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Determinants of Pakistan's Exports: An Econometric Analysis

Abstract

The research investigated the determinants of Pakistan's exports by using time series data from 1990–2016. Certain econometric tests were also applied to check cointegration among variables. A unit root test was used to check the stationarity of selected variables. After the stationarity of the data, a vector error correction model is used to estimate the effect of regressors, like foreign direct investment, gross domestic product, employment level, and consumption expenditures on a dependent variable, i.e. exports in the short run. The result shows the positive relationships that foreign direct investment, gross domestic product and employment level have on exports, and the adverse impact of consumption expenditures on the dependent variable. The study uses Johansen's cointegration test for the long run. The results show that all the variables are co-integrated in the long run. It is suggested that the government should encourage foreign direct investment and gross domestic product, which would help accelerate Pakistan's exports. It is also suggested that whenever policymakers provide a trade policy, in particular, in relation to exports, then the adverse effect of exchange rate depreciation, external debt burdens, taxes, sanctions and protectionism should be quantified, and necessary measures be suggested so as to minimize any repercussions.

Keywords: *Exports, GDP, VECM, FDI*

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1. Introduction

1.1. Background of the Study

International trade plays a key role in addressing economic phenomena and can help to earn foreign exchange and achieve economic development. The relationship between economic growth and international trade has always remained a topic of debate for economists. Classical as well as modern economists are of the view that trade bridges economic growth and development. Thus, a government can boost its economy through exports, imports or both, and trade with other countries. A major target for every country is to boost its gross domestic product (GDP), where foreign trade can play a significant role in this regard (Hotchkiss et al. 1994). It is believed that long-term export growth is positively related with better fiscal performance and factual foreign exchange markets. In the context of under-developing countries, investment in capital and the labor force, the ability to adopt technological changes, open trade policies, low inflation and a high employment level are necessary for economic growth (Luka and Spatafora 2012). Various theoretical models include human capital, labor force and trade policy as factors of production which are considered to be elements of the growth process (Hassan & Butt 2008).

Imports and exports are two sides of the same coin of international trade. If imports are greater than exports, the economy may face financing deficit and balance of payment and trade deficit, which can adversely affect the growth rate of the economy. The expansion of the economic position of any country and the distribution of wealth and income are mainly related to the development in international trade, especially exports. Export is considered to be an important part of international trade; however, it is a complex phenomenon. Goods produced in a country and shipped to other countries for further sale or trades are known as the exports of the domestic country. It determines the balance of payment deficit and revenues earned, which can be utilized in the formation of domestic capital. The success of countries may be attributed to their careful attention to all aspects of development, like commercial policy, purchasing power parity (PPP) in terms of foreign exchange rate, tariffs, import quotas, export duties and trade agreements between or among countries. Exports, therefore, play a crucial role in this regard. Instability in exports causes doubts about the economy, and this can adversely affect economic growth.

The question arises, why is trade inevitable between or among nations? The reason is that it fulfills the requirements of the nation. Exporting countries have absolute advantages, specializing in the production of goods which they can produce more efficiently. Through those goods, they have relative economic advantages, like the opportunity of low cost and comparatively better quality. Pakistan's economy, in terms of exports, faced some upswings and downturns from its independ-

ence in 1947. One may go back to the early history of the country to determine its quantum of exports. After the partition of India in 1947, import substitution was rightly emphasized in Pakistan (Froyen 1996). However, with the achievement of self-reliance on cotton textiles in the second half of the 1950s, export development became vital. It made the secluded market in East Pakistan (now Bangladesh) accessible, while the availability of large-scale foreign assistance accelerated Pakistan's economy. Additionally, the demand for Pakistani jute increased in the global market due to the Korean War in 1952. The target for export growth during the first five-year plan (1955–60) and the second five-year plan (1960–65) was 3 percent per annum, in nominal terms. The low rate of exports was probably linked to the inadequate infrastructure, low industrial base and poor performance in the agricultural sector, coupled with the non-standard quality of exports. The major exports of Pakistan were mainly primary and agricultural goods, like jute and raw cotton (Sargent & Wallace 1975).

In 1960, semi-finished products were boosted and great variations in exports were introduced due to the export bonus scheme and the devaluation of the currency. In addition to primary goods, semi-finished goods also found space in the global market. Such products include sports goods processed, and textile products, in particular, cotton (Akbar et al. 2000). During the period 1970–1980, the economy of Pakistan improved, but it also faced some difficulties, for example, the 1971 crisis and the separation of East Pakistan (now Bangladesh). A trade shortfall occurred because Pakistan lost its exports of jute, which had come from its eastern region. Now it could export only from its western regions (now called Pakistan). However, with the passage of time, Pakistan's exports scenario changed drastically due to what was happening globally. As a result of these changes, Pakistan's main exports went through major changes, due to currency devaluation and also the export promotion policy of the government. The share of semi-finished goods increased from 30 to 35 percent whereas the share of primary goods declined from 51to 46 percent of total exports. The share of Pakistan's exports to domestic output was about 11 percent of GDP (Government of Pakistan 2008).

2. Literature review

Analysis of the related literature is very important, because it emphasizes the problem under investigation. An in-depth review of research studies of the past is essential to understand the strategy from previous work done in the relevant fields. This chapter analyzes the literature directly or indirectly linked to the present study.

Rehman (1950) highlights the overall economy of Pakistan and elaborates that the major consideration of Pakistan's government has been its constant focus

on exports. It recognizes that through foreign trade it can obtain enough foreign exchange with which to buy and import the necessities and capital goods.

According to a 1953 government report, the level of national income and the financial stability of Pakistan are directly linked with the global demand for her limited number of export products, i.e., jute and cotton are important commodities for Pakistan because the total share of these two products was more than 85 percent of Pakistan's total exchange earnings. Arnold (1950) summarized the foreign trade of Pakistan with the United States. He is of the view that most of the products which are exported to the USA are primary or raw material, including wool, hides, jute, cotton and goat hair. A 1956 government report on exports highlighted how exported products started to develop at the beginning of 1955. Due to the devaluation of the currency, the remaining jute stocks of were bought which had previously been stored by the jute board. The reason for the devaluation of currency was that until Pakistan's rupee depreciation in Mid–1955, most of Pakistan's minor exports were usually over-valued in relation to other currencies. Thus, Pakistan suffered by having to compete with countries whose devalued currencies allowed similar products to be bought with less foreign exchange than those from Pakistan.

According to Haq (1957), the Pakistani government was able to adopt a friendly policy toward private investment to develop the industrial sector of the economy. Due to encouragement of the private sector, it was progressive and productive. For instance, the installed capacity of cotton industry increased rapidly. Three woollen mills were built, and numerous private engineering plants started to produce a wide variety of items, such as electric lamps, galvanized iron pipes, welding electrodes, electronic wire, cables, radios, vacuum brakes, hose pipes and fittings, and automobile and bicycle tires and tubes. The policy of industrialization increased Pakistan's foreign trade, in particular, exports. Balassa (1978) noted that for the promotion of economic growth and development, exports play a significant role. He gave the example of the four Asian countries known as the Asian Tigers – Taiwan, Hong Kong, Korea and Singapore – which pursued a policy of promoting exports and achieved significant economic development. Many developing countries tried hard to follow their pattern by designing economic policies focusing on the promotion of exports. Shirazi and Lutkepohl (1982) investigated the association between foreign trade and the economic growth of Pakistan's economy. They focused on long-term exports, neglecting the short-term export policy. However, it is worth mentioning that short-run patterns may play an extra positive role increasing an association between imports, exports and economic growth.

Akbar (1986) found that exports earning is important for the balance of payment equilibrium, capital equipment and technical services, which are essential for economic growth. Hasan and Khan (1994) investigated the relationship between Pakistan's exports and the factors affecting the exports growth rate. The results show that external factors affect the demand for exports and that internal factors affect the supply of Pakistan's exports. There are positive associations between

the export demands of Pakistan and a negative relationship between export price variables, while there is a positive relationship between the nominal exchange rate and exports demand in both cases.

Yousef (1999) investigated the relationship between economic growth and exports of the Malaysian Economy. In that study, all other factors, such as capital, labor and exchange rate, are allowed to influence exports and economic growth. Exports-led growth shows better performance in the short run rather than the long run, and it is clear that economic growth mostly depends on the exports performance of the economy. Kanayake (1999) examined the economic and export growth of eight emerging Asian countries by using cointegration and error models. He found that the causality between economic and export growth is bi-directional in seven out of eight countries. Through this investigation, the short-run Granger causality test running from economic growth to exports are the same for all selected countries except Sri Lanka; however, in the long run, there was strong confirmation of Granger causality running from exports to economic growth for all countries. This study also highlights that, in the short run, the Granger causality running between economic growth and exports are the same for all selected countries except Indonesia and Sri Lanka.

Ahmad (2000) examined the economic growth and export determinants in which the means of causality between growth of GDP and export revenue were uncertain. The evidence reveals that commonly there is no joint response influence between export revenue, external debts service and economic growth. The general terminology is that both, the GDP growth lead to export promotion and export driven hypothesis are not creating support in all respective investigation. An important point that emerges from the investigation carried out by Akbar and Naqvi (2000) is that the focus in the early phase was on least value added goods and labor intensive products (e.g. raw cotton and cotton yarn). However, more recently, the importance has shifted to comparatively higher value added products. The quality of exports can play a crucial role in the growth process of both income and exports.

Atique and Ahmad (2003) explain Pakistan's exports growth rate by dividing the endogenous and exogenous variables in the form of an export supply function and an exports demand function. Using the OLS techniques with respect to the exports demand function, Pakistan's exports increased when Pakistan's real effective exchange rate decreased. Pakistan's exports increased when the global economic activities rose. Afzal (2005) examines Pakistan's exports demand factors and exports supply factors. The relationship between the price elements of exports and world income were found to be vital and the other side the supply function of Pakistan exports and world income were found inconsequential. Exports price variables but coefficient of variables was found progressive and positive. The production capability of Pakistan's exports is inelastic in relation to the relative prices of exports, but on the other hand, it is highly elastic in relation to local production capability.

A study by Khan (2006) shows the determinants of total factor productivity (TFP) in Pakistan in the constructive outcomes of the development of the financial sector; it implies that the financial sector may influence TFP in two ways, classified as quality channel and quantity direct. Personal credit is finding new areas of investment, in particular, under the capable portion of assets. Effortless entree to praise not only enhances economic growth but also the level of company production and it contributes to TFP in the whole economy.

3. Research methodology

In this chapter, we describe the variables, their nature, and the format and source of the data. This chapter consists of three main parts. The 1st part deals with the source of the data for different variables. In the 2nd part, a model is suggested for empirical estimation. In the last part, a comprehensive description of variables is presented.

3.1. Data Source

The study used annual secondary data from 1990–2016. The main sources of the data are the Economic Survey of Pakistan, the Federal Bureau of Statistics (FBS), the State Bank of Pakistan (SBP), the International Monetary fund (IMF), and the World Development Indicator (WDI).

3.2. Unit Root Test

A unit root test was applied to examine whether the data is stationary or not. The process is said to be stationary if its covariance, variance and mean remain the same over time (Ahmad et al., 2014). Consider the AR (1) model.

$$Yt = Ø\ Yt–1\text{-}ºt.$$

The explanation is as follows:
Case: 1. $Ø < 1$, therefore the data is stationary.
Case: 2. $Ø > 1$, where in this case the series explodes.
Case: 3. $Ø=1$, where in this case the series contains the unit root is non-stationary.

3.3. Augmented Dickey-Fuller Test (ADF)

The Augmented is the expansion of Dickey-Fuller. It is used to be higher order lack of the dependent variable in order to study the autocorrelation problem. The ADF test has also been used by different researchers, like Abdullah and Kalim (2012), Anam et al., (2014) and Chughtai and Kazmi (2014). Three possible kinds of ADF test are given by the following equations.

$$\Delta Yt = \gamma Y\, t{-}1 + \acute{O}^{p}_{i=1}\, \hat{a}_i\, \Delta Y_{t-1} + \epsilon_t \Delta Y = \dot{\alpha}_o + \Upsilon Yt{-}1 + \acute{O}^{p}_{i=1}\, \hat{a}_i\, \Delta Yt{-}1 + \epsilon t\, \Delta Y = \gamma Y\, t{-}1 + \dot{\alpha}2t + \acute{O}^{p}_{i=1}\, \hat{a}_i\, \Delta Yt{-}1 + \epsilon t$$

3.4. Johansen's Cointegration Test (Long Run Results)

The fundamental concept is that if there are economic time series data that are integrated and of the same order (which means they are non-stationary), and which we know are related, then we try to check whether we can find a way to combine them together into a single series which is itself non-stationary. It is possible that the series exhibits this property is called co-integration (2004).

3.5. Diagnostic Test

A diagnostic test will also be conducted. It includes Hetero skedasticity, Normality (Jarque Bera Test) and Serial LM Test.

4. Results and discussions

Time series data, covering the period 1990–2016, has been used for this study. Before we proceed for exports of Pakistan and its determinants (by using Vector Error Correction Model), certain econometric tests such as unit root, co integration, multicollinearity and diagnostic tests were applied on the data and trend analysis is also presented. All of these have been discussed in detail in the paragraphs.

To check whether the variables are stationary or not, the researcher's employed the ADF test. A summary of the results is given below.

Table 1. Augmented Dickey-Fuller Test Results

Variables	Intercept and Trend	Stationarity Remarks
D(X)	–6.726166	Stationary at 1st
	(0.0000)*	Difference.
D(M)	–8.107049	Stationary at 1st
	(0.0000)*	Difference.
D(GDP)	–6.433451	Stationary at 1st
	(0.0000)*	Difference.
D(CO)	–6.823741	Stationary at 1st
	(0.0000)*	Difference.
D(EM)	–4.871489	Stationary at 1st
	(0.0005)*	Difference.
D(FDI)	–4.700624	Stationary at 1st
	(0.0012)*	Difference.

*Note: * the variables are stationary on 1st difference*

Source: Own analysis based on the following documents using time series data from 1990–2016.

The above table shows the results of the ADF test in level with trend. The results of our data show that all the variables are non-stationary at level. All the variables are stationary at first difference, as the absolute values of these variables. The same view has been presented by empirical researchers (Thapa 2005).

Table 2. Estimation of the Model

VARIABLES	Coefficient	Std. Error	t-Statistic	Prob.
C	–1.012590	2.151195	–0.470710	0.6429
DM	0.528310	0.151490	3.487431	0.0023
DGDP	3.088329	1.497524	2.062290	0.0524
DCO	–2.477155	1.114593	–2.222476	0.0379
DEM	1.479556	1.035845	1.428356	0.1686
DFDI	5.014462	4.385869	1.143322	0.2664
U(–1)	–1.896799	1.264492	–1.500048	0.1492
R-Squares 0.62			F-Statistic 5.54	
Adjusted R-Square 0.51			D.W Statistic	2.51
Probability F-Statistic 0.0028				

Source: Own analysis based on the following documents, using time series data from 1990–2016.

Our R^2 is 62%, which means that the independent variables, such as import, gross domestic product, employment level, consumption expenditure and foreign direct investment explain our dependent variable export by 62%. The value of the F-Statistic is 5.54, which shows that the overall model is significant in the short run. Moreover, The DW is equal to 2.51, which means that there is no problem of autocorrelation in the model (Gujaratiet al. 2004).

The result shows that there is a positive and significant impact of imports on exports, with a positive coefficient of 0.52. This means that any rise in imports will lead

to improved exports of the country. The result shows that there is a positive and significant relationship of GDP and exports, with a positive coefficient of 3.08. It means that any increase in imports will lead to an improvement in the GDP of the country. The result shows that there is a negative and significant relationship between consumption expenditure on exports, with a negative coefficient of –2.47. It means that any rise in consumption expenditure will lead to a decrease in exports of the country.

The result shows that there is a positive and insignificant relationship between employment and exports, with a positive coefficient of 1.47. It means that any increase in employment will lead to an improvement in exports of the country. The result shows that there is a positive and insignificant relationship between FDI and exports, with a positive coefficient of 5.01. It means that any increase in FDI will lead to an improvement in the exports of the country.

Table 3. Results of the Johansen cointegration test

S/no	Null	Alternative	No. of CE(s)	Trace statistic		Max-Eigen Value	
				Estimated value	5% Critical Value	Estimated value	5% Critical Value
1	r=0	r=1	None*	215.9623	107.3466	59.83893	43.41977
2	r<1	r<2	At most 1*	156.1233	79.34145	49.03566	37.16359
3	r<2	r<3	At most 2	107.0877	55.24578	47.56800	30.81507
4	r<3	r<4	At most 3	59.51966	35.01090	35.86805	24.25202
5	r<4	r<5	At most 4	23.65162	18.39771	14.45379	17.14769
6	r<5	r<6	At most 5*	9.197824	3.841466	9.197824	3.841466

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

Source: Own analysis based on the following documents, using time series data from 1990–2016.

As can be seen from the table, all the selected variables are significant. As such, it can be concluded that there are long-run relationships among all these variables (Abdullah and Kalim 2012; Anam et al. 2014).

Table 4. Results of the Diagnostic Test

Breusch-Godfrey Serial Correlation LM Test	Heteroskedasticity ARCH Test	Normality Test Result (Jarque Bera)
0.592305	0.031078	0.554
(0.5647)	(0.8618)	(0.7577)

Note: figures in parenthesis are p-values.

Source: Own analysis based on the following documents, using time series data from 1990–2016.

As can be seen from the table, both p-values of the LM Test and ARCH Test are insignificant, so it can be concluded that there is no problem of Heteroskedas-

ticity or serial correlation. Furthermore, the functional form of the model is correct (Gujarati et al. 2004). The same test was also used by Anam et al. (2014) and Amad et al. (2014).

4.1. Multicollinearity Problem Test Result

According to the rule of thumb test, the multicollinearity problem arises if the R^2 of the model is greater than 0.80. The F-test in most cases will reject the hypothesis that the partial slope coefficients are simultaneously equal to zero, but the individual t-test shows that none or very few of the partial slope coefficients are statistically different from zero (Gujarati et al. 2004; Brendan 1975; Krishna 1975; Robert 1975). In our case, the R^2 of the model is 0.63, which is less than 0.80. It is quite clear that there is an absence of multicollinearity problem.

4.2. Autocorrelation Problem Test Result

When the value of the DW statistic in the model is 2.0, near or above 2.0, it means that there is no problem of autocorrelation (Gujarati et al. 2004). In our case, the Durbin-Watson statistic shows a value of 2.4, which indicates that there is an absence of autocorrelation problem in the model. The augmented Dickey-Fuller test is used to detect autocorrelation problems.

5. Conclusion

The impact of FDI on exports is positive, which means that when FDI increases, exports will also rise. ER has a negative effect on exports. It shows that when ER decreases, then exports increase and vice versa. The labor force has a positive effect on exports, which means that when the labor force increases, then the exports will also increase. Furthermore, raw materials also have a positive impact on exports. It shows that as RM increases, exports rise. There is a negative relationship between external debts and exports. It means that any increase in ED reduces exports. Similarly, taxes and exports have an inverse relationship. It means that an increase in the tax rate should reduce exports. The influence of GDP on exports is positive, which means that an increase in GDP will also accelerate exports. Sanctions have a negative relationship with exports. It means that sanctions may reduce exports. Moreover, the influence of protectionism on exports is negative. It means that protectionism reduces exports.

Recommendations

- The government should encourage those industries which produce exportable items.
- It is suggested that efforts should be made to accelerate FDI.
- A stable and depreciating exchange rate policy has to be ensured in order to increase trade volume, especially exports.
- The government should make sure that new technological tools are installed in order to reduce the cost of productions and improved the quality of the products.
- The government should facilitate and modernize the agricultural sector of the economy, as most of the raw materials are obtained from this sector.
- The government should reduce the size of external debts, because it can-not be used for productive purposes as it increases the burden on the economy.
- The government should reduce the level of taxes on exportable goods, which may attract foreign investors as well as encourage local people to start businesses.
- The government should strengthen its friendly relationship with other countries as it will increase the volume of trade.
- The government should follow the rules and regulations of the WTO, helping to reduce the trade gap among member countries.
- The government should promote technical education, as skilled labor can bring revenue to a country.
- The government should make its trade policy favor exports, which may promote exports of the country.

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Streszczenie

DETERMINANTY EKSPORTU PAKISTANU: ANALIZA EKONOMETRYCZNA

Artykuł przedstawia wyniki badania determinant eksportu Pakistanu, dokonanego przy wykorzystaniu danych szeregów czasowych z lat 1990–2016. Zastosowano również wybrane testy ekonometryczne w celu sprawdzenia kointegracji zmiennych. Do sprawdzenia stacjonarności wybranych zmiennych wykorzystano test pierwiastka jednostkowego. Po sprawdzeniu stacjonarności danych stosuje się model wektorowej korekty błędem w celu oszacowania wpływu regresorów, takich jak: bezpośrednie inwestycje zagraniczne, produkt krajowy brutto, poziom zatrudnienia i wydatki konsumpcyjne, na zmienną zależną, tj. eksport, w krótkim okresie. Wynik badania pokazuje pozytywny wpływ bezpośrednich inwestycji zagranicznych, produktu krajowego brutto i poziomu zatrudnie-

nia na eksport oraz niekorzystny wpływ wydatków konsumpcyjnych na zmienną zależną. W badaniu wykorzystano test kointegracji Johansena dla długiego okresu. Wyniki testu wskazują, że w długim okresie wszystkie zmienne są skointegrowane. Sugeruje się, że rząd powinien wspierać bezpośrednie inwestycje zagraniczne i wzrost produktu krajowego brutto, co przyczyniłoby się do wzrostu eksportu Pakistanu. Sugeruje się również aby prowadząc politykę handlową, w szczególności w odniesieniu do eksportu, zawsze ilościowo określać niekorzystny wpływ deprecjacji kursu walutowego, obciążenia długiem zewnętrznym, podatków, sankcji i protekcjonizmu, a także proponować niezbędne działania służące zminimalizowaniu możliwych negatywnych skutków.

***Słowa kluczowe**: eksport, PKB, VECM, FDI*