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Exploring bilateral trade potential: A promising analysis

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Abstract

Trade has been playing a significant part as an engine of growth for almost every nation on the globe. Each country attempts to have bilateral, regional, free trade, or preferential trade agreements to boost its economic growth and potential. The study focuses on investigating the bilateral trade potential of Pakistan with selected Organization for Economic Co-operation and Development (OECD) countries specifically with the United Kingdom, Japan, Australia, Sweden, Switzerland, and Norway, through Panel data analysis. The sample period is taken from the year 1982-2021. Variables used are economic growth (GDP), economic development (GDP per capita), the exchange rate (exr), inflation (inf), and foreign direct investment (FDI) are empirically researched on bilateral trade. Unit root test is applied to test the stationarity. Following the stationarity estimations descriptive analysis is conducted. Simple panel OLS regression, random and fixed effects are applied. Hausman is conducted and probability was found to be less than 0.05 therefore, the fixed effects model was found to be the most appropriate. A test for endogeneity was applied. As endogeneity was found to exist, further two-staged least square is applied for robustness. The fixed effects model in 2sls revealed no significance of Gross domestic product, Gross domestic product per capita, and inflation, while the exchange rate has a positive and significant relationship. Distinctive results are attained for foreign direct investment where a negative significant relationship is discovered. The findings suggest that for trade promotion the goal should be to keep the exchange rate low and FDI flows are not to be focused on the trade partners.

Key Words: Trade, Panel data, OECD, 2SLS

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1. Introduction

Trade is an essential part of economic growth and development. The World economy, in general, is in pursuit of trade liberalization since the early 1980s. Developing countries are also keen on walking the same path to achieve the

economic growth of developed countries. The movement towards globalization is achieved through trade liberalization. Organizations like World Trade Organization (WTO), World Bank, and IMF has helped countries to move in this direction through either unilateral initiatives or

multilateral initiatives. The effects of trade liberalization are found to be diverse. In general, the impact of trade liberalization is found to be positive on imports more than exports. Considering various techniques, data sets, and methodologies the results achieved differ according to the circumstances. More often the studies conducted are on panel data or cross-section analysis. (Zakaria, 2014)

The value of trade has been greatly emphasized since the beginning. Classical economists like Adam Smith and David Ricardo have always supported the role of trade in the economy. They agreed upon the role of specialization and comparative advantage (Lam, 2015). Following then on there have been various theories of how trade can be an important factor. Among many theories, many researchers claim to propose that Hecksher Ohlin's theory is supportable in the case of Pakistan including (Irshad & Anwar, 2019). The Hecksher-Ohlin factor endowment theory represents that the export of any nation builds upon the endowment of resources, it can be capital-abundant or labor abundant. The theory assumes to have no contrast in the aggregate preference of both nations. The theory is criticized due to the fact that variation in resources is enough to create different production possibility frontiers in the two countries. Furthermore, lack of motivation, lack of resolve from the government and required concern from the industry would not imply the theory to work properly (Uddin & Godwin, 2021). On the other hand, Hecksher Ohlin, Factor price equalization theorem postulates that in the case, if the price of output is equal between the two countries it would also cause the inputs to equate with each other. Therefore, in the long run, the gap between wages and rents would gradually decrease

(Suranovic, 2006). The cause of concern related to this theory is inflexibility on the part of institutions such as ailing development of financial markets, financial systems, uncertain macroeconomic environment, etc would hinder the movement of capital inflow in the host country and thus the equalization (Uddin & Godwin, 2021).

Various theories have been proposed to explore the relationship of growth with international trade. The Traditional theories of international trade have been criticized for a number of reasons. Today it is believed that for a sustained increase in the volume of trade and enhancement of the economy trade liberalization is advocated in general. International Monetary Fund, World Bank, and other institutions have clearly described the benefits of how to further liberalization in international trade can help in reaping prosperity, especially in the case of developing countries. It has been observed that countries welcoming lower tariffs and barriers have encountered accelerated growth in the economy and a prominent reduction in poverty. This is seen in the case of India, China, and other high-income earning countries in Asia. Developing countries have the potential to gain both in the agriculture and manufacturing sector. Developed countries have more potential in agriculture than in the manufacturing sector. Therefore, developing and developed countries both have a lot to achieve from further trade liberalization. Markets with lesser barriers and quotas would allow developing countries to gain more from the non-protected markets and achieve a competitive edge as the market would be free from any bias.

Researchers such as ((Bhagwati & Krueger, 1973)(Winters et al., 2004)) have found empirical

evidence in support of trade liberalization. (Choi 2009) highlights that even with a large amount of existence of empirical evidence there is still a lack of liberalization theory. The paper proposes that the theory of trade liberalization is the theory of monopoly in the opposite direction. It was proved that liberalization would allow competitive firms to achieve higher profits as it allows the firms to strengthen and enlarge. It is further stated that not only will the liberalization increase the competitive abilities of the firm it will also assist in innovation capacity. The author eventually adds that achieving liberalization would not result in immiserizing growth as suggested by Bhagwati (1958).

Trade Potential can not be attained without trade liberalization. The trade potential of any nation could achieve larger economic growth as well as economic development. Therefore, Pakistan also aims to increase its trade volume and enhance its trade potential with various countries. In the initial 1980s, Pakistan attempted to make reforms and structural changes in its trade policies in an attempt to liberalize the trade market. A number of different institutional policy changes were applied such as the decrease in tariffs, abolishing quantitative controls, decreasing the gravity of tax levels in international trade, etc.

The trade direction of Pakistan has been toward the Middle East and Western countries. But currently, trade with the Middle East has declined and a larger portion of the trade consists only towards Western countries. A prominent reason for the loss of the international market in Pakistan is due to the expansion of Indian and Chinese trade. When exports are being considered Afghanistan, UAE, USA, and especially China are found to be leading partners. China alone accounts for 23% of exports from Pakistan in

2019-20. As China Pakistan economic corridor progresses the trade ratio between China and Pakistan is expected to grow even further. China is not just a major export partner of Pakistan but also an important import partner. Other prominent partners include UAE, Saudi Arabia, and Kuwait, where Pakistan's import consists of Oil alone.

Pakistan has been a trade partner with several OECD countries since 1975. A large amount of trade has been directed towards the OECD countries. However, the studies and trade potential of these countries have been focused on only a select few such as the United States of America, Japan, and the United Kingdom. A handful of research has been conducted on other countries and found to have strong potential for trade but there is still a lack of investigation and exploration on the majority of European states. Of the few studies conducted one of them is of (SULTAN & ABIDIN, 2017) in which the trade complementarity index was used to highlight the trade potential of all OECD countries, where except for Hungary potential for expansion existed for all the countries.

This study focuses on investigating selected OECD countries that are also part of the Paris Club. The research focuses on investigating trade relations of Pakistan with the United Kingdom, Norway, Sweden, Japan, Switzerland, and Australia. These countries are selected to investigate the trade performance of Pakistan. Moreover, they are also considered to further explore the steps that can be taken to enhance the trade performance of Pakistan which is far from exploring its trade potential. As Pakistan is required to build strong relations with countries holding strong economies, therefore the selection of these OECD countries would help inspect how significant relations have been built with these

developed economic countries and what should we do further to strengthen trade relations with them. The aim is to inspect the impact of economic growth through GDP, economic development through GDP per capita, exchange rate, and inflation on total bilateral trade.

2. Literature Review

(Bux et al., 2021) studies the empirical analysis of Pakistan's trade balance during the period of 1980-2020. Time series data has been used where trade balance, Exchange rate, GDP, Inflation, Infrastructure, and Domestic consumption are taken as variables. All the variables are found stationary at first difference through ADF test and PP test. For short-run analysis, VECM is used while for long run Johansen's cointegration is applied. The coefficients of GDP and Infrastructure were found to have a positive effect on the trade balance, While coefficients of the exchange rate, domestic consumption, and inflation depict a negative impact on the trade balance.

(Ahsan et al., 2021) explores the effects of trade facilitation on international trade in Pakistan. The author aims to explore ways to enhance and promote efficiency in trade for Pakistan constructed through comparative analysis with other countries. 20 major trade partners are selected and the Gravity model is applied. The period selected for the analysis is from 2000-2019. The results represent a low trade facilitation index. Furthermore, it was found that the country's imports and exports commodities are singular. It has a large trade deficit which does not support a healthy business development environment. Another important component to

address is trade cost which is negatively affecting trade facilitation.

(Rind et al., 2020) scrutinizes various policies, patterns, and compositions of trade in the case of Pakistan from 1947-2008. The paper investigates the expansion of exports in Pakistan. During the sixties decade trade widely improved. Imports of major products such as machinery, capital goods, and fuel especially from Saudi Arabia widened. Different economic policies have also been adapted to ban certain imports in the country. The paper overall concludes a lacking of trade partners on the part of Pakistan where the largest trade partner identified is the USA. This shows a heavy reliance on a very specific market which is not healthy for the trade environment. Moreover, it is advised to explore various other trade partners like China.

(Akram et al., 2020) inspects the trade potential of Pakistan in the Regional Comprehensive Economic Partnership (RCEP). This study applies the methodology of trade indices, trade cost, and Trade complementarity index and revealed comparative advantage to highlight the potential of trade in Pakistan at the sectoral level. The data has been collected from the UN Comtrade database and CEPPI and Asia-Pacific Trade and Investment Agreement database (APTIAD). It was found that a high level of complementarity exists among Pakistan and members of the proposed RCEP. Furthermore, over time this complementarity increases. It was found that the introduction of Pakistan in this block is of benefit to the Pakistan as well as the bloc through intra regional trade and investment flows. Pakistan can greatly benefit from RCEP countries at sectoral level by diversifying the type of products being traded, like electric machinery and mineral fuels.

(Irshad & Anwar, 2019) explores the determinants of Pakistan's trade with rest of the world. Furthermore, this study also attempts to discover the potential market for Pakistan by the help of gravity equation. The model specified in the study is to investigate the total merchandising trade with the trading partners of Pakistan, difference in per capita income, geographical distance, bilateral exchange rates, and trade openness with dummy variables such as population religion, sharing border and landlocked nation. GDP has been considered a proxy of market size. The time period considered is from 1992-2016. A total of 198 countries have been chosen for the study. For methodology Panel cross section dependence test is used as it is a prerequisite of gravity equation to explore whether the sample data cross-sectionally dependent or independent. The level of significance is found for GDP at 1%. The results show that as this 1% significance increases bilateral trade for Pakistan increases by 0.94% to 2.97%. Furthermore, an increased percentage in distance decreases by 1.3% to as much as 9.84%. It was also found that exchange rate depreciation for Pakistani currency can actually increase level of imports. The conclusion showed that Pakistan trade pattern supports the Heckscher Ohlin Theory.

(Taguchi & Rubasinghe, 2019) investigates effects of trade of the South Asian free trade Agreement precisely focusing in trade between India and Sri Lanka (ISFTA) and India and Pakistan (PSFTA). The data has been used from 1980-2016. Twenty four sample countries/regions have been considered for estimation including both SAARC economies and NON SAARC economies. For methodology Gravity Trade Model has been utilized. Data has been collected from Trade Statistics (DOTS) and International

Financial Statistics (IFS) by International Monetary Fund (IMF) and World Economic Outlook (WEO). Results showed that in case of PSFTA trade creation is found only on Sri Lankan imports. Moreover, there is a lot of potential for trade between Pakistan and Sri Lanka.

(Abbas & Waheed, 2019) investigates the potential of trade in Pakistan with 47 cross section countries. It was implied in this paper that the trade of Pakistan is dependent on limited number of products. The data utilized for the study has been taken from 1980-2013. Gravity model approach has been applied for the analysis. It was found that augmented variables reveal that relative price has a positive impact with lower price elasticity. It was further revealed in the study that Pakistan tends to have a lower volume of trade with its border sharing countries while more with the countries where it shares the language. Moreover, it was exhibited that the trade taking place with major trading partners is depleting and therefore a diversification and extension in variety of trade products is required. In addition the Pakistan has benefited from bilateral trade agreement (BFTAs) but South Asian Free trade Agreement (SAFTA) has not been considerably beneficial for Pakistan and has instead brought several inefficiencies. A prominent potential of trade exists between Nepal, Iraq, Philippines and Jordan within Asia, while the most untapped potential is found to lie in European countries.

(Yeo & Deng, 2019) inspects effects of trade policy on volume of trade between Pakistan and its trading partners where larger flow of trade exists, through gravity model. The data employed has been taken from 2006- 2015. The results show existence of statistically significant correlation on exports and imports by trade policy

variables. The study attempted to explore the impact of trade policy utilizing four specific trade groups, OECD(Organization for Economic Co-operation and Development), SAFTA (The South Asian Free Trade Area), APEC (Asia-Pacific Economic Cooperation), GCC (Cooperation Council for the Arab States of the Gulf). Evidence has been found that the trade policy of Pakistan effects its trade with its prime trading partners but the extent of impact is dependent upon the organization to which the trading partner belong and also on the geographical location due to the distance. The conclusion reveals that strict trading policies effect the environment of the trade between Pakistan and its partner countries by reducing total volume traded.

(Khan et al., 2018) scrutinizes the multilateral free trade agreement of Comprehensive and Progressive agreement for Trans-Pacific partnership (CPTPP). This partnership is focused between 11 countries on either sides of the Pacific region. The study suggests that this agreement is most probably adversely affect the trade of Pakistan especially in textile and apparels as the agreement mandates the members to purchase all the products within the process from the member countries only. Therefore, the study aims at evaluation of the expected impact of this regional trade agreement on macroeconomic variables of Pakistan like real Gdp and sectoral imports and exports. Database consists of 140 regions, 119 countries, and 21 aggregated regions. The study further suggests that if Pakistan joins the Agreement and becomes a member state this would be highly beneficial for Pakistan. The analysis applied uses the methodology of computational general equilibrium (CGE), Global trade analysis project (GTAP) and My GTAP model. The data has been taken GTAP

database 9a and Comprehensive Pakistani SAM 2010-11.

(Ahmad et al., 2017) examines the effect of exchange rate on exports for Pakistan. The time period selected is from 1970-2015. Data has been collected from International Monetary fund and World Bank. For methodology ARDL is applied. The results of the study depict exchange rate to be insignificant on exports. On the other hand global income has positive and significant effect on exports.

(D. J. Iqbal, 2016) speculates and analyses the exports of Pakistan. The author has taken panel data and applied gravity model analogous to that of (Frankel 1993) and (Sharma & Chua, 2000). The results reported are compatible with the previous studies made on the same topic .The author found to estimate both fixed and random effects in the model. And after conducting Hausman and LM test fixed effects model was found to best suit the condition. The author has included the impact of membership in SAARC and explored that it has a positive and significant impact. The other variables that also were found to have significance were GDP and GDP per capita Furthermore, the factor of common border was found to be irrelevant in case of Pakistan and distance though depicts a positive significant impact but the coefficient is very minimal. Adding to the study exchange rate was found to be insignificant. A few limitations mentioned in the study includes non availability of the price indices of some major trading partners like Bangladesh and UAE which could have resulted in biased results.

(J. Iqbal et al., 2015) tests the Marshall Lerner case for Pakistan. Ten major trading partners are considered for study; USA, UK, Saudi Arabia, China, France, Canada, Japan, UAE, Kuwait and

Germany. The study is conducted for the period of 1980-2013. Methodology applied is Johansen's co integration process. The outcome indicated long run co integration relationship among balance of trade and exchange rate. Nevertheless, Marshall Lerner condition does not suffice for all nations, but for only six. In case of UK, USA, China, Canada, France and Saudi Arabia, the Marshall Lerner condition is full filled, while the same cannot be said about the other four countries.

(Sultan & Munir, 2015) aims to explore export, import and total trade factor and potential of Pakistan through gravity model. The data utilized is Panel data across 38 countries from 2000-2013. Trade potential with Norway and Hungary is found to have strong chances. With Switzerland and Hungary a strong export potential exists and in case of imports the Potential lies with Norway, Philippines, Portugal and Greece. It was furthermore found that Pakistan has unexplored potential with the countries with which it shares its borders. Due to the results observed the policy recommended in this paper is to remove all kind of trade barriers to enhance the trade potential of Pakistan.

(Miankhel, 2015) researches the different institutional, socio-economic and political constraints that Pakistan faces in international trade market. Considering 'behind the border' constraints and 'behind the border constraints' where the literature in context of Pakistan is not significantly present. The methodology adopted is of gravity model considering the data from two time periods, 2006-2008 and 2009-2011. Furthermore analysis was also done on four single-digits SIC categories of products. It was found in the model that in case of Pakistan 'behind the border' constraints are highly

significant during the second time period considered in the sample data. The results depicted that Pakistan's exports are majority labor intensive. The study states that Pakistan has a lack of realization of its potential trade. Pakistan needs to enhance its institutional capacity to deal with trade limiting factors.

(Abbas & Waheed, 2015) evaluates the exports potential of Pakistan and the conduct of macroeconomic variables of flow of export with its trade associates. The methodology applied is of gravity model. The data has been taken of 40 trading partners as panel data from the time period of 1991-2011. The data was collected from Statistical year book of Pakistan, World Development indicators, and international financial statistics. The results of the gravitational model depicts that there is an adverse impact on the trade potential of Pakistan due to geographical distance while the exports are positively affected by the Partner country's potential of demand, Pakistan's own supply capacity and the size of the market. Common language is also seen to have a significant positive impact but common border depicts results otherwise. The free trade agreements of Pakistan show adverse insignificant effects. A high export potential have been found to exist with certain countries in every Asia, Oceania, Africa and Europe where Europe was found to have the highest bilateral potential especially with countries like Norway, Denmark, Switzerland, Hungary, Austria, Finland and Sweden. The result of the study establishes that Pakistan should revisit its agreements and diversify its trade products to capture the potential.

2.1 Significance of the study

It is very important for Pakistan to explore its trade potential in different regions of the world and increase it in the existing ones. Pakistan is constantly trying to enhance its trade throughout the globe. Various free trade agreements has also been signed by Pakistan with countries like Malaysia, Sri Lanka and China, But it needs to diversify and find new arenas of trade. One of the important regions for enhancement of trade is with OECD countries, where the data shows that a large amount of trade volume is directed to few countries but a potential of immense enhancement is expected. To uncover the evidence a very limited amount of research exists in case of Pakistan and OECD countries especially towards developed Paris club countries. The study being conducted focuses on exploring the trade potential of Pakistan in selected OECD countries that are also part of Paris club. The objective of the study is to explore the trade potential of Pakistan with six selected OECD countries; United Kingdom, Japan, Australia, Sweden, Switzerland and Norway.

2.2 Hypotheses

H1: There is potential for increase in trade volume of Pakistan with United Kingdom.

H2: There is potential for increase in trade volume of Pakistan with Norway.

H3: There is potential for increase in trade volume of Pakistan with Sweden.

H4: There is potential for increase in trade volume of Pakistan with Japan.

H5: There is potential for increase in trade volume of Pakistan with Switzerland.

H6: There is potential for increase in trade volume of Pakistan with Australia.

3. Data and methodology

The data has been collected from different issues of Economic survey of Pakistan, WDI open data and International Monetary Fund (IMF) from 1982-2021 on annual bases. Total trade volume is taken as dependent variable and the variables selected are, Exchange rate, GDP of Pakistan, GDP per capita of Pakistan, GDP of partner country, GDP per capita of partner country, inflation and foreign direct investment as independent variables.

Quantitative techniques have been applied to investigate the model. Panel unit root test is applied to find the stationarity of the data. Prior to undertaking any analysis for regression descriptive statistics is calculated. Mean, minimum, maximum, standard deviation, skewness and kurtosis are all calculated. Furthermore, three panel data models are applied. First with common constant: panel OLS model, fixed effects and random effects models. Hausman test is applied for comparison of estimation between random & fixed effect models. Moreover, 2SLS model is also applied to check the robustness between models.

3.1 Model of study

General equation (Panel OLS):

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 w_{it} + \varepsilon_{it}$$

Fixed effects method:

$$Y_{it} = \alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_k X_{kit} + u_{it}$$

Random effects method:

$$Y_{it} = (a + v_i) + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_k X_{kit} + u_{it}$$

$$Y_{it} = a + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_k X_{kit} + (v_i + u_{it})$$

Vot= Volume of Trade/Total trade

Exr =Exchange rate

GDP= Gross domestic product

GDPP = Gross domestic product per capita

Two staged least square model:

$$\hat{X}_{it} = \beta_0 + \beta_1 I_{1it} + \beta_2 I_{2it} + v$$

$$Y_{it} = \alpha_0 + \alpha_1 \hat{X}_{it} + \alpha_2 Z_{it} + \varepsilon_{it}$$

Model:

$$Vot_{it} = \beta_0 + \beta_1 Exr_{it} + \beta_2 GDP_{it} + \beta_3 GDPP_{it} + \beta_4 Inf_{it} + \beta_5 FDI_{it} + \varepsilon_{it}$$

Inf =Inflation

Fdi =Foreign Direct Investment

i= represents the country while t is for time.

Table 1**Descriptive Statistics**

United Kingdom						
	LVOT	LGDP	LGDP	LEXR	LFDI	INF
Mean	24.7302	27.6650	9.7488	4.2847	27.8713	3.0376
Minimum	22.3562	26.4096	8.5632	2.9211	18.1604	0.3680
Maximum	26.7894	28.4443	10.4265	5.3719	31.1583	8.5989
Standard deviation	1.2644	0.6022	0.5501	0.7420	2.4309	1.9444
Skewness	-0.2575	-0.5850	-0.6974	-0.4663	-1.9469	1.3887
Kurtosis	-1.0151	-0.8102	-0.6833	-1.0522	5.6957	1.5409
Norway						
Mean	21.5750	28.7030	13.3582	1.8607	25.4799	3.2508
Minimum	19.1434	27.4186	12.1885	-0.2053	18.3277	0.4545
Maximum	23.5998	29.5949	14.1068	2.9063	28.5887	11.3410
Standard deviation	1.1381	0.6833	0.5999	0.7998	2.3618	2.4040
Skewness	-0.2185	-0.2486	-0.3333	-0.6022	-0.9054	1.6836
Kurtosis	-0.5578	-1.3168	-1.2735	-0.4255	0.5321	2.7115
Sweden						
Mean	22.8824	29.5891	13.5686	1.8219	25.9183	2.8783
Minimum	20.3078	28.3992	12.4644	0.5322	18.7275	-0.4945
Maximum	24.8877	30.3489	14.2033	2.9273	29.1575	10.3666
Standard deviation	1.3185	0.5504	0.4898	0.7108	2.6156	2.9899
Skewness	-0.2570	-0.4770	-0.6040	-0.3088	-1.1119	1.1604
Kurtosis	-1.0347	-0.7354	-0.6186	-0.9830	0.7597	0.2925

Japan						
Mean	24.9365	35.1901	16.5424	-0.9793	25.5597	0.6641
Minimum	22.9817	34.6613	16.0710	-3.1055	18.7605	-1.3528
Maximum	26.3859	35.3475	16.6936	0.4077	29.9486	3.2514
Standard deviation	0.9534	0.1859	0.1664	0.9970	2.6330	1.1747
Skewness	-0.1831	-1.7402	-1.7258	-0.6353	-0.5150	0.6416
Kurtosis	-0.9107	1.8743	1.8627	-0.5700	-0.3335	-0.4421
Australia						
Mean	23.5341	28.9117	12.1146	3.5591	26.8867	3.6496
Minimum	20.7965	27.5027	10.9674	2.4113	18.0053	0.2249
Maximum	25.5352	29.9240	12.8623	4.7824	29.6420	11.3518
Standard deviation	1.3609	0.7294	0.5727	0.7693	2.3658	2.7300
Skewness	-0.5585	-0.2646	-0.3572	-0.0142	-1.4250	1.3084
Kurtosis	-0.7606	-1.0656	-1.0018	-1.3476	3.6243	0.9272
Switzerland						
Mean	23.2215	28.8244	13.0132	3.5581	26.6852	1.3810
Minimum	20.7051	28.1235	12.4531	1.6951	22.7019	-1.1439
Maximum	24.7265	29.2584	13.2940	5.1694	31.3602	5.8596
Standard deviation	1.1075	0.3360	0.2469	1.0082	2.3758	1.7235
Skewness	-0.8061	-0.5181	-0.7708	-0.2738	0.0642	1.1541
Kurtosis	-0.4563	-0.7558	-0.3762	-0.9306	-0.8806	0.9014

4. Empirical Analysis:

4.1 Descriptive Statistics:

The data for investigation is selected from 1982-2021. Cross sections of six countries are selected United Kingdom, Norway, Sweden, Japan, Australia and Switzerland.

Table 1 represents description of 240 observations of 6 OECD countries for a period of 29 years from 1982-2021. The table demonstrates mean, minimum, maximum, standard deviation, skewness, and kurtosis for every country. Mean is the average of all 50 observations, Standard deviation demonstrates the extent to which the value varies from average value. Skewness defines level of asymmetry in

the series, higher the zero is positive skewness while less than zero means negative skewness. Kurtosis at last measures the how flat or steep the curve is due to the distribution sample.

It is observed from the data that mean of all the 6 countries of all the six variables is positive. On average the highest volume of trade with Pakistan is of Japan and United Kingdom. The minimum highest trade volume is found to be with Japan and the highest maximum trade is with United Kingdom. Highest standard deviation in trade is found with United Kingdom.

In case of gross domestic product and gross domestic product per capita, Highest GDP is of Switzerland and highest gdp per capita is of Japan. Highest average exchange rate with

Pakistan is of United Kingdom and the lowest average exchange rate is of Norway. Skewness of exchange rate with all the countries is positive that is it is right tailed. Kurtosis of all the nations is less than 3 residing in the category of Platykurtic.

Moreover, the table also reveals that highest foreign direct investment is of United Kingdom highest inflation among all these 6 countries is that of Norway and the lowest is of Japan.

4.2 Empirical Estimates

After taking log of all the variables to estimate the model stationarity of the variables have been checked for stationarity. Where volume of Trade (vot), Exchange rate (exr), Foreign Direct

Table 2

Regression Estimates

Variable	Coefficients	t-statistics	Probability
Constant	-4.7220	-6.5463	0.0000
Gross domestic product	1.1541	42.6117	0.0000
Gross domestic product per capita	-0.6096	-19.5597	0.0000
Exchange Rate	0.7998	25.3283	0.0000
Foreign Direct Investment	0.0003	0.0176	0.9860
Inflation	-0.0543	-3.4242	0.0007

The results depict that gross domestic product, gross domestic product per capita, exchange rate and inflation all have significant effect on the volume of trade but foreign direct investment is insignificant. To further test if Panel OLS is appropriate or not Breush-Pagan test and redundant likelihood test is applied to select the model between panel OLS or Random effects model, while redundant likelihood test is applied to explore whether OLS or fixed effects model should be preferred. **Table 3** shows the p-value

Investment (fdi) are stationary at first difference while Gross domestic product (gdp), Gross domestic product per capita (gdpp) and Inflation (inf) are stationary at level.

A panel model can be of three types: Panel OLS regression model, fixed effects model (Variable intercept model) and Random effects model (Variable coefficient model). As put forward by (Wooldridge 2010) Panel OLS is applied when at every time period year/month/quarter etc a different sample is selected. While fixed effects model or random effects model is preferred when same cross section ids are observed as countries/firms etc.

Therefore, first panel regression analysis is applied. The results are shown in the table 2.

of the Breush-Pagan Langrangian multiplier test is found to be 0.00, at 5% level of significance, therefore OLS is not the preferred test and random effect model is applicable. Additionally, **Table 4** shows results of Redundant fixed effects where probability is less than 0.05 therefore rejecting the null hypothesis and accepting fixed effects model as the better model.

Since the results do not support Panel regression analysis Random effects model is conducted.

Table 5 below shows the results of random effects model.

Table 3

Breush-Pagan Langranigian For Homoscedasticity

Chi-square	600.4499
Probability	0.0000

Table 4

Redundant Fixed Effects Result

Cross-section F	0.0000
Cross-section Chi-square	0.0000

Table 5

Random Effects Model Result

Variable	Coefficients	t-statistics	Probability
Constant	-4.7220	-9.0609	0.0000
Gross domestic product	1.1541	58.9800	0.0000
Gross domestic product per capita	-0.6096	-27.0731	0.0000
Exchange Rate	0.7998	35.0575	0.0000
Foreign Direct Investment	0.0003	0.0244	0.9806
Inflation	-0.0543	-4.7395	0.0000

The results of the random analysis suggest that all variables except for foreign direct investment have a significant impact on volume of trade, while gross domestic product and exchange rate have a positive and significant impact the variables gross domestic product per capita and inflation has a negative and significant impact on trade.

To further analyze the relevance of Random Effect Model Hausman test is applied. The test is conducted to choose if Random effects model is the best suited model or whether fixed effects model should be chosen. One of the two would

be selected on the basis of inter-variance or intra-variability.

The hypothesis of the Hausman test shows:

H_0 = Random effects model is the appropriate model

H_a = Fixed effect is appropriate model.

Table 6 shows the results of the Hausman test.

Table 6

Hausman Test

Chi-square stats	219.297
Probability	0.000

Table 7**Fixed Effects Model Result**

Variable	Coefficients	t-statistics	Probability
Constant	-0.3742	-0.0521	0.9585
Gross domestic product	0.4852	1.0353	0.3016
Gross domestic product per capita	0.6313	1.1812	0.2387
Exchange Rate	0.7917	15.2233	0.0000
Foreign Direct Investment	-0.0263	-2.3886	0.0177
Inflation	-0.0085	-0.6770	0.4991

Considering the results depicted, p-value is less than 0.05% therefore null hypothesis is rejected and Fixed Effects model is applied as it is considered the most effective model of the three. The results are represented in table 7.

To further identify the finest model fixed effects model is enforced two ways. One by keeping fixed only under cross section and the other by placing both fixed cross sections and periods. The aim of redundancy test here is to determine

the appropriateness between period fixed effect and cross sectional fixed effect (or both).

As seen by the results in Table 8 the probability value of cross section chi square is less than 0.05% that is 0.00 and period chi square is also less than 5% also 0.00 therefore null hypotheses is rejected for both cross section and period. In this model the fixed affects can be accounted for both cross section and period.

Table 8**Redundant Fixed Effects Test**

Cross-section Chi-square	0.0000
Period Chi-square	0.0000

The results of the fixed effects model illustrate that exchange rate and foreign direct investments are the only variables that have a significant impact on the volume of trade where exchange rate has a positive and foreign direct investment has a negative constant. All other variables Gross domestic product, Gross domestic product per capita and inflation represent an insignificant impact on the volume of trade of the selected countries.

By virtue the panel data is likely to suffer from the issue of endogeneity due to existence of correlation between error term and explanatory variables, endogeneity was checked. The outcome portrayed that gross domestic product; exchange rate and foreign direct investment were found to be endogenous. Results are given in table 9. To resolve this concern an alternative technique of two staged least square (2SLS) is applied. The selection of instruments is pivotal to establish the results in 2sls model. The

instrument variables selected to amend the endogenous variables in the model, correlating with the error term resulting in unreliable result from OLS, should be exogenous in nature,

therefore only affecting the definite explanatory variable and not the dependent variable in the given model.

Table 9
Endogeneity Test

Variable	Value
LGDP	0.0499
LGDPPI	0.1833
LEXR	0.0009
LFDI	0.0033
INF	0.4470

As evident, the 2SLS model involves estimation process in dual stages. The first phase the endogenous regressors are mutated to estimate the forecasted value by the instrumental variables.

$$\hat{X}_{it} = \beta_0 + \beta_1 I_{1it} + \beta_2 I_{2it} + v$$

In the second phase of the model the replacement of endogenous variable takes place by its predicted value. The 2SLS model absorbs the endogeneity problem by the incorporation of instrumental variables.

$$Y_{it} = \alpha_0 + \alpha_1 \hat{X}_{it} + \alpha_2 Z_{it} + \varepsilon_{it}$$

Table 10
2SLS Estimates

Variables	Panel OLS		Fixed		Random	
	Coefficient	T-stats	Coefficient	T-stats	Coefficient	T-stats
Lgdp	1.1541*	42.612	0.4852	1.0353	1.154*	58.98
Lgdppi	-0.6096*	-19.56	0.6313	1.1812	-0.610*	-27.07
Lexr	0.7998*	25.328	0.7917*	15.223	0.799*	35.058
Lfdi	0.0003	0.0176	-0.026*	-2.389	0.000	0.0244
Inf	-0.0543*	-3.424	-0.008	-0.677	-0.054*	-4.739
Constant	-4.7220*	-6.546	-0.374	-0.052	-4.722*	-9.061

Note: *Significant at 0.001 level

Table 10 shows the results from 2sls model. The 2 SLS regression analysis was conducted primarily with panel ols, followed by random and fixed effects. According to the panel regression approximations of 2sls it can be claimed that gross domestic product, gross domestic product per capita, exchange rate, and inflation all are significant variables. From the results, it can be concluded that a 1 percent inclination (decline) in

GDP brings an inclination (decline) of 115.4% volume of trade. This portrays that as the production increases it has a major significant positive impact on trade between these countries. On the other hand, the coefficient of GDP per capita shows a negative coefficient concluding that an increase (decrease) in 1 percent of GDP per capita would decline (incline) 60.9% volume of trade. The exchange rate also has a positive

relation with volume of trade responding with 79.9% increase or decrease in response. Inflation has a negative relationship responding with 5.4% change.

The second method applied is fixed estimation, where GDP, GDP per capita, and inflation are all insignificant. Among them, only the exchange rate and FDI are significant at 0.05% level. The exchange rate has a positive coefficient depicting a direct relationship with the trade. On the other hand, foreign direct investment is negative showing an inverse relationship with the dependent variable. The outcome represents that an increase or decrease in the exchange rate would result in a 79.2% response volume of trade, while an increase (decrease) in foreign direct investment would result in a 2.6% decrease (increase) in the volume of trade.

The third 2sls model estimation conducted is the Random effects model. Where the outcome is similar to that of 2sls panel regression analysis where only FDI is insignificant while all other variables are significant. The response ratio of the dependent variable towards all the independent variables is almost similar to that of the 2sls panel regression analysis.

Since the application of Hausman results revealed the fixed effects model to be the most favorable, therefore the same will be selected in 2sls. Consequently, the 2sls fixed effects results are the most appropriate in this scenario.

5. Conclusion

Trade has been one of the most influential elements of any nation to bring about prosperity towards a country. For this reason, it has also been one of the widest-studied and most investigated topics for economists. For this

reason, international trade has always been a crucial variable of every nation. Likewise, Pakistan since 1947 has been working to promote cordial trade relations with as many countries as possible. To achieve this goal several strategic aims are devised.

The focus of this research is to analyze the performance of trade in Pakistan with six selected OECD countries, Namely the United Kingdom, Japan, Australia, Sweden, Switzerland, and Norway. Panel regression is conducted on yearly basis. The period selected is from 1982-2021. The performance was estimated on the basis of economic growth, economic development, exchange rate, foreign direct investment, and inflation.

The descriptive analysis of all six countries has been made finding average, minimum, maximum, standard deviation, skewness, and kurtosis. Furthermore, econometric empirical results represented a significance of level 5% of the volume of trade with all the variables except foreign direct investment. Moreover, Breush-Pagan and the Redundant likelihood test were conducted; both do not support panel regression. Further Random effects model was applied, producing the outcome similarity of insignificant FDI and all other variables significant. For further assessment, the Hausman test was conducted supporting fixed effects model. The fixed effects model shows exchange rate and fixed effects model significant and having an indirect relationship with the volume of trade.

A test of endogeneity was also conducted as usually panel data is found to have this issue. Three variables gross domestic product, foreign direct investment, and exchange rate were found to be endogenous. Therefore, for robustness two-staged least square model was applied. The

2SLS test results were conducted with 2sls panel regression, fixed, and random effects. Panel regression and random effects produced the same results, while fixed effects had an entirely different outcome. As Hausman test was conducted to explore the

The empirical evidence estimated from the econometric study in the case of Pakistan is found to be supportive of the previous studies for only two variables foreign direct investment and exchange rate. On the other hand, regardless of other studies conducted variables like the gross domestic product, gross domestic per capita, and inflation follow a different trajectory. In the case of Pakistan, the estimated results summarize their insignificant impact on increasing volume of trade. There is a lack of research study evaluation between the relationship of inflation and trade. Of the few mixed results that have been attained Pakistan is found not to have a significant impact of inflation on its volume of trade. Since its probability is insignificant according to the 2sls fixed effects model. Moreover, the literature provides strong relation in many cases between volume of trade and gross domestic product and gross domestic product per capita, but the empirical results from 1982-2021 do not hold true for these variables in the case of Pakistan.

The results of the preceding studies reveal that majority have a positive significant relation between foreign direct investment and trade. Only a few have contributed to the study where FDI does not have a favorable effect. In case of Pakistan, the Initial case applies where FDI is found to be significant (probability of 0.017), but it has a negative coefficient therefore the relation is inverse for volume of trade. The results incline with that of (Thi 2014 and Sajjad 2010). The

foundational theories between trade and foreign direct investment furnish both complimentary and substitute relations among the two. The empirical analysis provides evidence for both cases where foreign direct investment and trade are replacements of each, and where both are compliments (Zarotiadis 2008). In many cases the relation between foreign direct investment and trade has found to be positive. But since every country has a different structure of economy there are several studies conducted that show to have a non-supportable behavior of foreign direct investment for trade. Therefore, the estimations reveal unique outcome with the six OECD countries where either foreign direct investment can be promoted or trade. As a consequence, foreign direct investment would not help in any kind of trade promotion with the United Kingdom, Japan, Australia, Norway, Switzerland, and Sweden. Conclusively the results in case of Pakistan with the given countries tend to support the result from (Anwar & Nguyen, 2011, (Anwar & Nguyen, 2011) and (Anwar & Nguyen, 2011)).

The second variable found to be very significant in the model for trade volume of Pakistan is the Exchange rate (probability of 0.00). The studies of (Napoles, 2019), (Nguyen & Do, 2020), (Goa, 2019) are in alignment with our results. It has a positive significant relation with volume of trade. A rise in exchange rate would mean a decline in the domestic currency this would result in a larger volume of trade as our exports become cheaper compared to our competitors, consequently resulting in a higher volume of exports demand.

5.1 Policy Implications

The investigation aimed to explore the trade pattern with six OECD countries. It was detected that among the five variables only foreign direct investment and exchange rate are significant. It can be said that the six OECD countries do have trade potential with Pakistan under specifically directed conditions.

In order to enhance trade with these countries, Policies should be focused on strategies that direct towards exchange rate. A higher exchange rate (a lower currency rate of Pakistan) would result in higher trade volumes with these countries. Therefore, to compete with the competitors these countries would prefer higher trade from Pakistan if prices are lower. Since increasing exchange rate increases volume of trade the government should keep its currency on a depreciated level so that the prices of exports can be lower compared to competitors and therefore the quantity of exports tend to increase. The second distinctive revelation contrary to the majority of literature on Pakistan is of indirect trade relations with foreign direct investment. The six OECD countries would rather prefer to indulge in any one. When trade promotion is the focus of the government it should not be through foreign direct investment as instead of increasing trade it tends to decrease it. Any trade promotion with these countries should apply policies minus foreign direct investment.

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