



Pakistan's Global Trade Potential with Selected Trading Partners: A Gravity Model Approach Using Static and Dynamic Panel Data

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ABSTRACT

This research study employs a gravity model to explore Pakistan's trade potential from 2000 to 2020. China, United Arab Emirates (UAE), Saudi Arabia (KSA), Kuwait, United States (USA), Malaysia, Japan, India, Singapore, Afghanistan, Iran, Spain, Germany, United Kingdom (UK) and Belgium are among our significant trading partners. The study uses both static and dynamic econometric techniques to capture the trade potential of Pakistan. The findings from both methodologies are comparable, indicating that economic size and distance have a significant effect on bilateral trade. Furthermore, throughout the research period, political globalization is determined to be considerable and has an important influence on the economic masses. These factors support the theoretical model(s) that Pakistan and Pakistan's trading partners with economic integration, political globalization, and distance all depict a significant impact on trade relations.



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1. Introduction

Trade is an important aspect of a country's economic growth. Many countries have liberalized bilateral trade and reduced trade restrictions because of globalization (Anderson, 2011; Xuegang, 2008). Globalization may be characterized as the improvement of economic integration, free capital mobility, border sharing and labor mobility, and so on (Rahman, Shadat, & Das, 2006; Rehman, Bashir, Shah, & Bhatti, 2021). In the previous two and a half decades, Pakistan has negotiated a number of bilateral and regional economic trade agreements with bordering nations. Furthermore, these agreements have improved the quality of masses life in this condition via bilateral trade (Siddique, Anwar, & Quddus, 2020; Suvankulov & Guc, 2012).

Many researchers have found a favorable association between regional trading agreements, market size, geographical distance, shared border, language, culture, and trade flows. Moreover, the ASEAN, EU, NAFTA, and WTO exemplify economic integration. The trading relationship and economic progress are the result of economic regional integration (Anderson, 2011; Mirza, Abbas, & Nawaz, 2020; Samy & Dehejia, 2011; Serrano & Pinilla, 2012).

Due to falling commodity prices and the snowballing volatility of financial markets in major economies, global aggregate demand grew at a slow pace in recent years (Arellano & Bover,

1995). However, the rise of import demand in Europe is slowing, and a poor aggregate demand in the US and Japan is resulting in a drop in agricultural commodity demand (Prehn, Brümmer, & Glauben, 2016). As consequences, developing economies like Pakistan have suffered a drop-in demand for their commodities and fewer export revenues in this age. Because Pakistan has been predominantly an agricultural economy, its exports are dominated by agricultural commodities such as cotton and cotton products, rice, wheat etc. (Pakistan Bureau of Statistics, 2020), as indicated in table 1.

Although the majority of Pakistan's exports are destined for western economies and in the recent period, the proportion of exports to these nations such as Germany, France, Italy, Spain, and the United Kingdom (UK) has been relatively stable whereas the volume of Pakistan's exports to the United Arab Emirates (UAE) has decreased significantly, indicating that China and India are acquiring this market. On the other hand, Afghanistan, China, the UAE, and the United States are the important importers for Pakistan. As seen in table 2. In last decade, Pakistan's agricultural commodities were in high demand in international markets; however, water scarcity and a lack of improved pesticides, as well as a failure to adapt to changing market trends, have harmed agricultural commodity demand and exports (T I Ahmad, Khan, Soharwardi, Shafiq, & Gillani, 2021). For agricultural goods, Pakistan also confronts tough competition from India and China. Pakistan primarily exports grains, fish and fish preparations, fruits, cotton yarn, textiles, chemicals, and medicines to other nations, as well as leather products (Shafiq, Gillani, & Shafiq, 2021). Pakistan imports the majority of its goods from China, which accounted for 23% of total imports in 2019-20. This ratio has risen dramatically in the previous decade, and because of the China-Pakistan Economic Corridor (CPEC), bilateral trade will continue to increase in the future (Pakistan Bureau of Statistics, 2020; SBP, 2020).

Pakistani imports have generally been concentrated within few international markets, such as China, Saudi Arabia, Kuwait, and the United Arab Emirates, where oil-related goods are mostly purchased from Gulf States. The percentage of oil-importing states has decreased by 3 to 2% in recent years, responding to lower oil prices (see table 3).

Figure-1 represents the selected trade characteristics of Pakistan's economy over the last two decades. We may elaborate that the percentage growth rate over the period has been declining trend whereas the other selected features depict the increasing trend during our sample time period except the year 2020. This diminishing trend has been experienced due to globally prevailed covid-19 pandemic situation. Moreover, overall growth of trade characteristics has been depicted trade pattern between Pakistan and the world including its selected trading partners in million USD. Pakistan imports petroleum products, iron and steel products, non-electrical machinery, electrical items, and chemical products etc., while, major exports include leather, textile and clothing and other food commodities. Additionally, Construction-related activities may expand in public sector investment on CPEC infrastructure in coming next years (SBP, 2020).

This research study is novel in various ways. One of the key purposes of this study is to explore the importance of primary features of the country's trade statistics with its selected major trading partners which comprise more than two-thirds of the country's trade volume. Secondly, this study analyses Pakistan's geographical importance for its trading partners through means of bilateral trade (BT) flows by using static and dynamic model's technique. Thirdly, the work-horse gravity model is employed to determine Pakistan's trade potential among SAARC regional-integrated, neighboring and selected EU countries. Thus, this extensive research study attempts to fill this research gap by taking into consideration a robust and rigorous research analysis.

Table 1
Pakistan's Major Exports at HS-02 Digit Level Products

Average of 5-Year Major Exports (% Share)					
HS-02 Digit Level Products	2000-04	2005-09	2010-14	2015-19	2020
Textiles & Cotton	44.64	49.36	51.23	50.98	54.16
Leather & Leather Products	5.16	5.35	5.85	5.98	5.28
Rice	12.15	9.01	9.28	6.69	8.04
Sub-Sum	61.95	63.72	66.36	63.65	67.48
Remaining items	38.05	36.28	33.64	36.35	32.52
Grand Sum	100.0	100.0	100.0	100.0	100.0

Source: Pakistan Bureau of Statics Various Issues

Table 2
Major Export Destinations (US\$ Billion and % share)

Country	2000-09		2010-2019		2020	
	US\$	% Share	US\$	% Share	US\$	% Share
USA	3.74	15.22	03.17	16.21	4.51	18.14
China	2.45	09.25	02.95	09.44	2.13	10.22
UAE	2.79	06.56	01.03	04.25	2.11	04.01
Afghanistan	01.91	07.21	02.01	08.87	1.65	07.99
UK	01.61	06.35	02.16	07.39	1.36	06.69
Germany	01.15	05.11	01.59	05.54	1.25	05.91
France	0.49	03.55	0.39	02.87	1.95	02.50
Bangladesh	0.78	03.66	0.91	03.52	0.66	03.21
Italy	0.71	0.72	0.93	03.10	0.81	02.95
Spain	0.69	0.88	01.88	01.08	0.55	01.83
Belgium	0.15	0.29	0.65	0.79	0.21	0.91
Rest of the world	11.21	39.96	10.55	36.94	08.56	35.65
Total	27.53	100	28.22	100	25.75	100

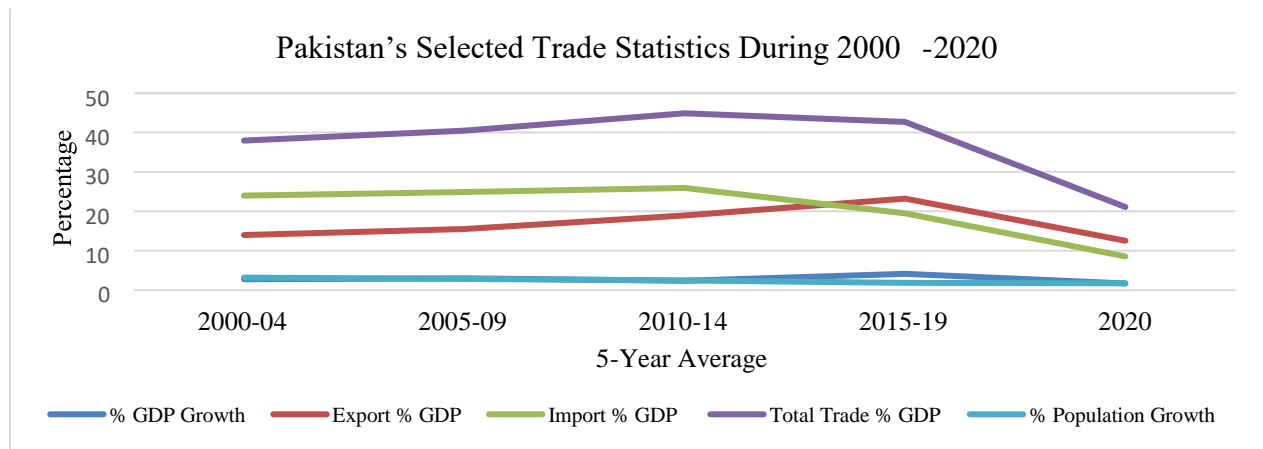
Source: Pakistan Bureau of Statistics, Various Issues

Table 3
Major Import Markets (US\$ Billion and % share)

Country	2000-09		2010-2019		2020	
	US \$	% Share	US \$	% Share	US \$	% Share
UAE	07.34	15.46	06.86	15.88	06.45	14.56
China	07.17	16.87	10.12	23.12	07.11	22.14
Kuwait	03.45	06.85	02.65	04.95	03.88	03.85
Saudi Arabia	04.25	10.07	03.66	07.28	04.89	07.52
Malaysia	01.87	04.05	0.94	02.11	02.21	03.12
Japan	01.72	03.94	01.87	03.54	01.81	03.98
India	02.09	04.68	01.71	03.14	02.78	03.58
USA	01.18	03.88	01.78	03.84	02.33	02.82
Germany	01.25	02.78	0.91	01.66	01.65	01.22
Indonesia	01.64	03.94	02.11	04.68	01.71	03.89
Remaining Others	12.40	27.48	13.23	29.78	15.61	33.22
Total	44.36	100	45.84	100	50.43	100

Source: Pakistan Bureau of Statistics, Various Issues

The rest of this research paper is organized as follows. The section two represents the brief review of the literature related to trade potential related to international trade explored by various researchers and elaborating a comprehensive methodological foundation of our proposed gravity model following the sub-section. Section three consists on the data source and a brief explanation of the variables which are utilized in this research study. Section four and five analyze the estimations, results-discussion and conclusion to explore the Pakistan's untapped trade potential respectively.



Source: World Development Indicators

Figure 1: 5-Year Average of Pakistan's Selected Trade Statistics

2. Literature Review

In empirical studies on bilateral trade, gravity models are quite often employed. The initial efforts at elaborating trade flows are based on the size of the trading economy and distance among the trading partners (Leibenstein, 1966; Poyhonen, 1963). This study takes into account the gravity-related literature review and focuses on global international trade studies including Pakistan-relevant research studies. Export is used as a dependent variable in the majority of international research (Bhatti & Fazal, 2020; Kong & Kneller, 2016; Suvankulov & Guc, 2012; Trotignon, 2010; Ullah & Inaba, 2012). Likewise, the import was utilized as a dependent variable in various other research (Abiad, Mishra, & Topalova, 2014; Tumbarello, 2006; Westerlund & Wilhelmsson, 2011). The averages imports (M) and exports (X) between the two nations is used as the dependent variable by (Bussière, Fidrmuc, & Schnatz, 2008).

Khan and Mahmood (2000) developed a gravity model to examine bilateral trade in Pakistan while taking into account the size of the economy, geographic location, and cultural closeness. The response variables are the trading volume. The independent variables include per capita GNPs, real exchange rates, tariff rates, remoteness, indigenous language, border share, and regional integration dummies such as ASEAN, and EU, etc. The model uses interval data and covers 10 commodities for 21 nations. Except for the neighboring country, which has a negative sign, all of the coefficients were highly statistically significant (Fazal, Bhatti, & Ahmad, 2019). One of the explanations might be the historical rivalry between Pakistan and India over the prior decades.

Many research studies have used gravity analysis to assess the effect of trade barriers (Zhuang et al., 2021). Butt (2008) utilized panel data from the SAARC nations to examine the key 19 sectors of the Pakistani economy. The findings imply a greater weighting of export potential with trading partners under regional trade. Rahman et al. (2006) employed the gravity approach for panel countries including Bangladesh. In regression analysis, his key results revealed that the economy size, GNP per capita (GNPPC), trade openness (TO), and distance (Dist) involved in bilateral trade, are all significantly and positively related. Similarly, Montanari, Nelson, and Palme (2008) corroborated the (Rahman et al., 2006) model by demonstrating that increased income stocks had a substantial influence on exports and simultaneously (Hao, Shah, Nawaz, Nawaz, & Noman, 2020). The classical and modern trade theories describe global trade explicitly, and the gravity model is currently doing very well in economic relations.

Similarly, Butt (2008) reported on gravity models in many sectors. Export volume is used as a dependent variable, with various dummy variables such as shared border, geographical characteristics, import tariffs, and common language, etc. The analysis covers fifteen important industries during 2000-2003 and assesses two states' trade potential in the context of the Pakistan and India relationship. The findings revealed that the trade potential would be greater if both nations were not involved in military conflicts, and restrictions to bilateral trade were avoided (Yang & Shafiq, 2020). They also demonstrated that food and drink, chemicals and tobacco items, leather products, and textiles all have a strong trading potential.

Similarly, most of the analyses in the literature include GDP, per capita GDP of trade partners, and distance as independent factors (Abiad et al., 2014; Suvankulov & Guc, 2012; Ullah & Inaba, 2012). In this context, there are various more factors that may be included in gravity equations to illustrate the true picture of Pakistan's international trade. They include certain "multilateral resistance factors" in the equation, for example, in addition to gravity models (Kamran, Qaisar, Sultana, Nawaz, & Ahmad, 2020; Ranajoy & Banerjee, 2006; Westerlund & Wilhelmsson, 2011). As a proxy for trade expenses, Baier and Bergstrand (2009) employed distance and border share. However, over time, dummy variables such as geographical location, free trade agreements (FTA), cultural proximity, and economic multilateral such as SAARC, EU, and ECO etc., were incorporated to the proposed gravity model (Shafiq, Hua, Bhatti, & Gillani, 2021; Trotignon, 2010; Ullah & Inaba, 2012).

In a brief, the gravity model has been employed in a large number of empirical studies to investigate the trade potential of certain economy. Thornton and Goglio (2002) obtained substantial results by emphasizing the role of economic size, distance, and a shared language in regional commerce for ASEAN. Moreover, Anaman and Al-Kharusi (2003) for Brunei-Darussalam; Babetskaia-Kukharchuk and Maurel (2003) for the EU; Blomqvist (2004) for Singapore; Rahman et al. (2006) for Bangladesh; Batra (2006) for India; Baroncelli (2007) for Pakistan-India; Minetti, Mulabdic, Ruta, and Chun Zhu (2018) for the UK-EU, all those studies focus on widespread discussion; the role and importance of bilateral trade (BT) and estimated the outcomes based on traditional economic concepts.

3. The Gravity Model

The earliest proof of gravity comes from Newton's physics law. The model was developed using Newton's Law of Gravity (Leibenstein, 1966; Poyhonen, 1963), which was employed in international trade for the first time. The analysis on the basis of gravity-model has been considered the workhorse of trade research scientists for the past fifty years. In this approach, trade volume between nations is directly connected to economic sizes and negatively correlated to distance between the two countries of more (Anderson, 2011; Balassa, 1966). Similarly, Caves (1981); Leibenstein (1966); Poyhonen (1963) and Toh (1982) take into account that due to the proxy for transportation cost; geographical distance has much importance in gravity model as a major determinant. Likewise, Eichengreen and Irwin (1998) and Rauch (1999) underlined the need of include common language in the gravity equation. The gravity equation may be stated as follows using these variables:

$$BT_{ij} = G D_{ij}^{-1} S_i^{\alpha} S_j^{\beta} \quad (1)$$

Where, i and j represent the Pakistan and 12 trading partners respectively i.e., $1 < j < 12$. Moreover, BT_{ij} signifies the trade flows from country i to j . S_i and S_j are Pakistan's GDP or PGDP and trading partners respectively which describe the economy size. D_{ij} measures the geographical distance (GD in KM) between Pakistan and trading partners while G is the constant

term in the above equation. After applying log on equation (1), this becomes the given linear form of the above gravity model.

$$\ln BT_{ij} = \ln G + \alpha \ln S_i + \beta \ln S_j - \delta \ln D_{ij} \quad (2)$$

In G is the constant (intercept), and α , β , and δ are the elasticities of the variables i.e., economy size(s) and distance respectively. Now, we proceed to estimate Pakistan's trade flow by employing the static econometric model as:

$$\tilde{Y}_{it} = \tilde{n}_0 + \tilde{n}_1 X_{it} + \tilde{u}_1 + \varepsilon_{it} \quad (3)$$

Where, \tilde{Y}_{it} denotes the collective export, import, and bilateral trade of Pakistan respectively, while, X_{it} shows the set of regressors in the given set of equation. Moreover, this model takes the log form of the variables with the following characteristics; i is the disregarded individual-specific effects (ISE); it represents idiosyncratic error with the property having expected value is zero and constant variance i.e., $E(it) = 0$ and $\text{Var}(it) = \sigma^2$

However, fixed-effect (FE) model has a disadvantage as it ignores time-invariant variables like geographical distance. We employed the random effect and Tobit in a static model to solve this issue. Random and Tobit give more accurate results in the static gravity model (Verbeek, 2008); contradicting, the theoretical trade related modeling, which do not recommend a dynamic set of requirements, we implemented a new variation in the static-model because of the concerns with correlation and endogeneity of a few independent variables in this static model. Furthermore, Arellano and Bond (1991); Arellano and Bover (1995); Blundell and Bond (2000) revised the concept of GMM-model at first difference to address these challenges.

The GMM system estimator was employed in this study. The static model may be converted into the dynamic form shown below:

$$\tilde{Y}_{it} = \phi \tilde{Y}_{it-1} + \tilde{n}_0 + \tilde{n}_1 X_{it} + \tilde{u}_1 + \varepsilon_{it} \quad (4)$$

If $\text{Cov}(\tilde{Y}_{it-1}, i)$ is not equal to zero, and, \tilde{Y}_{it-1} is random variable instead of fixed, the estimator is unbiased and asymptotically biased. This phenomenon is termed as an endogeneity problem, and this type of problem can be resolved by applying instrumental techniques.

Moreover, the GMM and 2SLS methodologies generate identical outcomes. However, GMM methodology has the advantage over 2SLS in the case of over-identified equations. But unfortunately, both methods remain stagnant in the case of under-identified questions. In the end, both GMM and 2SLS are useful instrumental techniques to resolve the identified problems. Furthermore, the endogeneity problem may be overcome after adding one lag in the above equation.

$$\tilde{Y}_{it} = \phi \tilde{Y}_{it-2} + \tilde{n}_0 + \tilde{n}_1 X_{it} + \tilde{u}_1 + \varepsilon_{it-1} \quad (5)$$

We get the following expression after deducting eq (5) from eq (6):

$$\Delta \tilde{Y}_{it} = \phi \Delta \tilde{Y}_{it-1} + \tilde{n}_0 + \tilde{n}_1 \Delta X_{it} + \Delta \varepsilon_{it} \quad (6)$$

The above expression is free of endogeneity problem, while eq (5) takes into account the feature i.e., $Cov(\tilde{Y}_{it-1}, \varepsilon_{it-1}) = 0$. Thus, GMM can be estimated by applying different instrumental techniques at level of first difference as:

$$\Delta\tilde{Y}_{it-1} = \phi\Delta\tilde{Y}_{it-2} + \tilde{\alpha}_0 + \tilde{\alpha}_1\Delta X_{it-1} + \Delta\varepsilon_{it-1} \quad (7)$$

The following equation is the new form of equation (7) after employing more differences:

$$\Delta\tilde{Y}_{it-1} = \phi\Delta\tilde{Y}_{it-3} + \tilde{\alpha}_0 + \tilde{\alpha}_1\Delta X_{it-2} + \Delta\varepsilon_{it-2} \quad (8)$$

This is the useful form to overcome the endogeneity problem. Now, we apply the GMM technique as the number of moments is higher than the number of unknown parameters. This method also reduces the sum of the square of the moments in GMM estimator.

The data is obtained from a variety of sources for 20-years from 2000 to 2020. All variables are this study utilize once a year except for border sharing and distance data. UN COMTRADE facts and figures are used to compile the data on Pakistan’s bilateral trade with its other trading partners. World Development Indicators (WDI), CEPII, and KOF Globalization Index, are taken into account to acquire secondary data.

4. Results and Discussion

Table 4 provides a brief overview of the variables including the comprehensive descriptive characteristics. Political globalization (Pg) is also an index comprised of four factors (Membership in International Organizations (MIO), Embassies in Country, International Treaties (ITs), and participation in United Nations Security Council Missions (UNSCM)), each with a distinct weightage in the index. Likewise, if the dummy of a SAARC member is assigned 1, then the dummy of a non-SAARC member is equal to 0. Table 5 has a unique Correlation matrix among the underlying variables of our study.

We employ a time invariant variable as a starting point in the econometric analysis of gravity model, therefore fixed-effect (FE) model(s) technically suffer from a difficulty. It, however, becomes statistically consistent; employing that random-effect (RE), Tobit analysis, and GMM modeling, all eliminate econometric difficulties.

Table 4:
Results of Descriptive Statistics (Selected Countries)

Variable	Definition	Min Value	Max Value	Mean	St. Dev
Export (X)	Exports come to the rest of the world (\$ Mill)	39	4450	799.6	1012
Import (M)	Imports come from the rest of the world (\$ Mill)	34	12145	2612	1865
Bil Trade (BT)	Between Pakistan and trading partners (\$ Mill)	198	13269	2885	2345
PGDP _i	GDP per capita, (\$ current PPP)	8.12	9.355	9.235	0.174
PGDP _k	GDP per capita, (\$ current PPP)	7.39	12.964	9.686	1.31
Cultural Prox (Cp)	Index of above-mentioned three variables	1	96.78	66.85	34.95
Pol. Global (Pg)	Index of above-mentioned four variables	39.2	95.30	70.49	15.98
Dist	Geographical Distance	0	11099	3165	3246
Bd	Shared Border=1, otherwise=0	0	1	0.662	0.495
SAARC	SAARC member=1, otherwise=0	0	1	0.191	0.395

Source: Author’s own compilation based on Pakistan Bureau of Statistics, WDI and CEPII.

Table 6 summarizes the findings of random effects. There are three major sorts of models: export (X), import (M), and bilateral trade (TB) is the proxy of trade volume. The RE model works well, predicting up to fifty percent of sample variance in bilateral trade between Pakistan and the trading partners. In Pakistan's bilateral trade and import model, the findings of economy size show stability under RE model, both coefficients are significantly positive at 1%, and domestic size of economy does not important for export (X). This suggests that the scale of the economy encourages bilateral trade, particularly imports (M). Other contributing variables such as political globalization (Pg) and distance (Dist.) are also statistically significant, however, in the case of Pakistan, only geographical distance (Gd) is significant at 10% in the first two instances and 5% in bilateral trade (BT). In the gravity model, the sign of political globalization's (Pg) coefficient is significant at 5% in RE model. Similarly, the cultural closeness (Cul. Prox) coefficient, border sharing (Bd), and SAARC membership have little impacts on Pakistan's export (X), import (M), and bilateral trading (TB) model. The similar findings have been estimated by many researchers in the literature i.e., Leitao and Tripathi (2013); Rahman et al. (2006) and Prehn et al. (2016).

Table 5
Correlation Matrix of Proposed Model

	PGDP _i	PGDP _k	Cul Prox (Cp)	Pol. Global (Pg)	Dist	Bd	SAARC
PGDP _i	1						
PGDP _k	0.1688	1					
Cul Prox (Cp)	0.0564	0.8125	1				
Pol. Glob (Pg)	0.2198	0.0417	0.2621	1			
Dist	-0.0198	0.4987	0.4655	0.4882	1		
Bd	0	0.7894	0.3966	0.0125	0.6921	1	
SAARC	0	-0.7825	-0.6255	-0.194	-0.425	-0.548	1

Table 6
Random Effects (RE): Gravity Model and Pakistan's Trade

Dependent Variables	Random Effects (RE)		
	Exports (X)	Imports (M)	Bil Trade (BT)
No. of Observations	154	154	154
Constant	7.242*** (2.119)	-13.98*** (1.838)	-11.68** (1.750)
Ln PGDP _i	-0.0301 (0.366)	1.596*** (0.336)	1.379*** (0.317)
Ln PGDP _k	1.105*** (0.205)	0.553*** (0.192)	-0.592*** (0.180)
Cul Prox (Cp)	-0.004* (0.005)	0.0004 (0.005)	-0.0009* (0.005)
Pol. Glob (Pg)	0.0333*** (0.012)	0.0349*** (0.010)	0.0276*** (0.0105)
Dist	-0.0001* (7.910)	-0.0001* (6.750)	-0.0001** (6.590)
Bd	-0.586* (1.338)	0.275** (0.844)	0.341** (0.910)
SAARC	2.391** (1.553)	-0.063* (0.894)	0.964** (1.005)
R-sq	0.48	0.54	0.62
Country and Yearly Effect	Yes	Yes	Yes

Note: Parenthesis contain Standard errors (S.E), *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The findings in table 7 support the underlying facts in the Tobit regression model. In terms of export model, the trading partner's GDP enhances Pakistan's exports among partner nations and determines products exports. Overall, this indicator has had a good impact on Pakistani trade, with somewhat positive impacts on Pakistan's export, import, and bilateral trade. Similarly, despite local GDP has little impact on exports, but it has a considerable impact on imports and bilateral trade at 1%. The outcomes also reveal that political issues have a substantial effect in all export, import, and bilateral trade; it's indeed significant at 1% in all

situations. In bilateral trade, distance plays a role in determining transportation costs and it has an inverse association with trading activities among partner countries. Moreover, higher the transportation costs, lower will be the trading activities. However, cultural, SAARC, and border sharing variables have a little influence in all dynamic models. These outcomes are consistent with the previous studies explored by Tusawar Iftikhar Ahmad, Shafiq, and Gillani (2019); Ranajoy and Banerjee (2006); Ullah and Inaba (2012); Xuegang (2008) and Suvankulov and Guc (2012).

Table 7
Tobit-Regression: Pakistan's Trade and Gravity Model

Dependent Variables	Exports (X)	Imports (M)	Bil Trade (BT)
Tobit Regression Analysis			
No. of Observations	154	154	154
Constant	-0.046 (0.3590)	-13.89*** (1.766)	-11.70*** (1.694)
Ln PGDPi	-0.171** (0.281)	1.598*** (0.32)	1.392*** (0.311)
Ln PGDPk	1.112*** (0.20)	0.540*** (0.184)	0.585*** (0.176)
Cul Prox (Cp)	-0.004* (0.005)	0.001* (0.005)	-0.0007* (0.004)
Pol. Glob (Pg)	0.033*** (0.012)	0.034*** (0.009)	0.027*** (0.010)
Dist	-0.0001** (7.940)	-0.0001** (6.380)	-0.0001** (6.420)
Bd	-0.565* (1.387)	0.287* (0.722)	0.329* (0.850)
SAARC	2.407* (1.622)	-0.051* (0.709)	0.954* (0.927)
Sig_u	1.579*** (0.349)	0.648*** (0.157)	0.869*** (0.195)
Sig_e	0.383*** (0.022)	0.379*** (0.022)	0.345*** (0.020)
Wald- χ^2	126.27***	247.53***	229.31***

Notes: Parenthesis contain Standard errors (S.E), *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8
GMM-Estimator: Pakistan's Trade and Dynamic Gravity Model

Dependent variables	Exports (X)	Imports (M)	Bil Trade (BT)
Dynamic Model: GMM-Estimator			
No. of Observations	143	143	143
Constant	7.099*** (1.458)	-1.254* (1.945)	1.541 (1.599)
D.L1	0.699*** (0.596)	0.685*** (0.0721)	0.701*** (0.065)
Ln PGDPi	-0.171** (0.281)	0.3501* (0.409)	0.0525 (0.279)
Ln PGDPk	-0.109* (0.154)	0.0415* (0.1339)	-0.148 (0.128)
Cul Prox (Cp)	0.005* (0.009)	0.008* (0.001)	0.012*** (0.004)
Pol. Glob (Pg)	0.3999* (0.0069)	0.002** (0.005)	0.010 (0.006)
Dist	-0.0001 (6.85)	-1.3705 (5.74)	2.1603 (5.27)
Bd	0.525 (0.721)	-0.566 (0.602)	0.338 (0.517)
SAARC	0.687 (0.584)	0.859** (0.428)	0.543 (0.381)
Wald- χ^2	438.28***	699.79***	710.02***

Notes: Parenthesis contain Standard errors (S.E), *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8 depicts the estimation findings of GMM-model at first-difference. The all coefficients of Export (X), import (M), and bilateral trade (BT) are all statistically significant on their own lag at 1% level of significance. Another intriguing conclusion is that although the size of Pakistan's economy is significant at 5%, the size of its trading partners' is insignificant in all circumstances. These findings are consistent with the previous research studies conducted by the various researchers such as Batra (2006); Blundell and Bond (2000); De (2013); Faustino and Proença (2011); Hashmi, Ahmad, and Nawaz (2021); Kong and Kneller (2016).

In the same way, GDP of trading partners has little bearing on GMM outcomes. Our export is influenced by political globalization, which rises and falls via this medium; however, in the case of imports and bilateral trade models, these elements are less relevant. Additionally, the findings also reveal that, although the cultural closeness coefficient is statistically negligible, it

has an effect on imports. All dynamic models have negligible impacts on geographical distance, border sharing, and partner's economy size. Conversely, the coefficients of SAARC regional integration have a large impact on the import model but are less important in the export (X) and bilateral trade (BT) models. These outcomes are persistent within the literature explored as Kabir and Salim (2010); Tumbarello (2006); Westerlund and Wilhelmsson (2011) and Serrano and Pinilla (2012).

5. Conclusion

One of the key goals of conducting this research study is to examine the diversity of Pakistan's bilateral trade flows by employing a gravity model technique to its 15 major trading destinations from 2000 to 2020. For the analysis, the research study employs the Tobit regression as well as Fixed and Random effect models. For several predictor variables, we additionally apply a dynamic panel (GMM-estimator) to solve the correlation, time invariant variables, heteroskedasticity, and endogeneity concerns. When using Tobit regression, random effect (RE), fixed effect (FE) models, and GMM estimator, we find that Pakistan's economy size and trading partners have a substantial impact on Pakistan's bilateral trading activities including export (X), import (M). This implies that developed nations trade more than developing countries. The rest of the factors had a little influence. Almost similar results have been estimated by the previous researchers in their respective studies. The findings show that smaller economies boost exports (X), imports (M), and bilateral trade (BT), although international economy size is crucial for Pakistan, trade declines as the geographical distance between two trading partners grows. Moreover, the estimates of global trade potential reveal that magnitude of Pakistan's trade is maximum with USA, China and selected EU countries followed by the neighboring trading partners. Additionally, the potential for expansion is higher in developed countries as compare to developing countries and Pakistan's trade may twice with India, Afghanistan, Belgium, Russia, Bangladesh and Spain. The outcomes of our proposed study are correlated with economics and econometric theoretical models, demonstrating that Pakistan's trading partners with economic size, political globalization (Pg), and geographical distance (Dist.) have a significant influence on trade and trading related activities.

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