



RESEARCH PAPER

Bilateral Trade Elasticities: Evidence from Pakistan and her Major Trade Partners

Zafir Ullah Khan*¹ Muhammad Zubair² Amin Ullah Khan³

1. Assistant Professor, Department of Economics, University of Science & Technology Bannu, KP, Pakistan
2. Assistant Professor, Institute of Management Science, University of Science & Technology Bannu, KP, Pakistan
3. Ph.D Scholar, Institute of Management Science, University of Science & Technology Bannu, KP, Pakistan

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ABSTRACT

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***Corresponding**

Author

dr.zafir@ustb.edu.pk

This paper estimates bilateral trade Elasticity between Pakistan and her major trade partners for the period 1981-2021. Johnson's co-integration technique is used to estimate the long-run relationship between the real GDP, Export, Imports and exchange rate of Pakistan and her trading partners. The study finds no long-run relationship between real exchange rate, bilateral Export and imports, which mean that the domestic currency's depreciation is not helpful in improving our trade balance. In this study, we also find that trade is beneficial for both Pakistan and India but India is comparatively in a more advantageous position. The study finds that Pakistan's income elasticity is high for USA and China which means that Pakistan's economic growth boosts both USA and China's economy as Pakistan mostly imports from these two economies. The study also concludes that the income elasticity of USA and UK imports is very small which is due to the fact that we are mainly exporting agricultural goods. Policies of diversification of export should be pursued to increase export earnings.

Introduction

Globalization in trade, finance and investment were facing issues caused by geographical tension between US and China over trade and Covid-19 further deteriorated the trade relation among countries of the world. Each and every nation of the world tried to protect its citizen from pandemics and imposed restrictions on the movement of goods and services resulting in an overall decline in world output growth.

Global financial crises and trade tension between leading countries, muted world trade volume to 0.9 Percent in 2019. Covid -19 distorted the global supply chain and foreign direct investment due to a fall in global demand. Pakistan enjoys a comparative advantage in international trade because of its abundance of human and natural resources and geographical location. Pakistan's top export market is the United States of America followed by China, Afghanistan, the United Kingdom, and

Germany (Finance, 2021). Despite the lockdown situation throughout the world, exports to the USA increased from 17.3 Percent to 19.7 Percent during 2020-21 while the share of export to China increased from 8.0 Percent to 9.7 Percent (Finance, 2021). These countries' total exports from Pakistan constitute 52.96% in 2021 as against 47.25% of total world trade in the previous year (PBS, 2021). In the same year, Pakistan's imports from China were at the top followed by United Arab Emirates, Indonesia and Saudi Arabia. The combined share of the top six countries is 56.31% as compared to 56.87% in the previous years. Pakistan's trade integration ratio decreased from 30.44% to 26.21% in 2020 from the previous year while India's trade integration ratio decreased from 39.39% to 36.37% in 2020 from the previous year (World Bank, 2021).

The purpose of this paper is to identify the competitiveness of Pakistan's external sector vis-a-vis its trading partners. Another objective is to examine the dependence of Pakistan's economic performance in the context of export on the growth and development of other countries. Moreover, the study intends to look at the role of the exchange rate in the promotion of exports. Also in this paper, bilateral trade elasticity between Pakistan and its trading partners including USA, India, and United Kingdom is estimated using a data set of 42 years (1981-2021). This type of work may help policymakers in formulating trade policy in the current period when Pakistan is facing volatility in the exchange rate.

Literature Review

There is substantial literature on the measurement of bilateral trade elasticity among countries of the world.

In a study, Aydın, Çıplak, and Yücel (2004) estimated import and export demand for the Turkish economy using Vector Auto-Regressive (VAR) model and calculated short-run and long-run income and price elasticity for imports. They found developed a vector auto-regressive model to estimate import demand for the Turkish economy. They found that short-run income and price elasticity are significantly lower than their long-run elasticity for export. In a cross-section study, using a structural import demand equation, and Cointegration and Fully Modified Ordinary Least Square Method(FMOLS) for panel of 77 countries, the study found average short run price elasticity to be lower than long run elasticity in absolute terms while the opposite results were found in case of income elasticity.

Similarly, for four South-Asian countries export and import demand function, Nguyen and Bhuyan (1977) estimated income and price elasticity using double logarithmic form in line with Houthakker and Magee (1969). The study conclude that income elasticity of import demand in case of food items was higher for Bangladesh than other South Asian Countries included in the study. Marquez (1990) used quarterly data to examine the implication of bilateral trade elasticities for balance of payment forecasting and found that income elasticity of US export is smaller than its import. The study also concludes that Marshall Lerner condition hold in the case of Canada, Japan ,US ,OPEC and other non OPEC included in the study.

Studies also examined the impact of the exchange rate on the export and import elasticities. Studies found income elasticity of imports is greater than one while the elasticity of imports is less than one. He concluded that Bangladesh being a

developing country has to import to meet her demand and so import demand is less sensitive to the relative price change (Kabir, 1988; Nguyen & Bhuyan, 1977). Another study concludes the existence of a long-run relationship between the income of countries, the relative price of commodities and exchange rate variables. The study also concludes that depreciation improve bilateral trade balance (Bahmani-Oskooee & Brooks, 1999).

Material and Methods

The purpose of this paper is to estimate bilateral trade elasticity between Pakistan and its trading partners i.e. USA, India, China, Sri-lanka and UK. The countries were selected purposively i.e. to know the competitiveness of Pakistan vis-a-vis developed and developing countries. For achieving the objective of this research paper, I have used secondary data for the period of 1981-2021 taken from various sources including international financial statistics (IFS), and the economic survey of Pakistan supplement. The variables of interest are bilateral imports, exports, real exchange rates and the Real GDP of Pakistan and its trading partners. To estimate bilateral elasticity we have used a co-integration approach using Eview 5.

The Import and Export Demand Models

To estimate trade elasticity on a bilateral basis, we have used bilateral imports, exports and real exchange rates. Also, Pakistan’s trading partner GDP is used in estimating import and export demand for Pakistan. Since for the estimation purpose, export and import prices are required which are not available for all countries, therefore the researcher used bilateral exchange rate as proxy variable for relative commodities price (Burstein & Gopinath, 2014; Dornbusch, 1987; Hau & Rey, 2006). Pakistan export demand is expressed as

$$M_{i,t}^{pak} = \alpha + \beta GDP_{pak,t} + \delta REX_{i,t} + \varepsilon_t \text{----- (1)}$$

Where

$M_{i,t}^{pak}$ = Pakistan real import from trading partner *i*.

$GDP_{pak,t}$ = Pakistan’s Real GDP

$REX_{i,t}$ = Real bilateral exchange rate between Pakistan and trading partner *i*.

We measured REX in a way such that a decline reflects a real depreciation of the Pakistani currency. Thus, if real exchange depreciates, our export (Foreign country import from Pakistan) increases as it becomes less expensive for importing country. So the coefficient of the real exchange rate is negative in the case of Pakistan’s demand for imports. So far the coefficient of real GDP is concerned, its coefficient is positive.

Pakistan Export Demand Equation (Or Country "i Imports from Pakistan is expressed as

$$X_{i,t}^{pak} = \alpha' + \beta' GDP_{i,t} + \delta' REX_{i,t} + \varepsilon'_t \text{----- (2)}$$

Where

$X_{i,t}^{pak}$ = Import of trading partner "i" from Pakistan i.e Pakistan Export to partners countries.

$GDP_{i,t}$ = Pakistan trade partner Real GDP.

From eq(2), an increase in $REX_{i,t}$ implies depreciation of Pakistani currency which make Pakistani export less expensive for foreigner and therefore Pakistan competitiveness improves. Therefore, the expected sign of coefficient of $REX_{i,t}$ is positive. It is assumed that Pakistan trade partner economic growth positively affect Pakistan exports and therefore, the expected sign of the coefficient of $GDP_{i,t}$ is positive.

Results and Discussion

For the purpose of analysis, we used time series data, therefore stationary of the data is checked using ADF tests, Levin, Lin & Chu test, Im,Peasron test and Hadri test. The results of these tests indicate that all the variables are integrated of order (1).

All the variables of the import demand function are expressed in log form, so the estimated coefficient gives the elasticity of imports to real GDP and real exchange rate. The result given in Table No.1 indicates that the elasticity of Pakistan's import demand with respect to India, the USA and UK, and China are significant but in the case of Sri lanka, the import demand elasticity is insignificant. Out of all the above-highlighted countries, Pakistan's income elasticity is high for USA and China. It may be due to the reason that Pakistan is importing more commodities from China and the USA. The income elasticity of Pakistan imports from the USA and UK are 1.633492 and 0.380187 respectively. The elasticity of imports with respect to the bilateral real exchange rate of Pakistan with the USA and the UK are -0.129263, 129263 and -0.483907 respectively. The result shows that with growth in the GDP of Pakistan, our demand for UK goods increases more than demand for the USA. With regard to the effect of depreciation, imports from the UK decrease more than the decrease in imports from the USA. This may be due to the reason that we are more dependent on the USA as our import from the USA mainly consists of capital goods and machinery.

Table 1
Import Demand Function of Pakistan Vis-à-vis her Trading Partners

COUNTRY	M_Pak	RGDP_Pak	REX_i	Constant
INDIA	-1	0.4747843800	-2.249810	5.707926
CHINA	-1	1.151564	2.563380	-3.791203
USA	-1	1.875204	0.476989	-3.141324
UK	-1	0.380187	-0.483907	4.937630
SRILANKA	-1	1.089869	-0109838	1.201978

So far the effect of the real exchange rate is concerned; it is positive in the case of China and the USA but negative in the case of the UK, India and Sri Lanka. This result in the case of China and the USA is not supported by the theory as with depreciation Pakistani imports become expensive and hence the demand for imported decreases. But in the case of other trade partners, with the depreciation- of the Pakistani rupee our demand for imports increases. This may be due to the reason

that in case of depreciation import from China is considered comparatively less expensive than import from other countries but for the case of USA it may be due to the reason that our import mostly consists of machinery and other product are required for the development our core industry for which Pakistan demand is less elastic.

This result is also compatible with economic theory because if the exchange depreciates, it will discourage imports. The elasticity of imports with respect to the real exchange rate is very low in the case of USA. This may be due to the reason that we as a nation prefer to hold foreign reserves in dollars.

Demand for Pakistan export is related to her trading partners' national income, exchange rate and so many factors. In this section, we estimated the relationships between Pakistan's exports to her trading partner nation's income and bilateral exchange rate. The estimation results of equation (2) are given in table No.2 for each country.

Table 2
Export Demand Function of Pakistan Vis-à-vis her Trading Partners

COUNTRY	X_Pak	RGDP_Pak	REX_i	constant
INDIA	-1	2.757064	-2.337348	-8.913699
CHINA	-1	1.286543	-0.099102	1.928036
USA	-1	0.019088	-0.257619	7.481477
UK	-1	0.235608	0.459129	7.4404874
SRILANKA	-1	0.474581	-0.478003	9.333368

From the above table is clear that the elasticity of Pakistan's export demand to India's real GDP is negative which means that growth in India's real GDP has a negative relationship with Pakistan's export (India imports). This may be plausible on the ground that India may be concentrating on import substitution industries. But the USA and UK elasticity of Pakistani export are positive even though it is very low. The reason may that we are usually exporting raw materials or other agricultural products such as rice for which income elasticity of demand is very low. Therefore even though these countries experience higher growth rates, their demand has not increased more for Pakistani products.

Result shows that with depreciation of Pakistani currency, exports of Pakistan increases which is in line with economic theory. Moreover, Marshall Lerner condition of stability is also meet in case of all trading partner of Pakistan considered in the study. The last result allow us to conclude that depreciation of Pakistani Rupee encourage Pakistan export sector supporting (Abeyasinghe & Yeok, 1998; Ahmed, Appendino, & Ruta, 2017; Arslan & Van Wijnbergen, 1993; Fang, Lai, & Miller, 2006).

We have also checked residual of the estimated regressions and found it integrated of order zero. So there may exist a long-run relationship. To check the long relationship among variables we use the Johnson technique. From the below table, it is clear that calculated values of Trace and max are less than critical values in all the cases which means that there is no long-run relationship between the real exchange rate, real GDP and export and import of Pakistan and its trading partners.

Table 3
Johnson Co-integration Test Result

Countries	Max-Eigen Statistics	0.05 Critical Value	Trace Statistics	0.05 Critical Value
INDIA				
Import				
None	15.85519	21.13162	21.17896	29.79707
At most 1	5.095157	14.24460	5.323776	15.49471
At most 2	0.228619	3.841466	0.228619	3.841466
Export				
None	14.39723	21.13162	20.18050	29.79707
At most 1	5.774683	14.26460	5.783273	15.49471
At most 2	0.008590	3.841466	0.008590	3.841466
USA				
(import)				
None	8.759714	21.13162	14.71671	29.79707
At most 1	4.138223	14.26460	5.956995	15.49471
At most 2	1.818772	3.841466	1.818772	3.841466
(Export)				
None	10.474744	21.13162	13.06937	29.79707
At most 1	2.557280	14.26460	2.591926	15.49471
At most 2	0.034647	3.841466	0.034647	3.841466
UK				
(import)				
None	17.12778	21.13162	23.89651	29.79707
At most 1	6.507091	14.26460	6.768735	15.49471
At most 2	0.261643	3.841466	0.261643	3.841466
(Export)				
None	13.91156	21.13162	19.12979	29.79707
At most 1	5.197608	14.26460	5.218232	15.49471
At most 2	0.020623	3.841466	0.020623	3.841466

Conclusion and Recommendations

The study concludes that among Pakistani trading partners considered in this study, Pakistan's import elasticity is high for India. This implies that the growth rate in Pakistan affects positively India's export and hence GDP growth. But the demand India for Pakistani imports did not increase much with India's economic growth, so it is more favorable for India to enhance trade relations with Pakistan. Also with the depreciation of the Pakistani rupee, our demand for India's goods increased. This may be due to the reason that in the case of depreciation import from India is considered comparatively less expensive than import from other countries. The reason may be that the exchange rate differential between Pakistan with India is smaller than USA and UK. In case of other countries, the devaluation of the Pakistani currency is helpful with respect to UK and USA. In the case of the entire trading partner, Marshall Lerner's condition is satisfied.

On the basis of the results of the study, we can say that policymakers should consider trade ties with India as it will be helpful for the growth of both countries.

With respect to other countries, our export did increase appreciably with their GDP growth as we mainly export raw materials and agricultural goods. Therefore to increase our export revenue, we should diversify our product in line with the tastes of foreign country residents.

Future Area of Research

This paper could not explore all the beneficial areas of trade between Pakistan and its trading partner. Future research can be undertaken to explore in which sector and kind of import and export Pakistan can gain a beneficial position vis-a- vis its trading partner.

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