EXPORT PERFORMANCE OF PAKISTAN:
A CO-INTEGRATION ANALYSIS WITH WORLD COMMODITY PRICES

Amina Malik and Muhammad Tariq Majeed[1]

ABSTRACT

The deteriorating export growth of Pakistan has captured the attention of policy makers. Liberalization policies provide equal opportunities to both developing and emerging economies to capture the international market for their products. In this scenario, few countries such as India, Vietnam, Cambodia, and Bangladesh performed well, while few countries were not able to even sustain their original position and Pakistan lies in later category. In spite of having GSP plus status in European Union, Pakistan's export performance is dismal as compared to other South Asian economies. In this study we have provided a detailed analysis of the performances of export by commodities and exhibit the stylized facts of Pakistan's export in comparison with Vietnam and Bangladesh. We have empirically explored the long run and short run dynamics between export and world commodity prices by employing co integration techniques and using quarterly data from 2004 (quater1) to 2016 (quarter 4). The empirical findings support the positive and long run relation of export earning of Pakistan with world commodity prices. Furthermore, the export performance also has positive linkages with the performance of large-scale manufacturing sector because of the major share of textile in LSM. However, the impact of natural gas supply on the export earning is transient and become insignificant in the long run.

Keywords: Exports, World Commodity Prices, GSP, Pakistan

JEL Classification: F21

1.   INTRODUCTION

Export an important driver of economic growth and major source of foreign exchange earnings is supported by many empirical studies, majorly after the East Asian crisis of 1997-1998. Export has majorly supportive to trigger the economic growth in Asian economies like South Korea, Malaysia, China, Taiwan. On the other hand many emerging economies are consistently facing the balance of payment problem primarily due to trade deficit and underlying reason behind is the failure to grow their exports relatively to imports to finance the import bill. To address this challenge many export biased policies have been designed and suggested by economist along with the flexible exchange rate. Removal of trade restrictions and quotas provide equal opportunities to both developing and emerging economies. In this scenario, few countries like India, Vietnam, Cambodia, and Bangladesh performed well, while on the other hand few countries were not able to even sustain their original position and Pakistan lies in later category.

---

[1] Authors are respectively Economic Analyst, State Bank of Pakistan and Assistant Professor, School of Economics, Quaid-i-Azam University, Islamabad. (email of corresponding author: tariq@qau.edu.pk)

In spite of granting GSP plus status to Pakistan by EU, it fails to fully exploit the opportunity. Pakistan exports are recorded depilated trend for last three consecutive years. Remittances had played unprecedented role during these years to finance the increasing trade deficit. Quench of foreign exchange is always very high in Pakistan to finance its import bills, but due to fiscal consolidation in GCC countries remittances are also showing the falling trend. Furthermore recent upheaval between Qatar and Saudi Arabia can further exacerbate the falling labor demand from Pakistan. Only option we are left with, for earning foreign exchange, is to take appropriate measure to revive the moribund export growth.

The purpose of our study is to analyze the trend in major export goods and to explore the sectors wise performance of growth over the past decade. We have tried to explore and discuss the issues in export sector of Pakistan. Furthermore, comparative analysis of export performance of Pakistan and other emerging economies like Vietnam and Bangladesh has been conducted to provide the better understanding of change in market share of export goods, especially in European Union. Over the previous two decades the export performance of Pakistan has been considered bleak when we compare it with our immediate neighbors like India and Bangladesh and competitors like Vietnam and Cambodia. Therefore, in this study we aim to empirically explore the supply side factors of exports along with in depth statistical analysis of these factors. Many factors at exporter's ends like lack of value added goods, unable to meet the changing taste and preferences, lack of innovations are also responsible for the gloomy picture of exports, along with the external forces like World Commodity Prices (WCP). Therefore, the responsibility of dismal export performance cannot be entirely laid on policy stance but exporters also share the responsibility by producing low value added products.

Moreover, we aim to find the long run relationship of export with world commodity prices, large scale manufacturing (LSM) growth, and natural gas production by employing co-integration analysis. In the result, we will be cognizant about depth of relationship between world commodity prices and export. Our study will contribute in the literature of Pakistan's export by providing in depth statistical analysis of disaggregated export, providing the stylized effects of Pakistan's export vs. Bangladesh and Vietnam's export, finding the long run and short run relationship of export with world commodity prices, LSM growth, and Natural gas.

1.1.   Stylized Facts of Pakistan's Export

Growing trade deficit of Pakistan with every passing month is exacerbating the apprehension of independent economists. All the claims made by government regarding the export performance of country are not appearing to be materialized and target set in strategic trade policy to grow export by 35 billion US$ by 2018 is difficult to meet. Export growth in Pakistan has been showing a dismal picture since last two years and it has decreased about 12.9% in 2016-2017. Energy crises, scarcity of raw material are usually claimed to responsible for this gloomy picture. Since 2008 to 2017 the exports of Pakistan is hovering between 19 billion and no significant improvement and growth has been witnessed in export performance of Pakistan. Last

year, it further increased the apprehensions of policy makers when it declined about 12.9 percent. In terms of percentage of GDP it has declined from 13.39% in 2003 to 7.46% in 2016 (see Figure1). Our export in terms of GDP is lagging behind with our peers such as Bangladesh, Vietnam and Cambodia.

Figure 1:   Export Trends of Pakistan
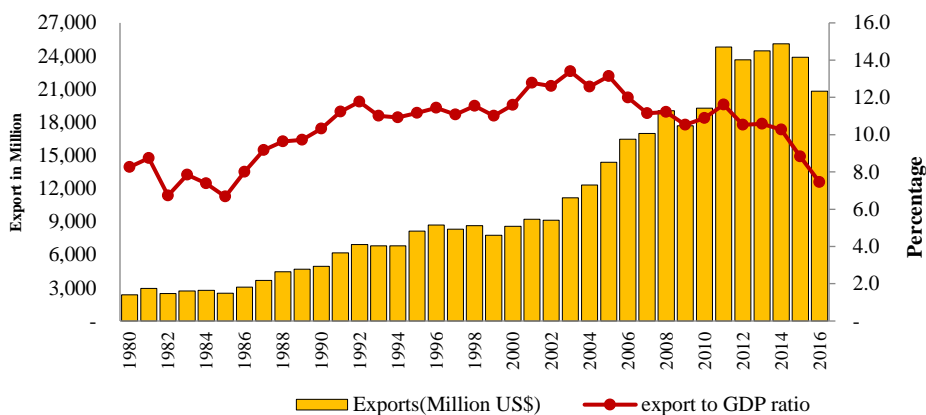
Source: State Bank of Pakistan

The major portion of Pakistan export is destined toward European Union. Due to decrease in aggregate demand and change in preferences in advance economies our export to EU declined about 5.88% in 2016-2017. While in previous year 2015-2016 it declined about 22.8%. In spite of getting GSP plus status in January 2014, Pakistan export performance in EU remained dismal. Along with the internal issues which hamper the export growth in Pakistan, slowdown in advance economies and lower aggregate demand also reinforced the declining trend.

However on the other hands, our peers Vietnam and Cambodia outperformed during same years, increased their export to EU about 11.14% and 14.78%, respectively. [1] Our export towards our immediate neighbors Afghanistan and India has been decreased due to border related issues. Our merchandize trade towards Afghanistan declined about 6.47% due to turmoil in porous Durand line. The situation remained gloomy with our export to China due to slowdown in China and our terms of trade is continuously falling with China. Our export towards the major export partners including EU, USA, China, and Afghanistan all declined in FY15 and FY16.

However, our export growth to UAE slightly increased in FY15-16 (see Figure 3). Most of our export partners are advance economies like USA, Germany, and UK and therefore it gives us tough competition. In order to exploit the full potential of our exports we should explore the other markets for our traditional or poor value added products or try to meet the changing preferences and demand in advance economies.

---

[1] Data is taken from IMF direction of trade.
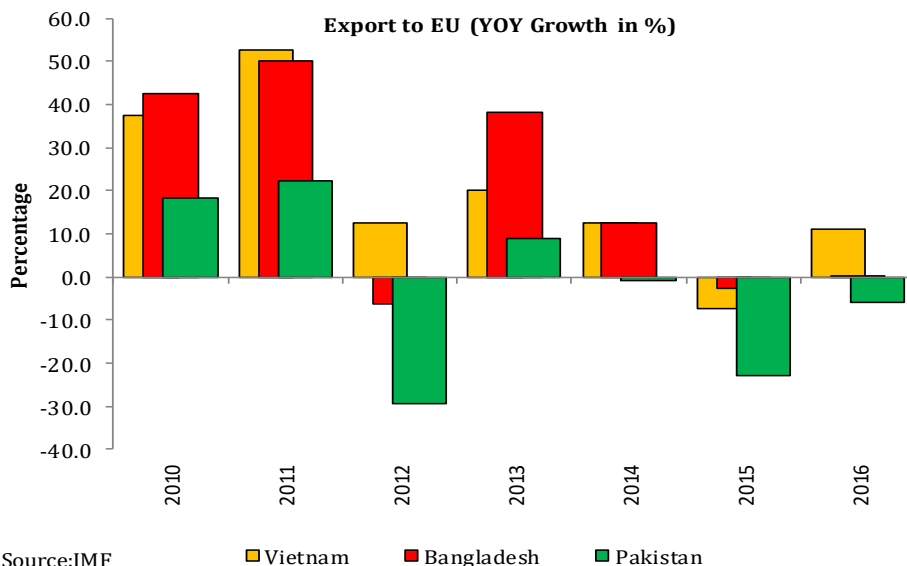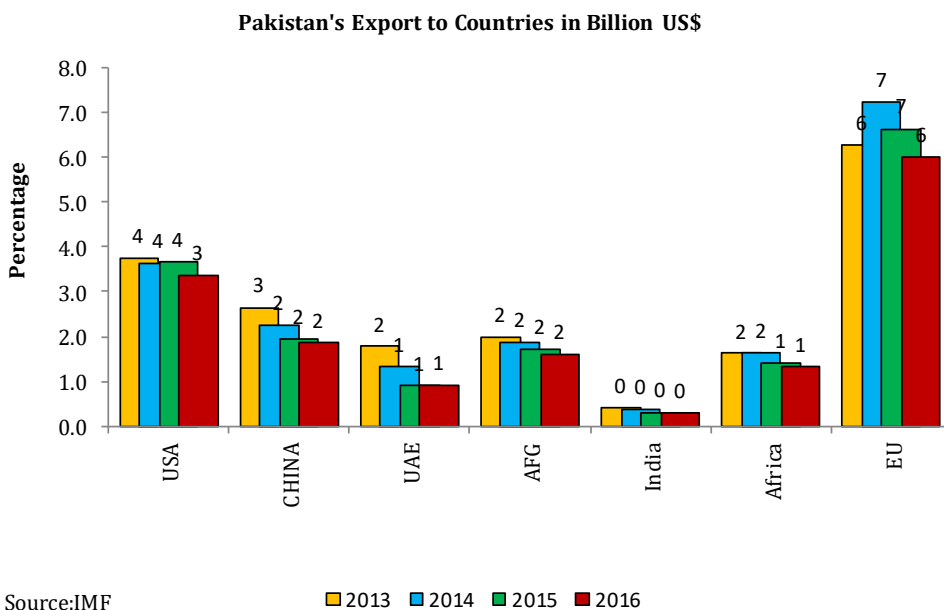
Figure 2: YOY Changing in Export to EU

Export to EU (YOY Growth in %)

Source:IMF   ▢ Vietnam   ▢ Bangladesh   ▢ Pakistan

Figure 3: Pakistan Export to Countries in Billion US$

Pakistan's Export to Countries in Billion US$

Source:IMF   ▢ 2013   ▢ 2014   ▢ 2015   ▢ 2016

The major commodities of Pakistan exports are grouped into five categories in SBP data that are textile group, other manufacturing, food group, petroleum group and all other (miscellaneous). The major categories of export and major export goods have

been presented using heat maps. We have standardized the growth of all sectors on 0 to 1 scale. Figure 4 presents the heat map of major export commodities while Figure 5 show heat map of export performance by sector. It is evident from Figure 4that the export performance of all major sectors of export industry was best in 2012 and worst in 2016. Similarly, Figure 6 indicates that the export performance by sector was best in 2012 and worst in 2016.

Figure 4: Heat Map of Major Export Comodities

	2010	2011	2012	2013	2014	2015	2016
Rice	0.64	0.85	0.31	0.28	0.37	0.25	0.14
Cotton yarn	0.07	0.91	1.00	0.21	0.85	0.11	0.01
Leather Tanned	0.06	0.31	0.72	0.20	0.87	0.12	0.03
Leather Manufactures	0.34	0.07	1.00	0.65	0.75	0.63	0.12
fruits	0.20	0.99	0.82	0.11	0.93	0.98	0.03
knitwear	0.24	0.34	0.96	0.07	0.23	0.42	0.38
Cotton cloth	0.26	0.12	0.95	0.49	0.49	0.14	0.19

Source: SBP and Authors' Calculation

Worst   Best
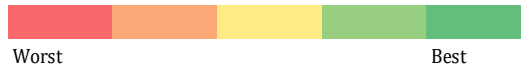
Figure 7: Relative Share of Exp comodities in total export in FY16 & FY17

Source: SBP

FY15 vs FY16 — Unit Circle

Source: SBP

Petroleum Group 2.06, All others 4.97, Food group 17.06, Other manufacturing 17.44, Textile Group 58.47

25
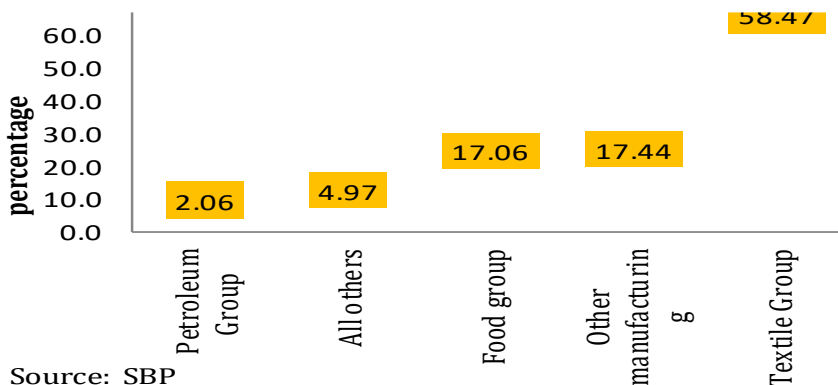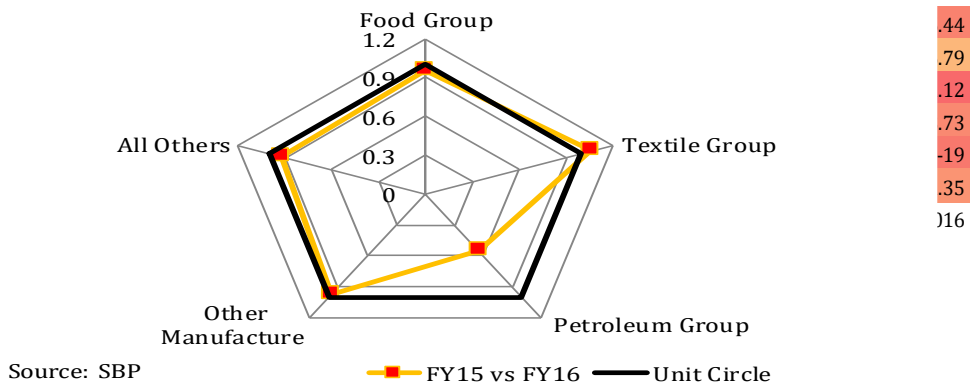
According to FY16, textile has the largest share in total export of Pakistan covering about 58.47% export of Pakistan; manufacturing commodities constitute about 17.44% of total export, Food group and petroleum group constitute about 17.06% and 2.06% of Pakistan's export, respectively. Figure 6 also exhibits that textile sector is the backbone of Pakistan's export and its share in total export has increased in FY16. On the other hand share of petroleum products have slightly declined because its lies inside the unit circle (see figure 7).

Figure 8 depicts that the majors textile good exported, which are cotton cloth, knitwear, readymade garments, bed wear, cotton yarn, towels, and synthetic textile. The major textile product exported by Pakistan is cotton cloth and knit wear that covered about 18.3% and 18.1% of textile export, respectively. The share of readymade garments and knitwear has been increasing gradually since last two years. While in absolute term the export of all the good has declined in past two years and the major reason for decline in total exports is the decline in textile export. In last two year due to slow down in major economies and poor competiveness of Pakistan's export is further reinforcing this trend. According to Figure 8 cotton cloths has major share in textile export; however the demand of cotton stuff in international market is declining due to poor manageability. While the demand of value added cloth with mixed nylon is more demanded due to its manageability. Instead of shifting toward the value added product we are consecutively increasing the share of cotton cloth in our textile export and as a result we are giving our market share to Vietnam, Cambodia and Bangladesh.

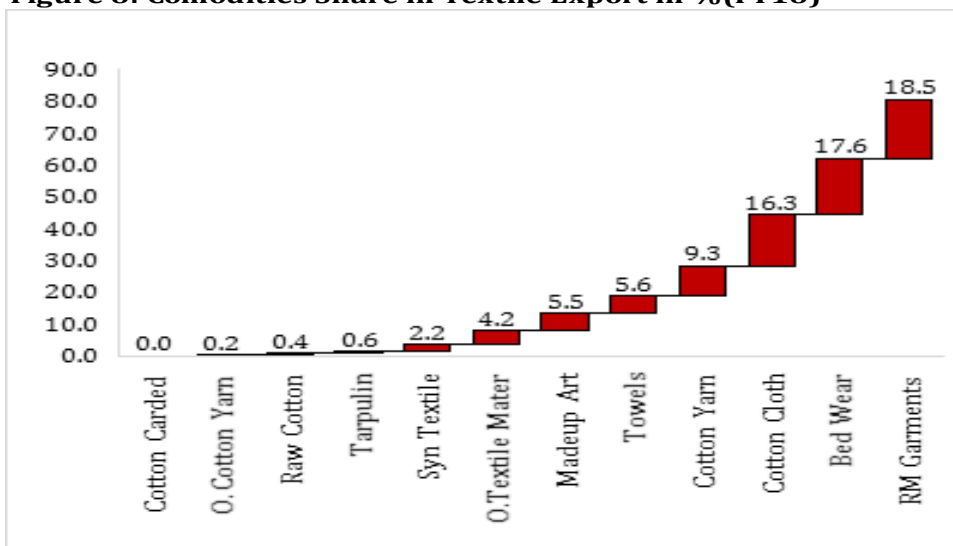**Figure 8: Comodities Share in Textile Export in %(FY18)**
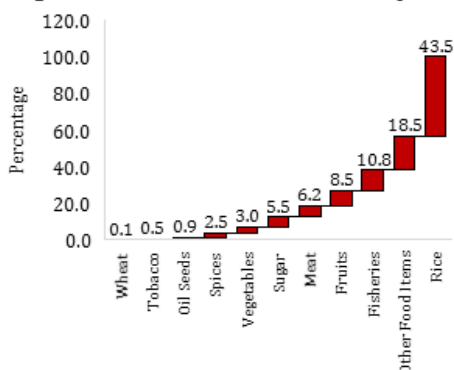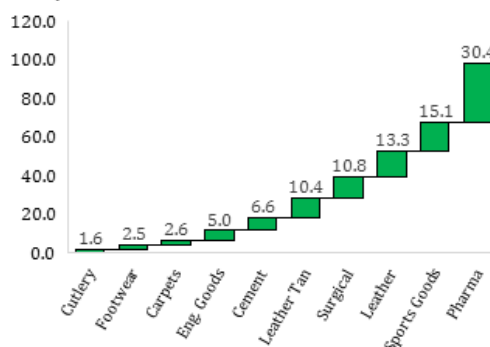
Figure 9: Share of comodities in Food Export

Figure 10: Share of comodities in Manufacturning Export

Food items are also an important export of Pakistan covering 17.06% export. Among the food export 49.77% export comprises rice, 8.86% fruits and 8.82% fish and fish preparation (see Figure 10). Others food items included vegetables, sugar and spices. After textile the major export of Pakistan is manufacture goods which constitute about 17.4% of total exports. The major commodities exported in this group is chemical and Parma product has 27.7% share in manufacture good export, sport goods has 14.2% share, leather manufacturing has 12.8% share, surgical good has 11.1% share, leather tanned has 11% share, and cement has 9.1% share in total manufacture good export.

1.2. Stylized Facts of Pakistan vs Bangladesh and Vietnam Economy

Vietnam and Bangladesh both are Asian economies and their economies grew by 6.17% to 6.2%, respectively in the last decade Vis-a-Vis 4.5% in the case of Pakistan. Liberalization policy after financial crisis 2008 leveled the ground for many economies to get advantage from pro-trade policies. Few countries played well such as Bangladesh and Vietnam and few countries were not able to sustain their position such as Indonesia and Pakistan. Liberalization policies of trade set the high level of competiveness for export goods. Export growth is considered as an important source of tremendous economic growth for many countries like South Korea, Cambodia, Bangladesh, and other Asian tigers.

Pakistan economy recently is dragging itself towards the low economic growth to moderate economic growth along with the deteriorating export and escalating current account deficit. Pakistan's export to GDP ratio has been declined to 8.7% in 2016 from 17% in 1990. While in the case of Bangladesh and Vietnam it has increased to 16.7% and 93.6% in 2016 from 6.7% and 30.92%, respectively.[1]Pakistan unlike its immediate neighbors Bangladesh and India cannot develop its potential to increase its share in world export since last three decades rather it has lost it share in world export. Its share in world export in 2016 is declined to 0.13% from 0.17% in 1991. While on the other hand the share of Vietnam and Bangladesh in 2016 is increased to 1.17% and 0.19% from 0.07% and 0.05% in 1991, respectively. Bangladesh endeavors in increasing its export share in world market and improving export to GDP ratio is quite successful (see Figure 11). In the case of Pakistan due to sluggish world economic recovery afterward financial crisis, deteriorating law and order condition, energy crisis, and inconsistent taxation policies reinforce the deterioration of export and it competiveness in international market.

Figure 11: Share in World Exports (%)
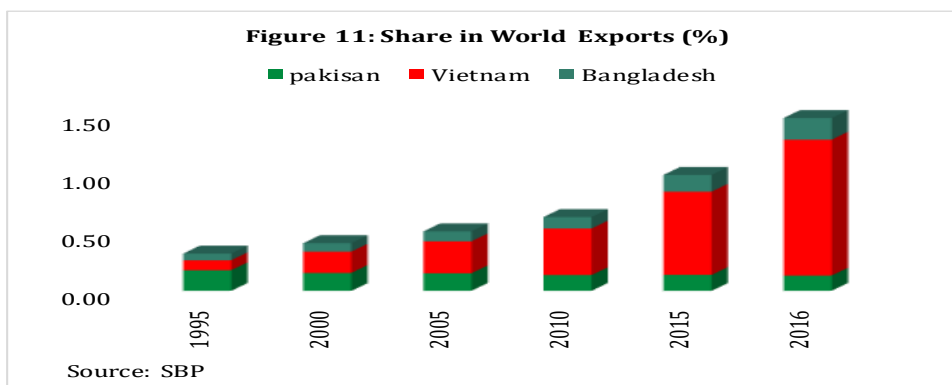
Source: SBP

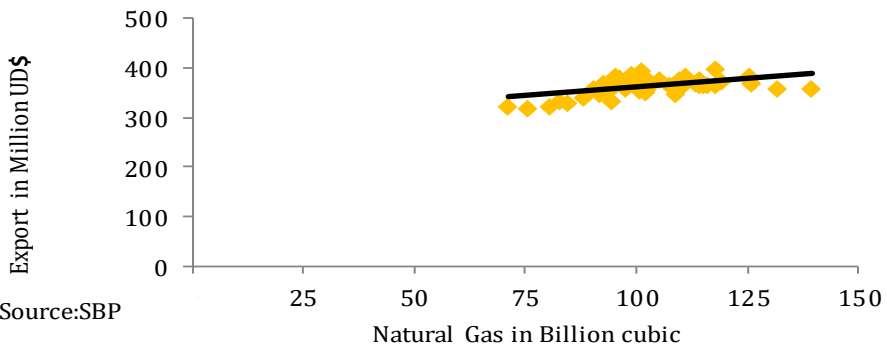[1] The growing area in Figure 13 exhibits the increase in export to GDP ratio such as area of Vietnam increase significantly and area of Pakistan is squeezing which indicate the declining export to GDP ratio.
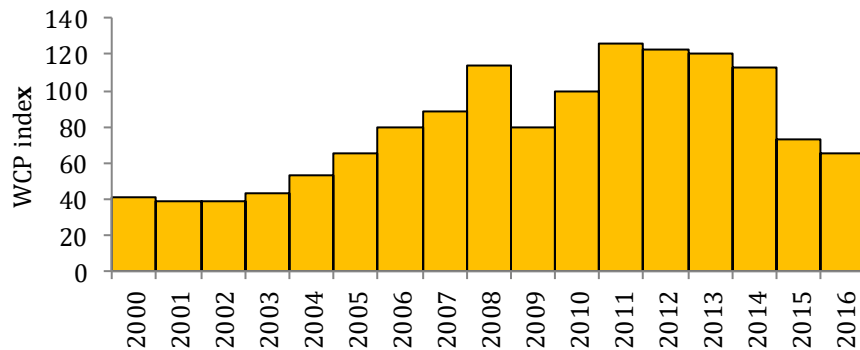
Figure 12: Export(% of GDP)
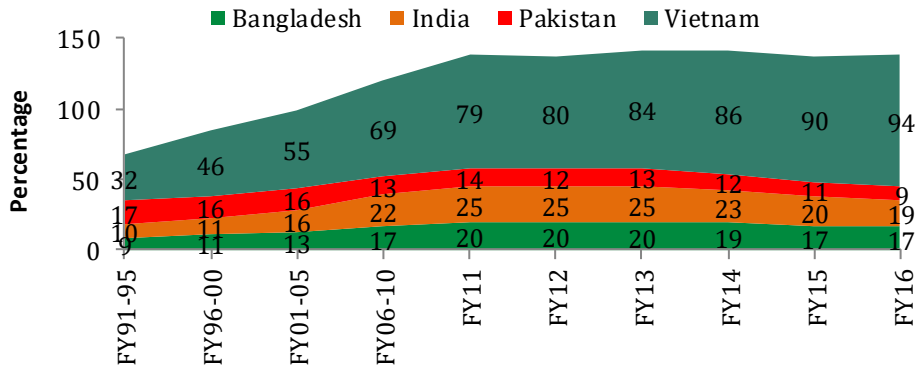
Source: SBP and IMF

Figure 13: Relationship between Export and Natural Gas Production

Source: SBP

**Figure 14: World Comodity Prices**

Source: IFS   ☐ World Comodity Prices

1.3.   Issues in Pakistan's Exports

Bangladesh and Vietnam both have transformed themselves from a poor under developed economy to fastest growing economy in Asia. Both countries have relatively exploited more benefit from GSP status in Europe then Pakistan. Bangladesh was awarded the GSP status in 2005 and Pakistan was awarded in Jan, FY14. Our neighbor has extracted much more benefit during those years and able to set the tremendous growth for its exports. While Vietnam's success story started in 1986 when Doi Moi (renovation), political and economic reforms, were adopted, this had prompted the economic growth of the country. Tamara Bekefi (2006) mentioned in their study Doi Moi reform paved the way of economic growth for Vietnam, including agriculture reform i.e. granting long term right to individual and families to use land that were previously centrally control by government, has turned Vietnam into a largest rice exporter. Indeed, economic growth of Vietnam is mainly supported by increasing exports and economic integration. Trang *et al.* (2011) empirically investigated the factors that contributed in export growth of Vietnam. According to study factors that contributed in higher export growth of a country is increasing economic growth of Vietnam, large population of import partners, high population growth which led to increase in labor supply, shared boarder with major importing countries (China, Cambodia, Malaysia), and free trade agreements. Moreover the growth in manufacturing goods like textile, pharmaceuticals, footwear's also contributed in the exports growth. Vietnam is inclined toward exporting comparative advantage goods such as natural resource-intensive goods, including food, livestock, crude oil, minerals, wood and cork manufactures.

In the case of Pakistan export goods are not merely concentrated in low value added and primary product but having negligible share in global markets. Moreover, among textile and food groups cotton cloth and rice has largest share in textile and food export which are sensitive to fluctuation in global commodity prices. From 2007 to 2011 global commodity prices increased so that exports in value were high, while from 2011 onward global commodity price decreased so that exports also show pro-cyclical trend. On the other hand Vietnam is inclined toward exporting manufacture goods, hence exports are relatively less sensitive. Pakistan can also shift its export from primary goods to manufacturing goods. Furthermore, In Pakistan exporters are not adapting the changes in preferences. Most of our export partners are developed countries so their preferences of goods kept changing. For instance, textile export is mainly cotton-oriented, while the demand of cotton product is losing grounds. Similarly demand of leather goods are also fading due to people inclination toward animals love and consumers are shifting their preferences towards leather like product such as faux leather. In this perspective proper awareness should be provided to exports so that our exports should commensurate the preferences of importers.

Figure 15.   Depreciation of Currencies (2014-2016)
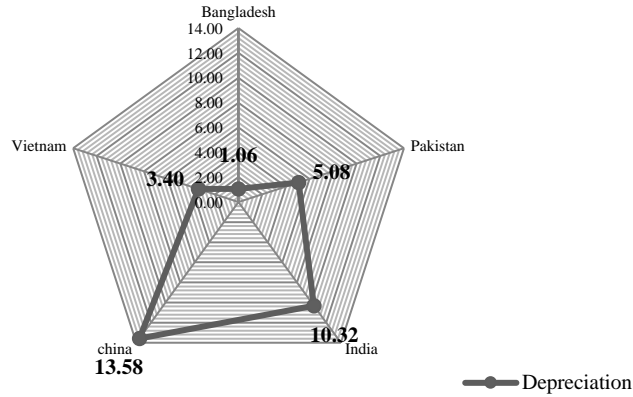
Source: IFS

Furthermore, absence of any long term exchange rate policy is also responsible for dwindling export. Exchange rate stability is always related with the economic health of country. Therefore, efforts to stabilize the exchange rate usually need central bank intervention. Due to its direct relation depreciation in local currency increase the demand of export in importing country. However, depreciation of currency itself has complication at multiple ends so it is not recommended to adopt this option without careful calculation. The perceived overvalue of exchange rate can be the stumbling block in the way of our national exports.

Another key issue that exporters facing is unavailability of raw material used in manufacturing of export product. Textile and leather goods exporters usually complain about insufficient availability of key raw material such as long staple-cotton and skins. If exporter anyhow, mange to produce the exported goods, in prevalence underlying issues, still due to lack of private property right they are discourage to bring novelty and value addition in product i.e. Pakistani basmati rice has been selling in the name Indian brand. In order to incentivize exporters it is requisite to provide them proper property right so that competitiveness of our export should enhance.

Figure 16: FDI Inflow % of GDP

Source: WDI
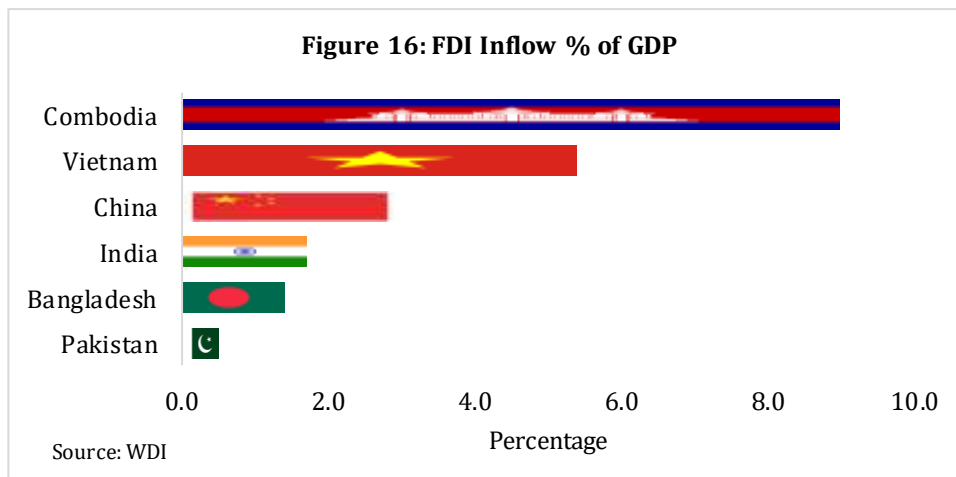
Due to political upheaval, falling FDI is adding to the scenario. FDI significantly contributes in exports of country, but in case of Pakistan it is losing ground. In addition, there is lack of export oriented FDI in Pakistan. The culture of MNCs in Pakistan is to focus on capturing the market; measures should be adopted to attract export-oriented FDI. In case of Vietnam increasing FDI has also triggered the export, due to its export-oriented nature. About 65-67% FDI directed towards Vietnam is export oriented. Xuan and Xing (2008) empirically found the positive linkages between FDI and export in Vietnam by taking data of 5,919 FDI project, originated from 23 countries, over the year of 1990 to 2004. The result implies that 1% increase in FDI will trigger 0.13% increase in export growth. Different MNCs such Samsung Electronics Co. has transformed Vietnam into a manufacturing hub for electronic goods, like smart phones. Exports in Vietnam enhance about 9% in FY16, mainly due to growth in electronic supplies, about 29%. In first 9 month FY16-17 the country shows the trade surplus of about $2.77 billion.

Moreover, the electricity outrages in Pakistan have caused the output loss of major export industries including textile. Rising gap between supply and demand of electricity has hampered the output growth of many industrial units. The underlying reason behind is the poor supply of natural gas that is used in the production of electricity. Figure18 also exhibits the positive relationship between export and natural gas production. Although the government's efforts to ensure continuous electricity supply to industrial sector have caused modest improvement in recent years. Figure 17 also illustrates that Pakistan has faced the highest loss among other Asian countries.

Figure 17: Loss Due to Electricity Outrages (% of sales)
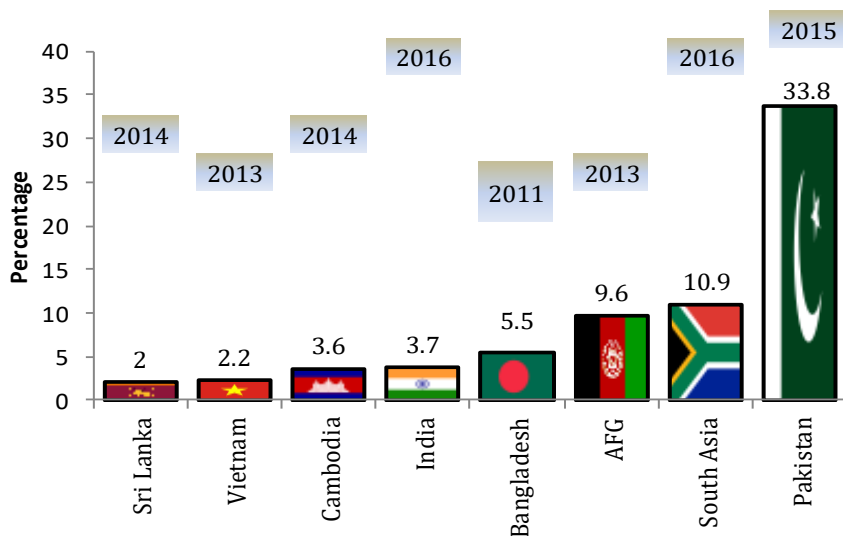
Source: WDI

2.   LITERATURE REVIEW

Export of partially processed products and raw material are the significant portion of the export of developing countries. Due to globalization and integration of economies the world commodity prices are prone to instability. Price instability has a very profound impact on the export revenues of developing countries which may lead towards the economic instability, poverty and current account crisis (Majeed and Ahmad, 2006). Page and Hewitt (2001) analyzed the trend in the market prices of major commodities such as agriculture products and minerals for following regions of the developing world: South Asia, Caribbean, Latin America, and Sub-Sahara Africa. Their study identified the constraints faced by developing countries in responding to the changes in world commodity prices. They argued that the long-term strategy for development for most countries must be to reduce dependence on commodities and move into production of manufactures or services.

Khan and Haroon (2015) analyzed the aspects of commodity price fluctuation with respect to Pakistan. The purpose of their study was to indicate the evolution in the commodity price and their possible consequences on the developing and emerging economies like Pakistan. Moreover they tried to suggest the possible short run and long run solution to cope this issue. According to them Pakistan should followed other emerging economies to respond the falling world commodity prices by eliminating subsidies on fuel and energy, currency adjustment and export shift. Since January 2013, PKR is devalued against dollar just 3.5% while on the other hand Indian Rupee, Turkish Lira, South African Rand has dropped about 15.8%, 29.3%, and 31.1%, respectively. The long run solution for fluctuating commodity prices is export diversification and shifting towards the export of manufacturing, services and non-

traditional goods. The valued added goods are less prone to fluctuation in prices and fetch high FX reserves.

Spatafora and Tytell (2008) also indicated in their book "Globalization, Commodity prices, and developing countries" that soaring commodity prices is beneficial for the current account stability especially for the emerging and developing economies. They explored that high commodity prices are beneficial for boosting the export of commodity exporter and also inclined them to move towards the manufacturing exports. On the basis of underlying scenario, real economic activity is surged on the back of high prices of export and developing countries are moving towards rapid trade and financial integration.

Ehrhart and Guerineau (2011) empirically explored the consequences of commodity price volatility on the public finances and export of developing countries. They used the data of 41 commodities from energy, food and mineral of 90 developing countries from 1980-2008. They concluded that soar in commodity prices increase the taxes on export because of high prices of export and increase revenue for public finance. While lower commodity prices are detrimental for the developing countries which exports are majorly comprises on commodity exports.

Khan and Haroon (2015) also supported the negative consequences of fluctuating commodity prices of Pakistan's exports and economic growth. They exhibited in their study that the current and future price prospects for rice, cotton, sugar, and fruits are debilitating. If Pakistan fails to design export diversification strategy then export earnings will be further devastating and adversely impact the current account deficits.

In this study our contribution in the literature is to empirically explore the long run relationship between Pakistan exports and world commodity prices by taking into account of exchange rate volatility, economic growth of advance economies, and LSM growth. The depleting exports of Pakistan has captured the attention of policy makers, the performance of export remain gloomy in this fiscal year even after providing conducive environment and policy support. So to explore the external shock on depleting export we are interested to find its long run relationship with world commodity prices.

3. DATA AND METHODOLOGY

3.1.   Data Analysis
In our study we have employed quarterly data of all the variables from 2004 quater1 to 2016 quarter 4. We are restricted to the data from FY04 because the quarterly data on Natural Gas production prior to FY04 is not available. The nominal export is employed in our supply model of export which is in million US$. The data of LSM are the index of the performance all the sectors of LSM, similarly index of World commodity prices are the price index of all primary products. Intuition behind taking the index of primary product is the major share of primary products in our exports.

Data of natural gas production in billion cubic meters is extracted from Haver (State Bank of Pakistan). In order to make data comparable we have transformed all the variables into FY10 base. Before moving towards formal estimation we have check the correlation between all the variables. Table 1 supports the positive and strong correlation with all supply side explanatory variables of export including WCP, LSM and natural gas production.

Table 1: Correlation Matrix

Correlation Matrix				
Variables	Export	Gas	LSM	WCP
Export	1.00	0.68	0.57	0.80
Gas	0.68	1.00	0.56	0.65
LSM	0.57	0.56	1.00	0.25
WCP	0.80	0.65	0.25	1.00

Source: Author Calculation

3.2. Methodology

The main focus of our study is to explain the export through supply side variables. For this purpose we are taking three variables of supply side i.e. World commodity prices, Natural Gas production, and Large Scale manufacturing (LSM), to determine the export performance of Pakistan. The dependent variable in our model is export which is explained by three supply side variables. In equation 1 WCP is World commodity prices, LSM is large scale manufacturing, and gas is the production of natural gas.

$$\text{Export} = \propto_0 + \beta_1 \, lsm + \beta_2 \, Gas + \beta_3 \, WCP + e \tag{1}$$

Pakistan export is majorly comprised on the primary product, as shown in graph above, including cotton yarn, rice, skin hides which are prone to fluctuating world commodity prices. World commodity prices were highest in 2007; hence the impact was also reflected in the exports of Pakistan. However it when it came down towards its equilibrium position in 2015-2016 in consequence we had witnessed a dismal export performances.

Moreover, Natural Gas production is also incorporated in our supply side model of export. Mahmood and Ahmed (2017) also mentioned in their study of "role of structural factors in export performance of Pakistan" that a continuous electricity outrage is the major reason of the dismal export performance of Pakistan in previous decade. This shortfall in power supply has translated into the noteworthy output losses of different industrial unit, among which textile lies on the top. On the basis of above intuition we are taking Natural gas production in our supply model because it is majorly used in the electricity generation in textile industry. Furthermore, LSM is also employed as supply side determinant of export performance. LSM growth is an important indicator which drives the export performance of Pakistan. Textile sector

has the major share in both LSM and exports of Pakistan, approximately 20% and 58%, respectively. Due to the high influence of textile sector growth on overall LSM and export performances we are incorporating LSM in our supply side model of exports.

There may the possibility of long run relationship as well between export and three supply side variable; hence we are employing the co integration method to explore the short run and long run relationship between these variables. In order to select the appropriate co integration methodology we will check the order of integration by employing Augmented Dickey Fuller (ADF) test of integration.

Table 2: Order of Integration

Variables	ADF Test with level and first difference (T-values)		Order of Integration
	Level.	First Difference	
Export	-2.368	-7.40***	I(1)
Natural Gas	-3.06**	0.00***	I(0)
LSM	-1.96	-13.45***	I(1)
World Commodity Prices	-2.48	-5.43***	I(1)

** indicates significant at 5% and *** indicates significant at 1%

Table 2 depicts the findings of ADF test of integration which shows that export, LSM and WCP are the non-stationary variables and integrated at order 1, while Natural gas production is a stationary variable and integrated at order zero.

The most appropriate Technique of co integration in this scenario will be Auto Regressive Distributive Lags (ARDL). The effectiveness of ARDL method is also supported by Pesaran (1997) and Pesaran and Shin (1999) when variables are not integrated with same order. On the basis of order of integration we applied ARDL model and estimated the following equation.

$$\Delta\ln(Export)_t = \alpha_0 + \sum_{i=1}^{n}\beta_i\Delta\ln(export)_{t-1} + \sum_{i=0}^{n}\gamma_i\Delta\ln(LSM)_{t-1} + \sum_{i=0}^{n}\delta_i\Delta\ln(Gas)_{t-1} + \sum_{i=0}^{n}\theta_i\Delta\ln(WCP)_{t-1} + \mu_1\ln(Export)_{t-1} + \mu_i\ln(LSM)_{t-1} + \mu_2\ln(Gas)_{t-1} + \mu_3\ln(WCP)_{t-1} + e_i \qquad (2)$$

The short run dynamics of model is represented by first of equation denoted by coefficient β, γ, δ, where the second part of equation denoted by coefficients $\mu_1, \mu_2, \mu_3 and \mu_4$ represent the long run dynamics of the model. Null hypothesis for the co integration of our model is:

Ho: $\mu_{1=}\mu_{2=}\mu_{3=}\mu_{4=}0$
H1: $\mu_{1=}\mu_{2=}\mu_{3=}\mu_{4\neq}0$

Table 3   Bound Test

Null Hypothesis: No long Run Relation Exist		
Bound Test: lag selected on basis on AIC		
T-statistic	Value	K
F-statistics	5.70	2
Critical value bound		
Significance	Lower bound	Upper bound
10%	2.63	3.35
5%	3.1	3.87
2.5%	3.55	4.38
1%	4.13	5.00

In order to check above hypothesis to find co integration between variables we use bounds test. To infer the finding we have compared the F-statistic with F-values given by Pesaran (1997). According to bound test If F-value lies above upper bond then we reject null and deduce the presence of co integration; if it lies below lower bond then we accept null and deduce no co integration; and if it lies between lower and upper bond then results are inconclusive. Table 3 depicts the findings of bound test which infers the presence of co integration in our supply side model of export as the value of bound test is higher than upper bound so we reject the null of no co integration. In order to check the co integration we will estimate the given model.

$$\Delta\ln(Export)_t = \propto_o + \sum_{i=1}^{n} \beta_i \Delta\ln(Export)_{t-1} + \sum_{i=0}^{n} \gamma_i \Delta\ln(LSM)_{t-1} +$$
$$\sum_{i=0}^{n} \delta_i \Delta\ln(Gas)_{t-1} + \sum_{i=0}^{n} \theta_i \Delta\ln(WCP)_{t-1} + e_i \qquad (3)$$

In order to estimate the speed of adjustment we will estimate the VECM which depicts that in case of shock in dependent variable which percentage of error will be corrected each quarter. To find the speed of adjustment we estimated following equation.

$$\Delta\ln(Export)_t = \propto_o + \sum_{i=1}^{n} \beta_i \Delta\ln(Export)_{t-1} + \sum_{i=0}^{n} \gamma_i \Delta\ln(LSM)_{t-1} +$$
$$\sum_{i=0}^{n} \delta_i \Delta\ln(gAS)_{t-1} + \sum_{i=0}^{n} \theta_i \Delta\ln(WCP)_{t-1} + \mu_1 \qquad (4)$$

In order to take into account of seasonality in our data we have used three seasonal dummies in our model. Data incorporated in our study is quarterly data so to avoid multicollinearity we use three dummies.

4.   EMPIRICAL FINDINGS

Table 4 depicts the short run dynamics of supply side of export. The lag selection of model is based on the AIC criteria. In this model we have kept WCP as an exogenous variable. The results exhibit that LSM growth and World commodity prices have positive and significant short run relationship with exports, while the natural gas production positively impacts the growth with lags. The error correction terms indicate the shock to exports will recover about 34% in each quarter.

Table 5 illustrates the long run relationship of export with supply side variables and results confirm that WCP and LSM performance have positive and significant impact

on the export of Pakistan. The coefficients of WCP and LSM depicts that one unit increase in WCP and LSM index boost up exports about 0.43% and 0.63%, respectively. The seasonal dummies indicate that export in first and second quarter are higher than export in 4th quarter, while export return in 3rd quarter is lower than export returns in 4th quarter.

Table 4: Short Run Coefficient of ARDL Co integration Test

Variable	Coefficient	Std. Errors	t-Statistics	Prob
Method: Auto Regressive Distributive Lags (2 1 0)				
Dependent Variable: Export				
Export(-1)	0.7365***	0.1442	5.1078	0.000
Export(-2)	-0.2317*	0.1323	-1.7431	0.089
GAS	-0.2999	0.3797	-0.7897	0.4344
GAS(-1)	0.6602*	0.3484	1.895	0.0653
LSM	0.3098***	0.1024	3.0229	0.004
WCP	0.2131***	0.0579	3.6812	0.0007
ECM(-1)	-0.3378***	0.0984	-3.4339	0.0014
@seas(1)	0.9124	2.7298	0.3342	0.7400
@seas(2)	3.3177	2.72286	1.2184	0.2304
@seas(3)	-1.960	2.735	-0.7169	0.4776
Constant	-39.8633	29.047	-1.3723	01776
Adj(R²)	0.895			
F-statistics	47.59			

World commodity price is exogenous variable
*** indicates significant at 1%, ** indicates significant at 5% and * indicates significant at 10%

Table 5: Long Coefficient of ARDL Co integration Test (2 1 0)

Variable	Coefficient	Std. Errors	t-Statistics	Prob
Method Dependent Variable: Export: Two Step Granger Co integration Test				
Gas	0.7278	0.7133	1.0202	0.314
LSM	0.6258***	0.1821	3.435	0.0014
WCP	0.4306***	0.110	4.2229	0.0001
@seas(1)	1.843	5.6400	0.327	0.7456
@seas(2)	6.7012	5.7927	1.1568	0.2542
@seas(3)	-3.961	5.674	-0.698	0.4892
Constant	-80.519			

World commodity price is exogenous variable
*** indicates significant at 1%, ** indicates significant at 5% and * indicates significant at 10

3.3.   Two Step Granger co integration Test

When two or more variables are non-stationary and integrated of order 1 but their linear combinations are stationary then there is cointegration in the model. In order to check the robustness of our findings we have also used two step granger cointegration test. First we regressed the export on its supply side determinants then extracted the residuals from the regression. The residuals are stationary which confirm the presence of cointegration in our model.

Table 5 depicts the long run coefficient of model and indicates the positive and significant long run relationship of exports with WCP and LSM. The relationship of exports and natural gas production is positive in long run but not significant. It means WCP and LSM drives the long run and short run performance of exports. Adjusted R^2 of the model is 82% which indicates that 82% variation in the supply of exports is determined by these three variables. Table 6 shows the VECM model of Two Step Granger Cointegration Test and illustrates that the shock to exports will recover about 9% in each quarter. According to this model only WCP has short run impact on the export performance of Pakistan.

Table 6:   Long Run Coefficient of Two Step Granger Co integration Test

Method Dependent Variable: Export: Two Step Granger Co integration Test				
Variable	Coefficient	Std. Errors	t-Statistics	Prob
Log(GAS)	0.2154	0.4306	0.5003	0.6193
Log(LSM)	0.7203***	0.13025	5.530	0.000
Log(WCP)	0.4195***	0.0598	7.0126	0.000
Constant	-1.685	1.5396	-1.0947	0.2795
@seas(1)	-0.041	0.0360	-1.1275	0.2655
@seas(2)	0.0704	0.0353	1.9972	0.0519
@seas(3)	0.058	0.0354	1.6396	0.1081
R2 adj	0.817			
F-Statistics	38.85			

*** indicates significant at 1%, ** indicates significant at 5% and * indicates significant at 10%

Table 7   VECM Coefficient of Two Step Granger Co integration Test

Method Dependent Variable: Export: Two Step Granger Co integration Test				
Variable	Coefficient	Std. Errors	t-Statistics	Prob
D(log)lsm	0.3614	0.261	1.385	0.179
D(log)gas	-0.2054	0.3792	-0.5418	0.5932
D(log(wcp)	0.3177***	0.0845	3.758	0.001
D(log(export(-3))	-0.4260**	0.1842	-2.3119	0.0301
Constant	0.0364	0.0421	0.8674	0.395
ECM(-1)	-0.089	0.1293	-0.6910	0.4965
@seas(1)	-0.0449	0.066	-0.6739	0.5071
@seas(2)	0.0038	0.0821	0.0468	0.9631
@seas(3)	-0.055	0.0586	-0.9325	0.3607
Adj(R²)	0.663			
F-statistics	4.9368			

*** indicates significant at 1%, ** indicates significant at 5% and * indicates significant at 10%*

3.3. Johansen Juselious Co integration

The Johansen's cointegration is most efficient when all the variables are integrated of order 1. The intuition behind using Johansen's cointegration is to confirm the robustness of our findings. After determining the lag length of VAR model on the basis of AIC criteria we determined the rank of cointegrating vectors by employing the trace statistics and maximum eigenvalue (λ max). Tables8 and 9 indicate the findings of Trace test and maximum eign value test which suggests the presence of one co integrating vectors in this set of variables.

Table 8: Trace Test

Co-integration Rank Test (Trace)				
Hypothesized no of Co integration Vectors	Eigen Value	Trace statistics	0.05 Critical Value	Prob**
None*	0.0507	52.917	47.856	0.0155
At most 1	0.2132	18.995	29.798	0.4932
At most 2	0.1324	7.4858	15.495	0.5219
At most 3	0.0138	0.66817	3.8414	0.4137

Trace Test indicates 1 Co integration vectors at 5% level

Table 9: Maximum Eigenvalue Test

Co-integration Rank Test (Maximum Eigenvalue Test)				
Hypothesized no of Co integration Vectors	Eigen Value	Max-Eigen Value	0.05 Critical Value	Prob**
None*	0.0507	33.922	27.584	0.0067
At most 1	0.2132	11.509	21.132	0.5965
At most 2	0.1324	6.8176	14.264	0.5109
At most 3	0.0138	0.66817	3.8414	0.4137

Trace Test indicates 1 Co integration vectors at 5% level

After confirming the presence of cointegrating vectors we have employed VECM in this framework to find the short run dynamics and Error correction in export. Table 10 and 11 depict the short run and long run relationship of export with WCP and results are consistent with the results of ARDL model. The EC terms indicates that in case of divergence to the equilibrium due to any shock to export the 22% divergence to equilibrium will recover in each quarter.

Table 10: VECM of Johansson Juselious

Variable	Coefficient	Std. Errors	t-Statistics
D(Export(-3))	-0.4729***	0.1321	-3.579
D(GAS(-3))	-0.8179*	`0.3924	-2.084
D(LSM(-2))	-0.3417**	0.1198	-2.85
WCP	0.1774***	0.0578	3.071
ECM(-1)	-0.2012***	0.0984	-3.7564
Constant	-15.18***	4.824	-3.489
Adj(R^2)	0.657		
F-statistics	6.276		

World commodity price is exogenous variable
*** indicates significant at 1%, ** indicates significant at 5% and * indicates significant at 10%

Table 11: Long Run Coefficient of Johansson Juselious

Variable	Coefficient	Std. Errors	t-Statistics
LSM	1.153***	0.2567	4.49
Gas	1.4170	1.00448	1.410
WCP	0.6009***	0.13207	4.44
Log likelihood	0.657		

*** indicates significant at 1%

5.   CONCLUSION AND POLICY RECOMMENDATION

Over the previous two decades the export performance of Pakistan has been considered bleak when we compare it with our immediate neighbors India and Bangladesh and competitors such as Vietnam and Cambodia. Why export performances of Pakistan remains dismal despite having GSP plus status in the European Union? To answer this question, this study empirically explores the long run and short run dynamics between export and world commodity using quarterly data from 2004 (quater1) to 2016 (quarter 4). Moreover, this study provides a detailed analysis of the performances of export by commodities and exhibits the stylized facts of Pakistan's export in comparison to Vietnam and Bangladesh.

The findings of study support the positive and long run relation of world commodity prices with export earning of Pakistan. Furthermore, the export performance also has positive linkages with the performance of large scale manufacturing sector because of the major share of textile in LSM. However the impacts of natural gas supply on the export earning is transient and becomes insignificant in the long run. The better supply of natural gas for electricity production can enhance the export goods production in short run but in order to put the export on the glory of growth we need to design a long run export policy.

Figure 19: Trend in Price Index

Source: World Economic Forum
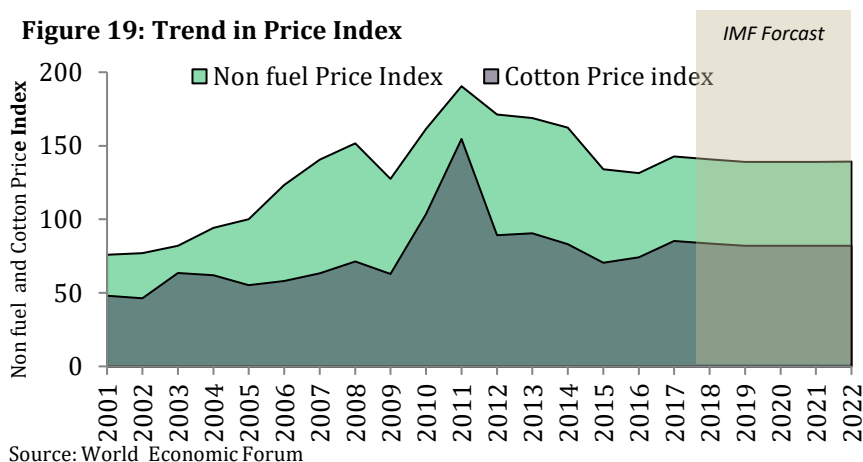
Most of our export earnings are extracted from primary products such as cotton, rice, fruits, sugar which are vulnerable to the changing in world commodity prices. After nearly decade, from 2001 to 2011, non-energy good prices have eased and trend is forecasted to be followed till 2022. The situation for Pakistan's export is quite challenging because of its high dependence on primary products. To nullify the vacillating world commodities price, export diversification policy needs to be revised. Pakistan should lessen its reliance on primary and traditional commodities and needs to shift towards the export of manufactured, value added, services, and nontraditional good export. To achieve this target the most important thing is to equip the labor with new technologies and skills to shift them from primary to secondary and tertiary activities. Pakistan is endowed with abundant of fruits and vegetables and by taking the benefit of this natural endowment it can export the canned foods, processed juices, jam and frozen vegetables.

Transition from traditional export goods to value added and manufactured export goods such as laptop, computer chips, semiconductor parts, and mobile phone parts will benefit Pakistan in two ways. First transfer of technology which is a main obstacle in boosting export earnings; second back up the local entrepreneurs to add high tech goods in global supply chain. A Chinese woman' Zhou Qunfei' by realizing the potential of protective glass used on smart phone screen become the most richest woman of China having wealth of worth 10.3 billion US$. Transition to high tech products needs the strong linkages between academia and industry. Moreover brand loyalty is also an import factor which can protect the goods in international market from fluctuating world commodity prices. Most of our primary goods such as basmati rice exported are exported to the name of other country brand. Measure should be taken to tackle this issue by educating exporters about the branding of their products.

REFERENCES

Bekefi, Tamara (2006). *Tanzania. E Lesson in building linkages for competitive and responsible entrepreneurship*. UNIDO and Kennedy School of Government, Harvard University.

Ehrhart, H., & Guérineau, S. (2011, October). The impact of high and volatile commodity prices on public finances: Evidence from developing countries. In *African Economic Conference* (pp. 25-28).

Khan, S. B., & Haroon, M. M. (2015). A Review of Fall in World Commodity Prices and its Prospective Impact on Pakistan's Economy. *Journal of Managerial Sciences, IX (1)* 1- 26.

Majeed, M. T. & Ahmad, E. (2006). Determinants of Exports in Developing Countries. *The Pakistan Development Review*, 1265-1276.

Mahmood, A. and Ahmed, W. (2017). Export Performance of Pakistan: Role of Structural Factors. State Bank of Pakistan Working Paper.

Page, S., & Hewitt, A. (2001). *World commodity prices: still a problem for developing countries?*. Londres: Overseas Development Institute.

Pesaran, H.M. (1997). The Role of Economic Theory in Modelling the Long- Run. Economic Journal, 107, 178-191.

Pesaran, H.M., and Shin, Y. (1999). Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis, Chapter 11, in Storm, S., (ed.), Econometrics and Economic Theory in the 20th. Century: The Ragnar Frisch Centennial Symposium. Cambridge University Press: Cambridge.

Spatafora, N., & Tytell, I. (2008). Globalization, Commodity Prices and Developing Countries. *World Economic Outlook*, (4).

Trang, N. T. H., Tam, N. T. T., & Nam, V. H. (2011). *An inquiry into the determinants of Vietnamese product export* (No. 08). Foreign Trade University, Vietnam.

Xuan, N. T., & Xing, Y. (2008). Foreign direct investment and exports. *The Economics of Transition*, *16*(2), 183-197.