8. AN EMPIRICAL ANALYSIS OF EXPORT, IMPORT, AND INFLATION: A CASE OF PAKISTAN

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Abstract

This article examines the association between inflation and exports & imports in perspective of the Pakistani economy. The researchers have taken month-to-month data of CPI (the indicator of inflation), imports and exports from July 2001 through June 2017. For the analysis purpose, researchers have employed error correction model to examine the short-run association amongst the variables; however, Johansen cointegration was used to investigate the long run association amongst the variables. The Granger causality approach has been applied to check the causal directionality between the pair of variables. Results of analysis exhibited that in a long run 1% increase in exports and imports cause 0.63% and 0.57% increase in the CPI (inflation) correspondingly. However, the coefficient of predictable error correlation signifies that approximately 1.18% deviance of inflation rate through the long run level of equilibrium has been adjusted every year. Whereas, the outcomes of variance decomposition analysis (VDA) demonstrated that exports employed the highest innovation influence on the CPI (inflation) amongst all three indicators in the overall arrangement of inflation. Lastly, the outcomes of Granger causality and Toda Yamamoto causality does not find evidence for the hypotheses that the monthly changes of export and import do not cause the monthly modification in inflation in case of Pakistani economy.

Keywords: inflation, imports, exports, co-integration, Granger causality, Pakistan

JEL classification: E31, E37, F4

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1. Introduction

The globalization has brought an open door for the world economies and international business trade. The international business has an imperative role in the production processes and consumption decision. In a closed economic situation, besides numbers of causative factors, inflation is attributed to excess demand created within that economy. But in case of the open economy, the situation of global trade, for instance, the export and import also influence the inflation. According to Dexter *et al.* (2005), the imports can directly influence the domestic inflation through the prices of import goods that are included in the price index, however, the imports can also indirectly influence via the competition of domestic services and goods as compared to the foreign imported items. The exports can also influence the inflation due to the supplies pattern of domestic goods and services to the household consumers. Thus, the international trade acts like an open door, and the pressure within the economy may migrate due to the products and services inflows and outflows. In an economy, when demand surpasses the local production level then the disparity grows, which leads to the inflationary situation. Thus, the country may pursue the import policy in order to respond this excess demand. On the contrary, when the country faces the reverse situation, and demand does not meet the local production then inflation begins to erode, and surplus production could be exported to other countries for handling this situation. Hence, these exports and imports are the causative factors for the generation of inflationary effect in an economy. Generally, an increase in imports may cause the depreciation in the rate of exchange, so, this inflationary pressure could be managed by increasing the cost of imports. Likewise, if the country imports the raw material, subsequently, the local currency depreciates, and that makes the imports pricy. Consequently, the cost of production of finished goods increases because of the increase of raw materials' cost; thus, higher imports incline to escalate the inflation. On the contrary, the increase in exports instigate the appreciation of local currency, hence, it tends to reduce the inflation. According to Lipsey *et al.* (1982), the increase in inflation makes every individual sadder due to the decrease in purchasing power of wages, corroding the living standards, and worse off the life uncertainties in many ways. In recent years, the Pakistani economy has faced an uprising inflation rate that is a foremost intimidation to the macroeconomic constancy of the Pakistan. There are numerous factors, which contribute to the inflationary pattern for Pakistani economy; the major factor is the higher imports that depreciate the local currency. The decrease in exports that also depreciate the exchange rate, other factors, for instance, variation in interest rate, decrease in foreign remittances, growth in money supply, decrease in manufacturing production and agriculture, and elevated growth rate of the population is the detrimental factors for the increase in inflation in case of Pakistani economy.

In undertaken research, we have taken two significant causal factor of inflation such as imports and exports, and examine the influence of imports and exports on the overall inflation of the Pakistani economy. We have investigated the association between inflation, and imports and exports by taking month-to-month data of CPI, import, and export for the time frame from July 2001 through June 2017. For the analysis purpose, we have used several econometrics techniques. The findings of the study provide an insightful thought regarding anti-inflationary policies not only for the Pakistani economy but it could be generalized for other developing economies as well, especially nations of the South Asian region where export and import have a crucial part towards genesis of inflation.

2. Literature Review

The determinants of inflation are discussed widely in the previous literature; the Economists from diverse schools of thought have proposed their postulates and theories about the causative factor of the inflation. In the period of Keynesian, it was believed that the inflation is an outcome of either rise in aggregate demand, which known as the demand-pull inflation, or decline in aggregate supply that is regarded as the cost-push inflation. The economists of this era considered the fiscal policy as an important mechanism to control inflation. The model of Phillips Curve developed by Phillips (1954) presents the notion of trade-off amid an employment and the inflation. On the same vein, Samuelson and Solow (1960), and Lipsey (1960) have further modified this model. According to this model, there is a negative association amidst unemployment and the inflation. However, the quantity theory of money model suggested a directly proportional association of money supply on the inflation. This theory emphasizes about the function of monetary policy for containing the inflation. Several research studies have investigated the possible determinants of inflation in developing and developed economies of the world. According to Liviatan and Piterman (1986), Sergent and Wallace (1981), and Montiel (1989), the typical factors that are associated with the fiscal disparity such as exchange rate depreciation, and superior money growth are dominating the inflation in developing economies.

An important study was carried out in the Turkish economy to examine the determinants of inflation, the study has used Johansen cointegration technique, and considered the data series from 1970 through 1995. Outcomes of the research study have demonstrated that the exchange rate, wages, exports' and imports' prices, and money supply are the significant factors that influence on the inflation in case of the Turkish economy (Lim and Papi, 1997). Gylfason (1997) studied the relationship between export and some of its determinants including the inflation and used econometrics techniques for the cross-sectional data of 160 countries. He concludes that high inflation has tended to be associated with low exports. Moreover, this study shows that exporters of primary commodities to have more inflation than the exporters of manufactures. Dexter *et al.* (2005) have conducted a crucial study in perspective of the US economy; they have concluded that the international trade has a cogent impact on the inflation. However, the exports have a direct relationship with the inflation, and imports have an inverse association with the inflation. In Pakistani perspective, Khan *et al.* (2007) have carried out an important study and examined the explanatory macroeconomic indicators for the inflation; they have considered the data from 1972 through 2005. The outcomes of the study have concluded that the import prices, government borrowings, private sector borrowing, exchange rate, wheat support price, real demand, last years' CPI, and government taxes have a significant part of contributing in an inflationary process in case of the Pakistani economy.

According to study Ali and Li (2016), the main reason behind the trade is not only provoked revenue but to get the autonomy of economic agents and countries, because no nations can live in an isolated environment as every nation in the world has different resources located in different regions naturally. However, few nations have the natural tendency for few resources but other do not have the same, therefore there is need to trade something because of comparative advantage, and other time because of natural lacking of some particular resources dearth. Factor endowment is asking for exchanges for goods and services. The study of Fatima (2010) has explored, variations in terms of trade have a strong influence on the income and consumption potentials. This study highlighted the terms of trade of Pakistan and its fluctuations by using time series analysis from 1990-2008 and identified the deteriorations.

The results have shown that due to the deluge in global commodity prices, the terms-of-trade deteriorated in the time period from January 2003 through May 2008. The South Asia endures enormously in higher prices of food; petroleum, and these losses were up to 36% of GDP for the countries like Maldives and Bangladesh. Inflation in Pakistan during 2008-09 was around 20 percent, the double-digit inflation led to disquiet for general consumers on one hand and afflicted the economy on another hand at the same time because of higher raw material prices especially in the area of construction material. Due to the bad crises of energy, Pakistan has faced astringent energy crises and unbridled borrowing of government from state bank of Pakistan. The inflation in 2012 was targeted 9.5 percent but actual inflation was deviating and higher than the targeted and the reason was structural changes in an economy at that time. The empirical analysis of trade impact on financial liberalization, using annual observation of the period 1961-2005, states that the financial policies and trade play the crucial role in economic growth of Pakistan for a long run. Thus, there is a need to study further for the trade and financial liberalization, which required commitments for promotion and ensure sustainability (Khan & Qayyum, 2007). Chang and Ho (2002) have observed that the South Korea's economic growth over the period of 1953-99 was influenced by the joint impact of trade and finance.

Pakistan is proved to have very high potential of exports with more than thirty profitable sectors such as leather, seafood, sports items, apparel and clothing, staple fibers, cotton and textiles, and carpets etc. The growth of real output contracted and there were adverse effects on the demand for investment and exports with high inflation in Turkey due to the anticipated exchange rate (Kandil *et al.*, 2007). According to Kandil *et al.* (2017), the exchange rate fluctuation and the Globalization cause economic growth in the India but reduce the same in the China due to more competitive exports trends worldwide. Raza and Afshan (2017) have carried out an important study, in which he used time-series analysis to examine the exchange determinants of Pakistan from 1972-2013. Outcomes of research study have demonstrated an inverse association in terms of trade, trade openness and economic growth with the exchange rate, but a positive association with money supply and inflation rate. In Pakistani and global environmental perspective Ahmed (1998) explored that Pakistan kept on changing the trade policies often in different era since Pakistan came into the existence, and in 1950s Pakistan formulated policies to buy agricultural raw material at lower prices than the prices prevailed in the world market at that time and this policy has contributed significantly to lowering the inflation rate. The trade situation of Pakistan can be observed from the statistics presented by the SBP via Bureau of Statistics, it revealed that Pakistan traded USD22.77 billion in imports and for exports USD36.90 in 2015 (Ali & Li, 2016). Pakistan's export of goods and services has shown an increasing trend from 2000-2012 and reaches USD2000 million (Bahmani-Oskooee *et al.,* 2012).

Zakaria (2014) in this study stated that the exports and imports both could be stimulated via liberalization. The liberalization influence exports more than the imports, which causes balance of trade deteriorations. Liberalization also affects the elasticity of the price and trade balance, imports, and exports', the outcomes of the study shows that how much should be the degree to opt liberalization in of Pakistan. A Study of Ahmad *et al.* (2011) suggested in his reinvestigated research of the association amid exports and growth that policymakers should concentrate on three major export partners of Pakistan to strengthen the relationship with favorable terms of trade and enhancement in exports to these three partners because approximately 30% of exports of Pakistan is based on the USA, UAE, and the UK, therefore the dependency of exports growth and economic growth are obvious. According to Ali and Li (2016), the experiences of exporting and importing industries of Pakistan explored that trade with the US from 1980-2014 was observed 50% of Pakistan's industries in the short-

run and influenced by exchange rate's fluctuations. The United States is the biggest trade partner of Pakistan. According to the figures of the fiscal year 2015, the total exports were USD24.59 billion; however, the estimated imports were USD47.43 billion in a similar time period. Similarly, in the same time period, Pakistan had received 14.4% of total remittance approximately 0.5 million residents of Pakistanis in the United States. The US account for almost 15 % of Pakistan exports, and USD1.2 billion of imports in FY 2015. The US is also one of the top FDI sources to Pakistan with about USD209 million in FY 2015 (Ali & Li, 2016).

3. Data and Methodology

This article investigates the relationship between inflation with two important macroeconomic variables named imports and Exports. We have considered the month-to-month data series of CPI (an indicator of inflation) from July 2001 through June 2017; thus, in this way we have taken 192 observations in total.

Table 1

Descriptive Analysis of the Variables

Statistics	CPI	M	X
Mean	130.30	2850.45	1561.54
Median	121.55	3143.15	1554.09
Maximum	216.33	5092.00	2622.00
Minimum	64.19	707.74	654.86
Standard deviation	52.20	1135.95	440.60
Skewness	0.22	-0.37	-0.18
Kurtosis	1.51	2.06	2.25
Jarque-Bera	19.17	11.4108	5.4387
Probability	0.0001	0.0033	0.0659
No. Of Observations	192	192	192

Source: Authors' estimation.

The source includes different monthly issues of a monthly statistical bulletin of Pakistan Bureau of Statistics (PBS). In the undertaken study we used inflation as a dependent variable, which was measures consumer price index (CPI) with the base period of 2007-08. However, the imports and exports have been incorporated as the independent variables for an undertaken research study. Both imports (M) and exports (X) are measured in terms of million US dollars. All these three variables are transformed to log in order to smooth the series (minimizes the volatility). We have performed a descriptive analysis of the data series; Table 1 shows the results of the descriptive analysis.

We have used the following multivariate structural model to examine the relationship between the variables; we have transformed values into a natural log before proceeding further analysis:

$$LCPI_t = \alpha + \beta_1 LM_t + \beta_2 LX_t + \varepsilon_t \quad (1).$$

where: in Eq. (1) LCPI is referred for the natural log form of consumer price index, whereas, LM and LX are the natural log forms of imports and exports respectively, the time period is labeled as 't'. However, α, β are known as the parameters that called as the intercept, and coefficient of slop respectively, finally, ε is called the white noise error.

3.1 Econometrics techniques for the estimations

We have employed two important techniques to check the unit root in considered data series, the first was Augmented Dickey-Fuller (1979, 1981) technique, and second was Philips-Perron (1988) test. We have employed Johansen (1988) cointegration technique for examining the long run association, moreover, Schwarz Bayesian criteria (SBC) has employed to select the lag order choice. The short-run association has measured by employing vector error correction model. According to Engle and Granger (1987), the VECM offers the information regarding the rate of change to the equilibrium in long run and evades the spurious regression problem. Once we have used the VECM approach and estimated the short run association amongst the variables. The next phase is to investigate the comportment of the shocks' error to every macroeconomic indicator on its own specific forthcoming dynamics; this further explains the error shock on the upcoming dynamics of other elements in the VECM arrangement. For this purpose, we used analysis of variance decomposition, and graphical analysis of impulse response function, the analysis of VDA measures the oscillation of forecasted error in percentage, which is clarified by other macroeconomic indicators in a short run dynamics and interaction. The Granger (1969) causality is an important to establish and test whether one variable could predict another variable while we consider different time series. Similarly, according to the Goebel et al. (2003), the causality technique is built on the multiple linear regression analysis. The past literature has demonstrated that several research studies have been carried out on the basis of residuals of the F-statistics. The coefficients of authorized trace could be employed in order to perform the T-test at statistics of group level (Chen et al., 2009). Similarly, MacFarlin et al. (2009) have clarified that the negative trace coefficients as restrained outcomes. We have also employed Toda and Yamamoto (1995) technique to validate the causality of the macroeconomic variables

3.2 Estimations and findings

Unit root tests for stationarity

The outcomes of Table 2 exhibited that both Philips-Perron and Augmented Dickey-Fuller tests do not reject the hypothesis of non-stationarities for the data series of LCPI, LM, and LX at the levels by using 5% level of significance. However for 1st difference of all series, the null hypotheses have been rejected, thus, the data series become stationary at the first difference.

Table 2

Outcomes of Stationarity Techniques

Variables	Level	P-Value	Ist Difference	P-Value
Augmented Dickey-Fuller test statistic				
LCPI	-0.5756	0.8718	-5.5054	0.0000
LM	-1.9356	0.3155	-13.8488	0.0000
LX	-2.8701	0.0509	-4.6704	0.0001
Phillips-Perron test statistic				
LCPI	-0.5199	0.8833	-11.58913	0.0000
LM	-2.0857	0.2508	-30.3601	0.0000
LX	-2.5870	0.0974	-23.35724	0.0000

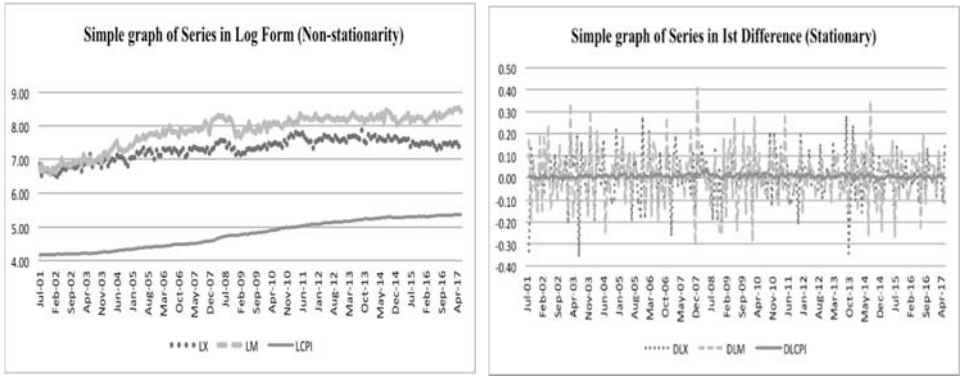
Note: Critical values are: at 1% (-3.4670), at 5% (-2.8775), and at 0.01 (-2.5754) MacKinnon (1996), one-sided p – values. Source: Authors' estimation.

Stationary and Non-stationary Graphs

Figure 1 is the representation of stationary and non-stationary visual graphs of LCPI, LX, and LM. The left-hand side figure shows the series are non-stationary at the level, however, the right side of figure exhibits that the series have become stationary at first difference.

Figure 1

Stationary and Non-stationary Graphs of LCPI, LX, and LM



Source: Authors' estimation.

Multicollinearity diagnosis

The multicollinearity diagnosis exhibited in Table 3, the results showed that the partial correlation showed a weak relationship between LX and LM, which indicates the multicollinearity, does not exist between the predictors. Moreover, value of tolerance is greater than 0.1, and variance inflation factor (VIF) is less than 10 that further demonstrated that multicollinearity does not exist between experts and imports.

Table 3

Multicollinearity diagnosis

Model		Correlations			Collinearity Statistics	
		Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)					
	LX	.845	.207	.102	.141	7.087
	LM	.870	.435	.232	.141	7.087

Note: Dependent variable: LCPI. Source: Authors' estimation

Breusch – Godfrey serial correction – LM technique

We have employed the Breusch-Godfrey serial correction method to endorse the autocorrelation drawback. Table 4 has exhibited the outcomes of this technique, we have developed the null hypothesis, "there is no serial correlation for 'm lag' orders", if 'm=1' then the 'Obs*R-squared measurement is called technique of Breusch-Godfrey.

Table 4

Outcomes of Breusch-Godfrey Serial Correlation – The LM Technique

F-statistic	773.8357	Prob. F (1,188)	0.0000
Obs*R-squared	154.4718	Prob. Chi-Square (1)	**0.0000**

Source: Authors' estimation.

VAR Lag Order Selection Criteria

In the next phase, we have examined the long-run relationship by using Johansson's cointegration method. Before applying for cointegration, we have identified the lag values used in cointegration method, for that we estimate lag order selection by using VAR approach, and Table 5 exhibited the outcomes of VAR lag order assortment criterion.
Hence, the outcomes of Table 4 exhibited that the developed null-hypothesis of no serial autocorrelation has been rejected at 1% significance level. Thus, it is concluded that there is an evidence of the existence of autocorrelation amongst the variables; hence, the estimated previous model is an indication of spurious regression.

Table 5

Results of VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	915.51	NA	0.00	-9.97	-9.92	-9.95
1	964.61	96.04	0.00	-10.41	-10.20*	-10.33*
2	974.44	18.91	0.00	-10.42	-10.05	-10.27
3	991.00	31.30	0.00*	-10.50*	-9.98	-10.29
4	998.62	14.17	0.00	-10.49	-9.80	-10.21
5	1005.98	13.43	0.00	-10.47	-9.63	-10.13
6	1013.36	13.23	0.00	-10.45	-9.45	-10.05
7	1024.32	19.28*	0.00	-10.47	-9.32	-10.00
8	1029.60	9.12	0.00	-10.43	-9.12	-9.90

*Note; * Denotes lag order selection by the criterion. Source: Authors' estimation.*

Testing Cointegration

As in the previous section, we used Schwarz information criterion (SC) for the selection of the lag length that is 1. The results of ADF and P-P tests exhibited that all the data series are integrated of order one. Hence, the Johansen cointegration technique would be an ideal to examine the long run relationship amongst the macroeconomic indicators such as CPI, imports, and exports. We have examined the number of cointegrating vectors by employing the techniques of the maximum eigenvalue, and trace statistics. Table 6 exhibited the results of cointegration analysis.

Table 6

Outcomes of Unrestricted Cointegration Rank Test

Trace test				
Hypothesized	Eigenvalue	Trace	0.05	Prob.**
No. of CE(s)		Statistic	Critical Value	
None *	0.1407	42.0853	29.7971	0.0012
At most 1	0.0582	13.4168	15.4947	0.1004
At most 2	0.0110	2.0855	3.8415	0.1487
Max-eigenvalues test				
Hypothesized	Eigenvalue	Trace	0.05	Prob.**
No. of CE(s)		Statistic	Critical Value	
None *	0.1407	28.6685	21.1316	0.0036
At most 1	0.0582	11.3313	14.2646	0.1384
At most 2	0.0110	2.0855	3.8415	0.1487

Note: Results of Max-eigenvalues test showed 1 cointegrating equation at 5% significance level.

**Indicates the rejection of the null hypothesis at 5% significance level; **MacKinnon-Haug-Michelis (1999), p – values. Source: Authors' estimation.*

The outcomes of the trace and Max – eigenvalues tests have identified one cointegrating vector, thus, it has confirmed that there is an association of long-run amongst the macroeconomic indicators such as the inflation (CPI) imports and exports. After standardization the cointegrating vector on LCPI, we have examined the normalized cointegrating coefficient as follows:

$$LCPI_t = 0.628LM_t + 0.568LX_t \quad (2)$$

The Eq. (2) depicted a long run and positive association between inflation, and the imports and exports, and both imports and exports have a positive influence on the inflation. Moreover, the relationship between CPI and independent variables such as imports and exports are established statistically significant at 5% significance level. Thus, it is finally concluded that there is an existence of a long run association, and 1% increase in imports and exports contributes 0.63% and 0.57% increase in inflation respectively in case of the Pakistani economy.

Vector Error Correction Model – VECM

We have employed the vector error correction model (VECM) to examine the short-run association amongst macroeconomic indicators such as CPI, imports, and exports. Table 7 exhibited the outcomes of VECM that demonstrated approximately 1.18% deviance of the inflation (CPI) from its equilibrium level is adjusted in every period for short run. However, the gapes in imports and export are approximately 10.7% and 0.6% respectively. Hence, it is finally concluded a short run relationship amongst the inflation, imports, and exports.

Table 7

Outcomes of Vector Error Correction Model – VECM

Error Correction:	**D(LCPI)**	**D(LM)**	**D(LX)**
CointEq1	-0.0118	0.1068	0.0570
	[-4.3979]	[2.6220]	[1.6661]
D(LCPI(-1))	0.1059	0.3627	-0.0666
	[1.4192]	[0.3193]	[-0.0698]
D(LCPI(-2))	-0.0470	2.9099	2.0836
	[-0.6325]	[2.5711]	[2.1916]
D(LM(-1))	-0.0032	-0.4274	0.1062
	[-0.5897]	[-5.1879]	[1.5343]
D(LM(-2))	-0.0045	-0.1083	0.0340
	[-0.8715]	[-1.3694]	[0.5117]
D(LX(-1))	0.0096	-0.1421	-0.5584
	[1.4616]	[-1.4208]	[-6.6473]
D(LX(-2))	0.0027	-0.0286	-0.2128
	[0.4281]	[-0.3009]	[-2.6647]
C	0.0060	-0.0060	-0.0062
	[7.1559]	[-0.4727]	[-0.5797]
R-squared	0.1697	0.2991	0.2689
Adj. R-squared	0.1376	0.2720	0.2406
Sum sq. resids	0.0096	2.2322	1.5752
S.E. equation	0.0073	0.1111	0.0933
F-statistic	5.2850	11.0352	9.5107

Source: Authors' estimation.

Variance Decomposition Analysis (VDA)

We have used forecast error variance decomposition analysis for examining the additional short-run dynamic properties of the inflation. Outcomes of Table 8 exhibited that the analysis of variance decomposition signifies the extent of information for every variable that contributes to the rest of macroeconomic indicators in vector auto regression (VAR) approach. The comprehensive outcomes of VDA have been shown in Table 8. As the variance decomposition analysis further exhibited that the dynamics disparity in inflation clarifies 100 per cent of mechanisms for deviation of the first time period, as the innovation of 1SD or one standard deviation in an indicator because of its own happening. However, in the second time period, it has gone up to 97.65% of an inaccuracy forecast for the inconsistency or unpredictability. Whereas, in the second time period the variability of 0.90% and 1.45% have been seen because of the imports and exports deviation respectively. The upsurge in the percentage characterizes to the deviation in imports and exports remain to oscillate with the drift to enhance that up to 15.57% and 6.73% correspondingly in the time period of the tenth.

Table 8

Outcomes of Variance Decomposition – LCPI

Period	S.E.	LCPI	LM	LX
1	0.0073	100.0000	0.0000	0.0000
2	0.0110	97.6550	0.8964	1.4486
3	0.0135	95.9925	2.0284	1.9791
4	0.0165	93.3844	4.3638	2.2518
5	0.0192	90.6582	6.3268	3.0149
6	0.0217	88.2052	8.0607	3.7340
7	0.0241	85.4743	10.0663	4.4595
8	0.0264	82.7836	11.9860	5.2304
9	0.0287	80.2262	13.7931	5.9807
10	0.0309	77.7032	15.5678	6.7291

Source: Authors' estimation.

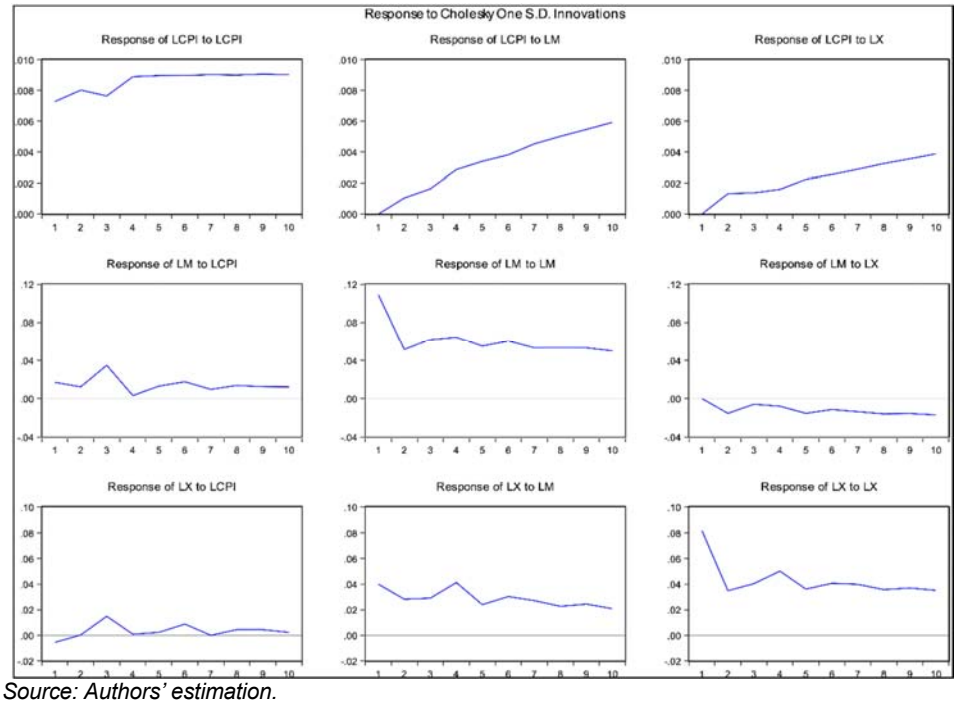
Impulse Response Function

Results of impulse response function as showed in Figure 2, exhibited that the influence of one standard deviation undifferentiated shocks in the imports and exports on the inflation (CPI) in case of the Pakistani economy.

The outcomes of Figure 2 are consistent with the outcomes of variance decomposition, where the inflation responds positively to shocks in imports and exports over time. Moreover, it is further concluded that the exports have exerted the highest innovation influence on the inflation amongst the variables in the measured system of inflation.

Figure 2

Impulse Response Function Graphs



Source: Authors' estimation.

Granger Causality Technique

Finally, we have to test the direction of causality amidst the macroeconomic indicators in a long run association. Thus, we have employed pairwise Granger causality test between sets of D(CPI) to D(LX), D(LX) to D(CPI), and D(CPI) to D(LM), and D(LM) to D(CPI) with lag 2. The outcomes of Table 9 exhibited that neither D(LM) has a causal effect on D(LCPI) nor D(LCPI) does any Granger cause on D(LM). The results of Table 9 further demonstrated that Granger causality does not find evidence for the hypothesis that the monthly changes of export D(LX), does not cause the monthly modification in inflation D(LCPI) in case of Pakistani economy.

Table 9

Granger Causality Technique

Null Hypothesis:	F-Statistic	P-value	Granger Causality
D(LM) does not Granger Cause D(LCPI)	1.2744	0.2821	No
D(LCPI) does not Granger Cause D(LM)	1.6525	0.1944	No
D(LX) does not Granger Cause D(LCPI)	3.9675	0.0206	Yes
D(LCPI) does not Granger Cause D(LX)	1.4424	0.2390	No

Source: Authors' estimation.

Toda and Yamamoto causality technique

We have also employed Toda and Yamamoto (1995) technique in order to examine the direction of causality between the pair of macroeconomic indicators. The results of Table 10 demonstrated the similar findings as we have already found in Granger causality test. The outcomes of Table 10 exhibited that neither D(LM) has a causal effect on D(LCPI) nor D(LCPI) does any cause on D(LM). The results of Table 10 further demonstrated that Toda Yamamoto causality does not find evidence for the hypothesis that the monthly changes of export D(LX), does not cause the monthly modification in inflation D(LCPI) in case of Pakistani economy.

Table 10

Toda and Yamamoto test

Null Hypothesis:	Chi-square	P-value	Granger Causality
D(LM) does not Granger Cause D(LCPI)	3.3200	0.1901	No
D(LCPI) does not Granger Cause D(LM)	0.8333	0.6592	No
D(LX) does not Granger Cause D(LCPI)	6.1124	0.0471	Yes
D(LCPI) does not Granger Cause D(LX)	3.1203	0.2101	No

Source: Authors' estimation

4. Conclusions

This undertaken research study has attempted to examine the association between inflation and imports and exports in perspective of the Pakistani economy. For this analysis, we have taken a month-to-month data series of inflation, imports, and exports for the time period from July 2001 through June 2017. The results of different econometrics approaches exhibited that both imports and exports have a positive impact on the inflation with all coefficients are statistically significant in both long run and short run association. However, the outcomes of Granger causality demonstrated the one-way causality from exports to the inflation (CPI), though; there was no evidence of any causal association between imports and inflation. This research study is significant, since, the economy of Pakistan has faced different episodes of inflationary trends over the last few years. So it is necessary to determine the influential and significances causative indicators of the inflation. Thus, the results of the undertaken study will help to take appropriate actions to formulate anti-inflationary policies in the perspective of imports and exports to put in place the stable economic growth. Since this study exhibited that exports are the causative factor for the inflation, and ironically, the exports of Pakistan continuously declining for last few years, thus, the outcomes of this study are the true depiction of the economic situation of Pakistan. Hence, it is imperative to take concrete measures for improving the exports of Pakistan, and the government should provide the competitive environment and incentives to the local industry to produce value-added products at competitive prices to the international markets. Moreover, the government should also reduce the unnecessary taxes and tariffs on the exports, and provide lucrative incentives to the foreign investors for local investment. There is a tremendous potential in textiles, fisheries, agricultural products, mining, pharmaceuticals, and sports goods, thus, the government should encourage these industries and provide a business friendly environment for competing international markets. In this study, we have used CPI as an indicator of the inflation, thus, future studies might be used the WPI instead of CPI as an inflation proxy, and further robustness could be achieved by breaking the period into different inflation episode like low, moderate and high inflation periods.

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