break point unit root tests to check whether the variables are stationary or not. The ARDL bound test has been applied to analyze long run relationship between variables. Our results confirmed that cointegration exist among variables for long run relationships. Financial development has positive significant impact on trade balance in long run but in short run, it has found insignificant. Similarly, exchange rate and inflation has negative and positive relationship with trade balance in short run as well as in long run respectively. The value of lagged ECM has found negative and significant which shows the speed of adjustment from disequilibrium to equilibrium.

The results of VECM Granger causality reveal that financial development, exchange rate and inflation cause trade balance in long run collectively. In short run, financial development does not cause trade balance but exchange rate and inflation cause trade balance. Bidirectional causality exists between trade balance and exchange rate. Unidirectional causality accrues from trade balance to financial development. Similarly, bidirectional causality exists between inflation and trade balance. Variance Decomposition Approach (VDA) has confirmed that financial development has majour contribution to explain trade balance till 10-year time zone. Similarly, majour share of financial development is explaining by shocks stimulating in trade balance till 10-year time zone. Trade balance and inflation both have majour contribution to explain exchange rate till 10-year time zone. Majour portion of inflation is also explaining by exchange rate and financial development.

Government should reduce lending rates and increase deposit rates to enhance financial development by using monetary policy. Low lending rates will help to meet the short term and long term financing needs of the private sector. High deposit rates will help to collect the domestic currency for the purpose of lending to private sectors. It will help to boost investment that will improve trade balance by enhancing exports.

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