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Trade Costs of Pakistan with its Major Trading Partners: Measurement and its Determinants

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Abstract:

Trade costs are cited as an important determinant of volume of trade. Higher trade cost is an obstacle to trade as it impedes the realization of gains from trade liberalisation. Determinants of trade costs of Pakistan for the period 2003-2012 with their major trading partners across Asia, European Union and North America are investigated. Several gravity type variables have been used as trade cost determinants. Trade costs for agricultural and non-agricultural sector are also calculated using a micro-founded trade costs measure. Estimates of trade costs equivalents show a declining trend of trade costs estimates over the period of study. Fully Modified Ordinary Least Square estimation of the model shows that tariff rates and distances between the trading partners increase the bilateral trade costs and thus adversely affect trade. Results show that improvements in port infrastructure and membership of free trade agreement significantly reduce the trade costs. Z-test shows that the effect of determinants of trade costs for agricultural and non-agricultural sectors is invariant. This paper recommends that the agreement on trade facilitation be implemented and reduce the red tape at border crossings to cut down the trade costs.

***Keywords**:* Trade Costs, Gravity Model, Liner Shipping Connectivity Index

1. INTRODUCTION

International trade is significantly affected by the trade costs incurred locally and across the borders. Trade costs form a potentially important barrier to trade. Higher trade costs are an obstacle to trade and impede the realization of gains from trade liberalization,[1] therefore

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special attention is given to trade costs. Owing to the importance of trade costs in explaining the volume and direction of trade, international trade economists are increasingly focusing upon trade costs and this has become an area of key interest within the modern stream of international trade research. The gradual decreeing of trade cost has been resulting major risen in international trade thus this tremendous change has brought improvement in every country for international trading over a past years.

The pertinent question is what exactly are the trade costs? They include all the costs incurred in getting a good to the final user, excluding the marginal cost of producing the good itself. Hence, trade costs include transportation costs (both freight costs and time costs), policy barriers (tariffs and non-tariff barriers), information costs, contract enforcement costs, costs associated with the use of different currencies, local distribution costs (wholesale and retail) and legal and regulatory costs [Singh, *et al.* (2014)].

Sources of trade costs are mainly divided into two main categories. First category totally consists of bilateral factors to put segregation between imported and exported and such factors are widely depending upon exogenous factors such as geographical distance, common border or sharing a common language than particular policy choices. The second category is composed of endogenous trade costs, which are international connectivity such as air or maritime transport services, tariffs and non-tariff measures, and other factors that facilitate trade.

Evidence shows that with growing regionalism in the world, countries have considerably reduced the tariff rates, i.e., 5% in developed countries and 10 to 20% in underdeveloped countries [Anderson and Van Wincoop (2004)]. With a drastic fall in tariffs on the one hand, there are, on the other hand, some other barriers to trade that are hampering the trade performance. Most important among those are barriers relating to infrastructure quality besides the tariff and non-tariff barriers, collectively these are referred to as policy barriers. Poor

[1]A growing literature has documented the impact of trade costs on the volume of trade (see, for example, Anderson and Van Wincoop, 2004).

institutions and poor infrastructure distort strategic trade policy focus, not only in terms of the traditional mechanisms of tariffs and quotas but also of infrastructure and logistics,[2] the so-called 'behind the border issues'. Thus, besides the differences in economic size and endowments, the differences in trade costs, which act as a friction to trade, is important reason as to why some countries trade more than others.

In an increasingly globalized and networked world, trade costs are of great importance from a policy perspective. This is because they act as a determinant of the pattern of bilateral trade and investment as well as of the geographical distribution of production. International trade costs are large and vary widely across countries and sectors. These costs are likely to be higher in developing countries as compared to the developed countries due to the existence of substantial tariffs and non-tariff measures accompanied by poor infrastructure, dysfunctional transport and logistics.

Pakistan is a country heavily enriched with natural resources. Pakistan's major trade partners are Asian, European Union and North American countries. These include China, USA, UK, India, Bangladesh, Saudi Arabia, Malaysia, Japan, Germany and UAE. EU has now emerged as Pakistan's largest trading partner.[3] Total trade between the two amounts to about $10 billion with Pakistan's share in EU market of about 0.09% and the share of EU in Pakistani market is 11.39%. Pakistan also has very strong trade ties with Asian economies like China, UAE, Saudi Arabia, and Malaysia. The main reason behind massive trade of Pakistan with Asian countries is low transportation costs, similarities of consumer tastes and trading priorities. USA is also one of the strongest trade partners of Pakistan.

The size of Pakistan's current trade doesn't truly reflect its trade potential. This is mainly because the direction of Pakistan's foreign trade, which is trade cost dependent, has not changed virtually since its independence. Keeping in view the trade potential of Pakistan and to reap full benefits from international trade, it is thus imperative to have a

[2]See, for example, Khan and Weiss (2006), who explain how and why infrastructure can assist the regional cooperation process.

[3]EUROSTAT (2013).

detailed insight into the determinants of trade costs. Pakistan needs to pay serious attention to the trade costs because only then it will be in a position to improve its ability to position better in global networks of trade and production. A detailed study on the determinants and calculation of trade costs will help identify the areas which need to be given special attention to identify policies and measures that have a significant effect on trade costs, and to prioritize them thus affecting the overall trade flows and composition of trade consequently.

The research problem which is to be addressed and assessed in this paper is "What are the factors that affect trade costs incurred by Pakistan with its major trading partners"? The study uses a set of selected trading partners of Pakistan due to the paucity of available data. The main objective of the study is to measure the trade costs incurred by Pakistan in agricultural and non-agricultural sector with its major trading partners in three different regions of the world, i.e., Asia, Europe and North America including USA, Germany, UK, Japan, China, UAE, Saudi Arabia, Bangladesh, India and Malaysia and empirically investigate the determinants of trade costs.

This area is virtually untapped in case of Pakistan. Therefore, there is a need to have a research study that can show Pakistan's position in terms of trade costs and identify its determinants. Such a study can provide insights that if properly targeted, trade costs can not only be reduced but also proper policies can be formulated to help boost the overall trade as well improving Pakistan's position in global trade network. This study would add to the literature by disaggregating trade into two macro-sectors; agricultural and non-agricultural. Harmonized System (HS)[4] based on two digit level with its major trading partners in three different regions of the world, i.e., European Union, Asia and North America. The countries include USA, Germany, UK, Japan, China, UAE, Saudi Arabia, Bangladesh, India and Malaysia.

[4]It is a coding system known for coding Harmonized Commodity Description of tariff nomenclature. It is a system of International standard of names and codes in order to classify traded products maintained by the World Customs Organization (WCO).

2. LITERATURE REVIEW

Trade costs have become a key area of interest for researchers. In this regard, it is important to understand which factors trigger the trade costs of a particular economy. Existing literature draws attention to some of important determinants of trade costs. This section sheds light on the existing literature in this area.

Limao and Venables (1999) identified the determinants of transport costs and showed how they depend on geography and infrastructure. Tobit model was estimated for the year 1990 taking 93 countries. Distance, contiguity and landlocked-ness were taken as geographical determinants and quality of transport and communication infrastructure were studied as infrastructural determinants. They discussed that land distance is much more costly than sea distance. Landlocked countries have high transport costs which can be reduced by better infrastructure facilities. They further argued that trade volume can be increased by a factor of five if transport costs are halved. The study highlighted the cost of being landlocked as far as bilateral trade flows are concerned.

Arvis, *et al.* (2007) estimated the cost attached to landlocked-ness with regards to the international trade. Based on empirical analysis, the study found out that large proportion of least developed countries are landlocked and their market access depends upon the availability of trade corridor or a transit system. High degree of unpredictability associated with transportation time increases the trade costs of landlocked economies along with high freight charges. The study highlighted the need for reliable logistic services which are hampered by flaws in implementation of transit system. They pointed that the business community should design and implement comprehensive trade facilitation strategies. In addition to the physical constraints, least developed countries are also faced with a problem of widespread rent seeking activities. Thus, they showed that high trade costs of LDCs are mainly due to high transportation costs which explain major proportion of high logistic costs and vulnerability of supply chains and these areas need to be targeted specifically.

Novy (2007) analysed the patterns of trade costs of UK and USA with 31 trading partners from a period of 1960-2002. His study found

out that tariff equivalents of trade costs for USA have declined over the period of study with US showing lowest trade costs with Canada and Mexico while UK exhibited a remarkable increase in its bilateral trade costs over time. Novy used micro founded trade cost measure for the calculation of trade costs. The main determinants of trade costs were classified into geographical, historical and institutional factors. Distance, landlocked-ness and exchange rate volatility ad tariffs showed a positive relationship with trade costs while common border, membership of free trade agreement negatively affected the trade costs.

Olper and Valentina (2007) examined the patterns of international trade costs in processed foods industry for a large cross section of developed and developing countries over the period of 1976-2000. Panel data estimation technique with country and time fixed effects was used in this study. Tariff equivalents of trade costs were taken as the dependent variable and the independent variables were divided into four categories as geographical factors, historical and cultural linkage, institutional factors and infrastructure development. Their study found out that geographical and historical factors dominate the infrastructural and institutional determinants of trade costs. Empirical results showed that tariff equivalents of trade costs for the Emerging countries declined by 13% over the period of study. However, developing countries showed a low reduction pattern thus highlighting a need for government to focus on the issue in order to achieve the goal of economic growth. They also highlighted the need for freer trade environment keeping in view the influential role played by trade policy in reduction of trade costs.

Duval and Utoktham (2011) examined the trade costs of Indian Mekong sub-region and also evaluated the policy related and other factors in order to facilitate trade and reduce trade costs. Novy's trade cost measure has been employed for calculating the trade costs. Various trade related factors which possibly effected the trade costs of the Indian Mekong sub-region were found to be bilateral distance between the trading partners, cultural distance, tariffs between the trading countries, liner shipping connectivity index, internet users per hundred people, ease of doing business and monetary costs of moving a container from factory to port and port to warehouse. Cross sectional data set of 64 countries

has been estimated for the year 2006 using the Ordinary Least Square estimation.

The results show that trade costs between India and Mekong countries are high. However, China, India, Thailand and most of other Mekong countries are making progress in reducing trade costs among themselves as compared to other countries like Japan and USA which is mainly due to the enhanced regional connectivity. The study also investigated the contribution of explanatory variables. Results revealed that the natural barriers contribute about 22 percent to the total variations in trade costs followed by the differences in maritime logistics and then the trade related but non-trade specific measures such as credit information, extent of information disclosure accounting for about 16 percent and 7 percent variations respectively in trade costs. The study highlighted the importance of logistics and information technology services regulation as important issues to reduce the trade costs.

Several researches have been conducted in different countries of the world as far as measurement and determinants of trade costs are concerned, but there is hardly any research on measurement of trade costs of Pakistan and investigation of determinants of trade costs with its major trading partners. Thus, the study at hand becomes all more important to fill this research gap.

3. OVERVIEW OF THE ECONOMY IN THE CONTEXT OF TRADE COSTS

Economic journey of Pakistan has faced serious global and internal challenges since independence. Despite the critical circumstances, the country, however, managed to gain a momentum. In this regard, the period of the 1960s was marked as the golden economic era of Pakistan. Trade policies in that era focused on industrial development and import substitution. Various incentives like tax rebates and exemptions as well as export bonuses were offered on exports, which resulted in a remarkable increase in export volume, with exports showing a growth rate of 16.19%. In the late 1980s, due to increased economic pressures and globalization forces, Pakistan initiated the process of trade reforms and its intensity increased in the first half of the 1990s. Wide

ranging thorough liberalization programmes started in 1996-97 in the agricultural sector. Government reduced average tariffs to a level of 15 percent compared to a high tariff rate of 51 percent in 1994/95 [WTO (2007)]. Trade volumes of Pakistan increased sharply in the 2000s. Total trade volume increased from $23,380 million in 2003 to $69,410 million in 2013 [GOP (2014)].

Analysis of the trade costs of Pakistan for agricultural and non-agricultural sector with its trading partners shows that on average Pakistan is facing high levels of trade costs despite substantial fall in tariffs worldwide. Quality of institutions and infrastructure differs across countries thus causing a difference in their levels of trade and trade costs. Therefore, today's trade strategy goes beyond the traditional mechanisms of tariffs and quotas and includes "behind-the-border" issues, such as the role of infrastructure and governance in supporting a well-functioning trading economy. For instance, many studies show that liberalisation of international transport services foster international trade similar to tariff liberalization [Baier and Bergstrand (2001)].

Estimates of trade costs equivalents show that trade costs have declined over the period of study thus showing an increase in international trade volumes of the country (Table 1). It may be noted that the agricultural sectors trade costs are comparatively higher than the non-agricultural sector due to the existence of policy barriers including high tariffs and non-tariff barriers. In addition, arguably the processing and storage costs of agricultural commodities are higher than such costs on industrial consumer goods.

Trade costs (TC) of Pakistan in agricultural and non-agricultural sectors on average show a declining trend for the period 2003-2012 (Table 1). The reduction in trade costs (TC) is consistent with the lowering of tariff rates. Tariffs not only make imports costly but also discourage exports by raising the cost of imported inputs and act as an implicit tax on exports. Thus, a fall in simple average tariff from 16.8% in 2003 to 13.9% in 2012 has resulted into a rise in exports and imports, also consistent with trade costs (TC) reduction.

Table 1. Trend in Trade Costs of Pakistan for Agricultural & Non-Agricultural Sectors

Year	TC Agr	TC NAgr	LSCI	Pak Tariff	ΔER (Dep/App)	TV (US$ million)
2003	204.08	159.93	19.29	16.81	0.008759	23380
2004	202.70	156.51	20.18	16.17	0.021759	27905
2005	197.26	154.50	21.49	14.61	0.012992	34989
2006	196.02	150.13	21.82	14.79	0.00785	45032
2007	198.41	150.55	24.77	14.9	0.160433	47516
2008	192.14	150.01	24.61	14.08	0.186123	59018
2009	193.70	151.84	26.58	14.78	0.049439	52510
2010	189.23	148.15	29.48	14.51	0.014068	54000
2011	190.39	147.83	30.54	14.25	0.082774	65224
2012	187.70	144.94	31.97	13.99	0.09536	68540

Source: Authors' estimations, except for LSCI, average tariff based on World Bank (2013) and trade volume based on GOP (2013).

Note: Positive change in exchange rate represents depreciation and negative change in exchange rate represents appreciation. LSCI stands for liner shipping connectivity index represents Port infrastructure, TV represents the trade volume.

An analysis of changes in the nominal exchange rate (ER) shows depreciation of nominal exchange rate (ER) over the period of study. Depreciation of exchange rate (ER) has increased the bilateral trade flows relative to domestic trade, thus, causing a reduction in overall trade costs (TC). Hence, depreciation of nominal exchange rate (ER) is seen as a factor helping in trade costs reduction.

Reduction in trade costs can also be attributed to improvement in port infrastructure and shipment. Table 1 shows a significant improvement in liner shipping connectivity index (LSCI) from 19% in 2003 to 32 % in 2012. More than 95% of total freight trade of Pakistan is sea borne; an improved and efficient port infrastructure facilitates trade and reduces trade costs. Keeping this in view, Ministry of Ports and Shipping of Pakistan is focused to achieve the objective of modernization and corporatization of ports introducing modern technology and data base in line with the present day trends, reviving ship-owning in the private sector by removing the impediments, and enhancing tonnage and profitability of Pakistan National Shipping Corporation. Fulfilment of these objectives will further enhance port efficiency, reduce the costs for

port users and enhance port management accountability; consequently reducing trade costs.

3.1. Sectoral Trade Costs

In trade costs equivalent terms, Pakistan and UAE on average have the lowest levels of trade costs in their bilateral trade, i.e., 146.5% for agricultural sector and 104% for non-agricultural sector. Table 2 and 3 provide trade costs of agricultural and non-agricultural sectors. There are many factors behind these lower trade costs between two partners; these include geographical proximity, cultural linkage, no currency restrictions from UAE, abundant energy supplies, and no corporate taxation [Hamid and Hayat (2012)]. Trade costs between two countries are expected to decline further with the decrease in oil prices, which will reduce transportation costs.

Another interesting finding of trade costs analysis is that despite being neighbouring countries, tariff equivalents of trade costs between Pakistan and India are quite high, i.e., 218% for agricultural and 176% for non-agricultural sector (Tables 2 and 3). Trade costs are not low between these two countries owing to the economic, political and military tensions. There is discriminatory stringent application of non-tariff barriers by India, i.e., regulatory and safety requirements that dampens Pakistani exports to India. Political uncertainty, strict procedures for licensing permits and visa hassles also act as barriers to trade, thus increasing trade costs. India follows a restrictive trade regime especially in case of agricultural goods which is depicted by the high trade costs of agricultural sector. Similarly, for textile exports, India observes a large number of non-tariff barriers including para-tariffs, sanitary and photo sanitary (SPS) measures and pre-shipment inspection. Some goods can only be imported through specified ports and road routes between the two countries are only open for exports of limited number of commodities. These bottlenecks on road and rail route and weak and inadequate transportation links between the two countries further increases the trade costs. Also, Pakistan maintained a "Positive list" for the Indian imports until 2011, which only allowed the imports of these 1,946 items from India. Later on the approach of "Negative list"

was adopted by Pakistan which prohibited the import of 1209 items to be imported from India. Positive list had also hindered the free flow of goods between the two partners thus aggravating the overall trade costs [Saleem, *et al.* (2014)]. With the adoption of a negative list, almost 85% of goods can be imported from India compared to level of 25% previously.

Pakistan and China are leading trading partners and neighbouring countries, sharing a common border. However, bilateral trade costs between two countries remain high. The government of China promotes domestic consumption through structural tax reduction policies and there is a strong domestic demand in China. Although, bilateral trade flows between two countries are very large, yet China's customs procedures still require harmonization. Besides, its tariff regimes have not changed substantially, which is a possible reason behind high trade costs.

In addition, China maintains restrictions, licensing and prohibitions on grounds of state security and morality, all these factors add to the levels of trade costs. Bilateral costs of trade between two countries can be reduced by upgrading the Karakoram Highway which is the shortest overland route between the two countries. Also, the construction of an economic corridor is foreseen as a great opportunity to reduce the staggering amount of time and distance consequently reducing the trade costs. Long shipping routes between the two countries add to the costs of trade which can be lessened by the construction of a direct corridor from Kashgar to Gwadar, which is estimated to cut down the existing costs associated to long distance by one-third of the current levels [Kayani, *et al.* (2013)].

USA is also among the top ten major trading partners of Pakistan. Trade costs between the two countries are high owing to the long distance as well as many other contributing factors. USA's domestic trade relative to international trade with Pakistan is very high as compared to Pakistan. The reason behind high values of domestic trade is that there is an excellent working relationship between US manufacturers and other distributors that provides wholesale customers with access to barge product wherever and whenever they need it. Also, there is an ease of transport (ground versus air/sea) which makes domestic trade more feasible. Trade costs between two countries are high

because of large distance, stressed relationship between the government, licensing and quality control requirements from USA government. Pakistan is a country that is included in the list of Restricted Entities by USA, imposition of non-tariff barriers makes textile and clothing products of Pakistan suffer the most.

Table 2. Estimates of Trade Costs Equivalents for Agricultural Sector

US Dollar (USD)

Year	IND	UAE	CHN	SA	UK	USA	MYS	JPN	GMY	BD
2003	241.26	148.28	222.76	217.26	190.21	205.22	200.31	239.38	224.92	151.18
2004	239.87	148.19	219.47	215.38	194.16	186.24	201.76	242.01	224.27	156.65
2005	217.54	142.31	207.87	210.65	191.83	201.09	199.33	240.87	220.86	150.09
2006	196.67	144.37	217.21	208.85	188.42	192.01	203.25	244.09	216.73	158.92
2007	222.88	148.86	196.07	208.87	190.65	193.84	199.07	233.54	218.59	151.07
2008	218.38	147.27	207.21	197.99	185.16	181.39	192.41	233.81	214.41	151.24
2009	221.74	146.92	206.35	199.52	184.25	190.03	180.85	229.68	212.57	150.12
2010	219.91	142.73	203.41	196.37	182.96	188.95	185.80	226.03	208.57	149.04
2011	213.50	149.18	199.91	206.34	181.23	192.93	179.77	219.32	209.42	149.82
2012	212.88	147.20	191.78	202.98	180.01	187.63	179.84	214.91	208.68	149.01
Avg.	218.66	146.53	206.62	204.42	192.68	191.93	192.24	232.57	209.76	151.71

Source: Authors' calculations.

Note: IND stands for India, CHN stands for China, BD stands for Bangladesh, SA stands for Saudi Arabia, MYS stands for Malaysia, JPN stands for Japan, GMY stands for Germany.

Pakistan and EU enjoy very strong and rapidly growing trade ties. We have chosen two countries from EU, United Kingdom and Germany for the purpose of trade costs analysis. Estimated trade costs show that despite the fact there is no cultural or geographical proximity between Pakistan and selected EU member states, trade costs on average are not very large. A further decline in trade costs is expected to occur by the GSP plus status granted by EU to Pakistan in 2014. Before that, Pakistan was given a general GSP status, and Pakistani exports faced some sort of non-tariff barriers like standard intellectual property rights, rules of origin and competition policy.

Pakistan and Bangladesh have not been able to bring about a significant reduction in their bilateral trade costs. Though trade between two countries is growing progressively and has crossed $1 billion mark but there is a need to develop trade facilitation strategies that can further

reduce trade costs. At present there is no direct air link between two countries, especially between Lahore and Dhaka. Infrequent shipping arrangements between the two countries hamper flow of goods between Pakistan and Bangladesh.

Table 3. Estimates of Trade Costs Equivalents for Non-Agricultural Sector

US Dollar (USD)

Year	IND	UAE	CHN	SA	UK	USA	MYS	JPN	GMY	BD
2003	203.47	107.78	162.67	150.15	157.63	171.20	164.49	161.65	180.25	139.10
2004	185.64	109.32	160.49	147.19	160.33	165.90	160.30	160.76	176.01	139.18
2005	182.60	106.39	153.83	148.71	158.85	164.03	160.52	156.64	176.86	136.60
2006	162.07	105.77	148.30	144.82	152.83	165.49	161.97	151.43	175.02	133.68
2007	167.94	104.07	146.72	138.61	160.79	166.59	155.62	157.19	174.32	133.98
2008	164.32	103.23	153.62	137.68	157.70	165.90	151.17	156.63	175.14	134.78
2009	174.46	103.62	158.80	135.74	157.75	163.74	149.79	164.01	172.78	137.91
2010	171.49	103.06	152.93	130.70	147.88	163.32	145.96	159.42	171.89	133.82
2011	169.34	101.52	154.58	131.80	148.71	163.63	147.88	158.34	171.37	131.54
2012	172.11	100.48.	154.64	127.84	139.88	158.63	142.73	160.10	162.04	130.99
Avg.	176.12	103.72	154.66	139.33	154.20	164.01	154.04	158.61	173.57	134.24

Source: Authors' calculations.
Note: IND stands for India, CHN stands for China, BD stands for Bangladesh, SA stands for Saudi Arabia, MYS stands for Malaysia, JPN stands for Japan, GMY stands for Germany.

Japan is an important trading partner of Pakistan. There is a huge potential for further increase in trade volume between the two countries. Trade costs estimates, however, do not present a very encouraging picture. Trade costs equivalents are very high. The import regulations, applicable standards and quarantine requirements make it all the more difficult to export Pakistani products specially food items. Pakistani exports also have the disadvantage of being more distant from the market than its competitors, such as China, Russia, Thailand, South Korea, etc. This not only increases transportation costs but also delays the delivery of goods, whereas Japanese importers prefer small size lots with short delivery schedules. Both the countries need to overcome these impediments to bilateral trade.

In the modern time, importance of trade costs as a determinant of national trade performance and competitiveness has been seriously

recognized by the developed countries. Their governments have been critically analysing and performing research for making effective policies for reduction of trade costs. On the other hand, developing countries have been rather ignorant and little efforts have been made so far at policy level to address this issue. Pakistan is not different from other developing nations. By looking at trade costs estimates, we find that the country still faces high bilateral trade costs *viz a viz* its major trading partners. This shows government's lack of policy attention towards trade facilitation. Pakistan still exports large volume of agricultural products, while trade costs for agricultural sector are substantially higher than that of non-agricultural sector, which speaks of sectoral inefficiency and bias in policies. Thus, the key need is to identify the primary sources of trade costs and formulate what government should do to address them so that trade can be used to sustain high rate of economic growth over a longer period of time.

4. THE TRADE COSTS MODEL

4.1. Theoretical Framework

Trade costs are cited as important determinant of international trade. Given the nature and pattern of trade costs, the Gravity model of international trade is most suitable to determine factors that affect trade costs. This is because the model provides main link between trade flows and trade barriers. The Gravity model has become a major pillar in applied international economics [Evenett and Hutchinson (2002)]. It is basically motivated by the Newton's gravitational law in which the gravitational force utilized among two bodies is determined by their distance and mass. This model became popular in international economics with the pioneering work of Tinbergen (1962). It relates bilateral trade flows to the GDP, distance, and other factors including trade barriers. Anderson (1979), Deardoff (1998), Hummels (1999), Baier and Bergstrand (2001), Limao and Venables (2001) have applied it in a wider sense to infer trade flow effects of institutions such as customs unions, exchange rate mechanisms, ethnic ties, linguistic identity and international borders.

This paper makes use of Novy's (2008) trade costs measure. This is a micro founded measure of trade cost that has been derived from Anderson and Van Wincoop (2003) model based on the Gravity equation. The Gravity equation has been most widely used instrument for modelling the bilateral trade flows. As a workhorse of international trade, it relates countries bilateral trade with their economic sizes and trade costs. This measure analytically solves the theoretical gravity equation for the trade cost parameters that capture the barriers to international trade.

Novy (2007) explained multilateral trade hindrance factors in detail and solved that trade function too. These new strategies are applicable to both international and domestic trade resistance. Basically, when the cost of a particular product reduces then such items are shipped out of countries and this implies that such hindrance have huge impact on domestic trade too. Previous theories don't justify this boarder hindrance and also, they don't take domestic trade in any account. A slight change in trade barriers can bring noticeable change in resources and can shift recourses into tradeable and non-tradable sectors and this will result in changes in trade flows (either bilaterally or multilaterally). Hence, multilateral resistance of the trading countries explains domestic trade very well so it is important to include domestic factor into the equation also to address the home biased.

The motivation behind Novy's approach was to overcome the drawbacks that were associated with the theory-based gravity framework by Anderson and Van Wincoop (2003), which imposed certain arbitrary trade cost functions. The theory-based gravity formulation was a refinement of the traditional gravity equation to include multilateral trade resistance variables.

Anderson and Van Wincoop [AvW (2003)] derived a micro founded trade cost measure based on a multi-country general equilibrium model expressed as:

$$\boldsymbol{x_{ij}} = \frac{\boldsymbol{y_i y_j}}{\boldsymbol{y_w}} \left(\frac{\boldsymbol{t_{ij}}}{\boldsymbol{\Pi_i P_j}} \right)^{\mathbf{1-\sigma}} \qquad \text{... (1)}$$

where, $\boldsymbol{x_{ij}}$ is the bilateral trade from *i* to *j*, $\boldsymbol{y_i}$ & $\boldsymbol{y_j}$ are nominal income of country *i* and *j*, $\boldsymbol{y_w}$ is the world income, $\boldsymbol{\Pi_i}$ is the outward multilateral resistance of country *i*, $\boldsymbol{P_j}$ is the outward multilateral resistance of

country *j*, and t_{ij} is the bilateral trade cost measure, σ is the elasticity of substitution between goods. The main innovation in AvW's (2003) model is to incorporate exporter and importer price indices (Π and P) such that trade not only depends on bilateral trade costs between the two countries but also on the trade "resistance" they face with all of their trading partners in the rest of the world. That is, country *i* is more likely to trade with country *j* if π_i is higher, meaning the multilateral resistance of country *i* to all other partners is higher.

Using Equ. (1), consider the intra-national trade of country *i* as:

$$x_{ii} = \frac{y_i y_j}{y_w}\left(\frac{t_{ii}}{\Pi_i P_i}\right)^{1-\sigma} \quad \ldots (2)$$

and rewrite it as:

$$\Pi_i P_i = \left(\frac{x_{ii}/y_i}{y_i/y^w}\right)^{\frac{1}{\sigma-1}} t_{ii} \quad \ldots (3)$$

which solves for country *i*'s multilateral resistance. Multiplying Equ. (1) with x_{ji}, we obtain:

$$x_{ij}x_{ji} = \left(\frac{y_i y_j}{y^w}\right)^2 \left(\frac{t_{ij}\, t_{ji}}{\Pi_i P_i \Pi_j P_j}\right)^{1-\sigma} \quad \ldots (4)$$

substitute Equ. (3) for country *i* and *j* into (2), we can derive the bilateral trade costs relative to domestic trade costs expressed as tariff equivalent by subtracting 1:

$$\tau_{ij} = \left(\frac{t_{ij}t_{ji}}{t_{ii}\, t_{jj}}\right)^{\frac{1}{2}} - 1 = \left(\frac{x_{ii}\, x_{jj}}{x_{ij}\, x_{ji}}\right)^{\frac{1}{2(\sigma-1)}} - 1 \quad \ldots (5)$$

where,

τ_{ij} = tariff equivalent trade cost (i.e., measures domestic trade relative to bilateral trade).

t_{ij} = international trade costs from country *i* to country *j*.
t_{ji} = international trade costs from country *j* to country *i*.
t_{ii}= intra-national trade costs of country *i* t_{jj} denotes intra-national trade costs of country *j*.
x_{ij} =international trade flows from country *i* to country *j*.
x_{ji} =international trade flows from country *j* to country *i*.
x_{ii} =intra-national trade of country *i*.
x_{jj} =intra-national trade of country *j*.
σ denotes elasticity of substitution between all goods.[5]

$\boldsymbol{\tau_{ij}}$ is defined as a ratio of trade cost across national border relative to trade cost within national border weighted by the elasticity of substitution. It must be noted that τ_{ij} is not directional, i.e., τ_{ij} measures the barrier between country *i* and *j* on average, so that it is a two-way trade cost measure. Intuitively, it measures the bilateral trade cost for both importing and exporting countries. Trade costs τ_{ij}, thus represent the geometric average of international trade costs between countries *i* and *j* relative to domestic trade costs within each country. Intuitively, trade costs are higher when countries tend to trade more with themselves than they do with each other, i.e., as $X_{ii}X_{jj}/X_{ij}X_{ji}$ increases. As the ratio falls and countries trade more internationally than domestically, international trade costs must be falling relative to domestic trade costs.

An additional advantage of Novy's trade cost measure is that it allows time-varying measurement of bilateral trade barriers. With readily available trade and production data in tradable goods categories, we are able to measure and explain the determinants of bilateral border effects.

The gravity equation represents one of the greater successes in empirical economics, as it describes the value of bilateral trade, which is function of the market size of the importer as well as exporter, and

[5]See, Anderson and Van Wincoop (2003) for detailed discussion on elasticity of substitution between goods. This thesis follows AVW's and Novy (2008) σ=8, which is the middle point of available estimates. Smaller value of σ results in higher trade costs showing that consumers are irresponsive to prices and trade costs and consume larger amounts of foreign goods.

distance among them [Lili (2011)]. Market sizes embody push and pull factors that affect value of trade flows, and are usually characterized by the *GDP*. Distance is generally measured by geographic distance among two regions (absolute distance). It is anticipated that large distance between trading partners leads to a decrease in trade, as trade will become complicated and bring transaction costs. The basic Gravity model is as the following:

$$T_{ij} = G\left(\frac{Y_i Y_j}{D_{ij}}\right) \quad \ldots (6)$$

where, *Tij* is bilateral trade volume, for sum of exports and imports; *Yi* is country i's GDP; *Yj* is country j's GDP, *Dij* is the distance among country *i* and country *j*; and *G* is a constant; and is independent of any subscript as it links to a standard Gravity equation in the following form. The multiplicative nature of Equ. (6) Suggests that by taking logs it can be made linear in parameters:

$$lnT_{ij} = lnG + a_1 lnGDP_i + a_2 lnGDP_j - a_3 lnD_{ij} + \varepsilon_{ij} \quad \ldots (7)$$

Objectives of this paper are to test the following two hypotheses:

$H_{1:}$ Connectivity constraints are more important trade deterrents than tariff barriers.

$H_{2:}$ Determinants of trade costs have similar effect on agricultural and non-agricultural sectors.

The relationship between trade costs and its determinants is difficult to capture given the paucity of data on all the factors involved. However, in order to explore the determinants of trade costs, our empirical analysis has used several gravity-type variables including distance, infrastructure development, exchange rate, tariff, area and two dummy variables for contiguity and free trade agreement between the trading partners.

4.2. Empirical Model

Following Novy (2007), joint observation of non-bilateral variables for country *i* and *j* are constructed by multiplying the single country variables to lead to symmetric and constant interaction effects. All variables are taken in the log natural form.

$$\tau_{ij} = f\ (DIST,\ TARIFF,\ EXCH,\ LSCI,\ AREA,\ CONT,\ FTA) \quad \ldots (8)$$

where, τ_{ij} is the dependent variable representing tariff equivalent of trade costs, *DIST* is the distance among Pakistan and partner country, *TARIFF* is the product of tariffs imposed by Pakistan and other trading partner, *EXCH* is the official exchange rate with respect to Pakistan (taken in current US dollars), *LSCI* is the linear shipping connectivity index of Pakistan and partner country, *AREA* represents product of land area of two trading partners, *CONT* and *FTA* are dummies for contiguity and free trade area, which take the value one if two partner countries are contiguous and members of FTA and zero otherwise.

Distance appears in the Gravity model as proxy of remoteness or transportation costs implying that coefficient of distance is expected to have a positive impact on trade costs. This paper uses liner shipping connectivity index *(LSCI)* as a measure of infrastructure development of the trading countries. Our model includes a dummy variable to show common border with the trading partner. Those countries that share a common border are reflected by a unitary value of dummy variable, known as contiguity. Common border again is a proxy for transportation and information costs, which tend to be lower for contagious trading partners as they are well aware of consumer's choices and trading prospects, thus making mutual trade less costly. Coefficient of contiguity is expected to be negative.

Ample land is an indicator of big economy and bigger population with high domestic demands. In order to fulfil that high demand foreign goods are also accepted and larger countries have cultural diversity, residents have greater acceptability for a variety of cultures, which calls for greater imports [Saleem and Mahmood (2014)]. Thus, trade increases and overall trade costs decrease. Coefficient of area of trading

partners is expected to have a negative sign. Another dummy has also been included to evaluate the effect of Free Trade Area (FTAs) on trade costs. Dummy for FTA is expected to have a negative impact on trade costs.

Tariffs and exchange rate are two policy related or institutional determinants of trade costs. Tariffs imposed by partner countries are used as a measure of restrictiveness to trade flows. Aggravation of tariffs imposed by the trading partners is expected to increase the bilateral trade costs, not only it affects imports but the level of exports also declines if tariffs are imposed on raw materials. Issues of duty draw back further add to the level of trade costs. Thus, overall international trade declines and intra national trade increases consequently increasing trade costs.

Exchange rate is used as a measure of competiveness in international trade flows. The study uses official exchange rate as a determinant of trade costs. Increase in nominal exchange rate leads to an increase in overall volume of trade is a well-established fact. An increase in trade flows with nominal depreciation therefore leads to decline in trade costs as trade flows and trade costs are inversely related. Keeping this in view, coefficient of exchange rate is expected to have a negative sign.

4.3. Empirical Specification

The general empirical model reported in Equ. (8) is transformed as the following econometric equation, which links tariff equivalents of trade costs with its determinants and is given as:

$$\tau_{ij} = \beta_0 + B_1 EXCH_{ijt} + B_2 TR_{it} * TR_{jt} + B_3 DIST_{ij} + B_4 LSCI_{it} * LSCI_{jt} + B_5 CONT_{ij} + B_6 AREA_i * AREA_j + B_7 FTA_{ijt} + \varepsilon_{ijt} \quad \ldots (9)$$

In our opinion, model in Equ. (9) will help us determine the impact of these variables on trade costs of Pakistan. The findings from this model will have important implications for the policy, as it will help the policy makers to figure out those areas that can bring about significant reductions in trade costs and prioritize policies accordingly.

Table 4. Definition and Sources of Data Variables

Variable	Definition	Proxy of	Data Source
Export/ Import	Bilateral trade flows between country *i* and *j*	Direct Variable	UN Comtrade
GDP	Output of agricultural and non-agricultural sectors of country *i* and *j* in current US Dollars	Direct Variable	WDI, World Bank
TARIFF	Product of simple average tariffs imposed by Pakistan and partner country.	Measure of restrictiveness	WDI, World Bank
EXCH	Average official exchange rate of Pakistan (US Dollar)	Competitiveness	Pakistan Economic Survey, GOP
DIST	Distance between Pakistan and partner countries capital cities.	Transportation costs	CEPII
AREA	Product of country *i* and *j* land area.	Size of economy	CEPII
FTA	Dummy equal to unity if two countries are a member of free trade area.	Market access	WTO website
CONT	Dummy equal to unity if two countries share a common border.	Information costs	CEPII
LSCI	Product of country *i* and *j* scores on liner shipping connectivity index.	Trade infrastructure	WDI, World Bank

5. RESULTS AND DISCUSSION

5.1. Summary Statistics

Summary statistics is a quantitative description of the main features of the data used in the study. Mean and median are used as measures of central tendency while standard deviation, maximum and the minimum values represent measures of variability. Table 5 provides summary statistics of Pakistan's trade costs with reference to the variables included in the study. A fleeting look at the summary statistics shows that highest mean value of total trade costs for Pakistan is 138.50% with maximum value of 191.8% and minimum value of 98.4%.

To identify whether a long run relationship between trade cost and explanatory variables exists or not, the prerequisite is to analyse the time series properties of all the variables first. As the co-integration tests

Table 5. Summary Statistics

Variable	Mean	Median	Std. Dev	Minimum	Maximum	Observations
TC	138.50	135.74	22.702	98.4	191.8	140
TARIFF	0.924	0.633	0.737	0.205	4.59	140
DIST	4299.13	3916.826	2472.13	683.369	11091	140
AREA	1042615	625300.8	873038.8	464239	2907092	140
LSCI	36.064	37.697	13.466	9.504	68.146	140
Dummy Variables						
CONT	0.214	0	0.410	0	1	140
FTA	0.285	0	0.451	0	1	140

can only be performed when the panels are non-stationary. For the purpose of checking the stationarity of the series, panel unit root test [Levin, Lin and Chu (2002)] is run on the basis of the following hypothesis:

H_0: Variables exhibit a unit root.
H_1: All the variables are stationary.

5.2. Empirical Results

5.2.1 Empirical Results of Pooled Unit Root Test

In order to check the presence of unit root in selected countries, pooled unit root test is conducted using the Eviews-8 Software. Table 6 reports the results of Levin, Lin and Chu (2002) stationarity test showing that the variables *TC, TARIFF, EXCH* and *LSCI* are stationary at the first difference, i.e., *I(1)*. Distance between countries and country area fail to show any result because they are independent of time. Remaining two variables included in the model are dummy variables.

5.2.2. Empirical Results of Kao (1999) Co-integration Test

To determine whether variables with first difference orders of integration, i.e., *I(1)* yield spurious regression or a long run relationship does exist, Kao (1999) panel co-integration test is run based on the null hypothesis of no co-integration. Table 7 shows that the null hypothesis

of no co-integration is rejected thus confirming that a long run relationship does exist. In other words, the possibility of spurious results has been ruled out.

Table 6. Levin, Lin & Chu Test for Stationarity

Variable	Level		First Difference		Order of Integration
	Stat.	Prob.	Stat.	Prob.	
TC	-1.315	0.0946	-8.717	0.0000	I(1)
TARIFF	0.151	0.5603	-4.736	0.0000	I(1)
EXCH	-28.001	0.0000			I(1)
LSCI	0.370	0.6444	-5.273	0.0000	I(1)

Table 7. Kao (1999) Residual based Co-integration Test Estimation

Kao Co-integration Test	Dependant variable: D (RESID)		
Included Observation: 139 after adjustment			
Variable	Coefficient	t-statistic	P-value
RESID(-1)	-0.233	-3.749	0.0003

Null Hypothesis: No co-integration

The results of Kao (1999) co-integration tests confirm the existence of a long run relationship between the dependent and explanatory variables. Therefore, the application of OLS technique will yield biased and inconsistent estimators. Fixed effects model cannot be applied to models involving time invariant variables such as distance as it leads to problem of endogeneity. We thus need to adopt an alternative method to estimate the co-integrated panel. In this regard, Panel Fully Modified Ordinary Least Square (FMOLS) method was developed by Pedroni (1996), which uses a correction approach to deal with the nuisance parameters and thus gives long run coefficients for the estimated model correcting for endogeneity and serial correlation. FMOLS has an advantage over other techniques as it allows for estimation of common co-integration vectors while allowing for heterogeneity both across time and cross sections [Pedroni (2004)].

Thus, the resultant estimates are more consistent, free of serial correlation and endogeneity.

5.2.3. Empirical Results of FMOLS: Total Merchandise Trade

Results of fully modified ordinary least square model show that trade costs equivalents for selected trading partners of Pakistan are significantly dependent on the explanatory variables included in the model.

Table 8 shows the estimated results of determinants of trade costs for overall merchandise trade with Pakistan's major trading partners. Dependent variable is the log of trade costs equivalents for total merchandise trade.

The results depict that nominal exchange rate (*EXCH*) is statistically significant at 1% level and has a negative sign. There is an inverse relationship between depreciation of nominal exchange rate and trade costs. In other words, with depreciation of the exchange rate, total volume of trade rises. As trade goes up, intra-national trade goes down resulting into a decline in trade costs. The coefficient for exchange rate suggests that 1% depreciation of exchange rate reduces trade costs by 0.03% (Table 8). This result is consistent with the findings of Singh, *et al.* (2012). Thus, an increase in international trade greater than the increase in intra-national trade as a result of currency depreciation implies that it has become easier for countries to have more trade internationally rather than trading internally, which is tantamount to a decline in trade costs. It is pertinent to note that with depreciation of nominal exchange rate it is realized that the growth in total bilateral trade with selected countries over the period of 2003-2012 is 50.4%, which is larger than the growth of intra-national trade which increased by 37.2%.

Tariffs always act as an obstacle to international trade, thus, increasing the trade costs. Imposition of tariffs not only decreases the level of imports as well as exports, because tariffs imposed on imported raw materials and inputs used in production of export tables, causing a switch towards intra-national trade leading to increase in trade costs. Thus, increase in tariffs adversely affects overall trade flow. Here, product of tariffs imposed by Pakistan and its trading partner is used,

reflecting degree of market access in two countries, which leads to increase in trade costs. Estimated coefficient sign for this variable is positive but is statistically insignificant. Results show that 1 % increase in tariffs will increase the trade costs by 0.02% (Table 8). These results are in line with the findings of Novy (2013) and Wincoop, *et al. (*2004).

Table 8. Empirical Results of FMOLS: Total Merchandise Trade

Variable	Coefficient	Std. Error	t-Statistics	p-values
TARIFF(TR_i*TR_j)	0.019663	0.051249	0.383675	0.7020
EXCH	-0.028292	0.009666	-2.927088	0.0042*
LSCI($LSCI_i$*$LSCI_{j)}$	-0.179337	0.045527	-3.939140	0.0002 *
DIST	0.278061	0.071994	3.862296	0.0002 *
AREA($Area_i$*$Area_{j)}$	-0.047967	0.015814	-3.159048	0.0031 *
CONT	-0.131884	0.099674	-1.323153	0.1888
FTA	-0.166789	0.071971	-2.31745	0.0224**
C	2.644451	0.553275	4.779636	0.0000*
R-squared	0.678589	Mean dependent var		4.916574
Adjusted R-squared	0.656313	S.D. dependent var		0.181657
S.E. of regression	0.106496	Sum squared resid		1.145483
Durbin-Watson stat	0.592009	Long-run variance		0.028958

* Significant at 1%, ** significant at 5%.

Distance, area and common border are geographic determinants of trade costs. Distance between the trading partners affects the physical transport cost. Geographic distance between the trading countries is a hindrance to bilateral trade flows. Estimated results show that geographic distance between Pakistan and its trading partners is positively related to the trade costs (Table 8). It indicates that 1% increase in distance increases the trade costs by 0.28%. Our result is consistent with the study of Duan and Jason (2012).

The regression coefficient of the variable land area of Pakistan and the trading partner is negative and statistically significant at 1%

confidence level. It implies that when there is 1% increase in land area, trade costs decrease by 0.04% (Table 8). Intuition behind this result is that generally countries with large land areas have large economies and populations, and thus have high domestic demand. To fulfil domestic demand, foreign goods are also accepted by local population, which results into trade. Moreover, in large size countries, cultural diversity is a hallmark and the residents have greater acceptability for a variety of culture including foreign cultural goods, which also causes greater import of cultural goods [Salim and Mahmood (2014)]. Thus, international trade flow increases and trade costs decrease. The present study's empirical result is same as that of Lili (2011).

Liner shipping connectivity index (*LSCI*) is used as a proxy for infrastructure development. Estimates of regression show that LSCI has a negative and statistically significant impact on trade costs. Better maritime connectivity and port efficiency reduce the level of delays in shipment of goods and thus lower trade costs. Results show that 1% increase in LSCI decreases the trade costs by 0.17% (Table 8). These results corroborate with the findings of Duval and Chorthip (2010), Singh, *et al*. (2012) and Olper and Valentina (2007).

Dummy variable for free trade agreement (*FTA*) exhibits a negative and significant relationship with trade costs. According to the regression results, Pakistan's membership in a free trade area reduces trade costs by 0.16% (Table 8). Free trade area reduces barriers to exchange and increases international trade through specialization, division of labour and comparative advantage. Thus, an increase in international trade in the aftermath of free trade agreement reduces trade costs. Our results are in line with the findings of Novy (2007).

R-square is used to measure the regression's success in determining the values of dependent variables. Overall, our model performs reasonably well and about more than half of the variation in dependent variable is being explained by independent variables. Adjusted R-square is 0.66, which shows that the above determinants are explaining 67% of variation in trade costs. Standard deviation of dependent variable is less than which indicates greater reliability of the results. Model is also adjusted for serial correlation and possible endogeneity problem because of FMOLS.

Estimation results for trade costs equivalents for agricultural and non-agricultural sectors along with the z-test results of cross model coefficients comparison are given in Appendix, the included explanatory variables yield same statistical relationship with the dependent variable as in the case of total merchandise trade.

6. CONCLUSION AND POLICY IMPLICATIONS

This study analysed the estimates of trade costs for overall trade, agricultural trade and non-agricultural trade of Pakistan with its major trading partners across Asia, Europe and North America over the period 2003-2012. Moreover, it examined the relationship between trade costs and its major determinants using the panel data estimation techniques. The study adds to the literature by disaggregating trade into two macro-sectors, agriculture and non-agriculture. Existing studies only used total trade, without attempting on sectoral trade details.

Despite the fact that international economy has considerably integrated, our analysis of tariff equivalents of trade costs emphasises that large unexploited gains can be reaped by further reducing the wedge between the cost of producing a good and price paid by ultimate consumer, i.e., by cutting down the trade costs.

Our estimates of trade costs reveal that Pakistan's trade costs are following a disproportionate pattern with its trading partners. Although, the estimates show a considerable reduction in trade costs, yet they indicate that substantial room remains for lowering them further. High bilateral trade costs with some of its very largest trading partners in particular calls for policies that can effectively reduce trade costs between the trading partners. Policy makers need to address the dynamics of higher trade costs in order to improve country's absolute and relative position in the global trade.

At the sectoral level, costs of trade for agricultural sector tend to bypass the costs of trade for non-agricultural sector. The fact that agricultural trade costs in many developing countries are relatively larger than that of the non-agricultural sector suggests that focusing on trade facilitation efforts for agricultural sector would be particularly

productive for Pakistan as WTO's agreement on trade facilitation also emphasis on the release of perishable goods at the earliest possible.

In addition to mapping out the level of trade costs of Pakistan in the recent decade, we used econometric method to investigate various determinants of trade costs. For this purpose, we decompose the trade cost components into various policy and non-policy features. A key finding is that distance, maritime transport and trade facilitation matter for trade costs. Two areas which are highly amenable to policy intervention for reduction of trade costs are the trade infrastructure and free trade areas with the trading partners. UNCTAD'S liner shipping connectivity index is a more important source of trade costs than tariffs.

This is because better shipment connectivity with the trading partners efficiently improves transportation routes thus reducing time and other costs. Similarly, we find that free trade agreements also play a significant role in reducing the costs of trade; this implies that the FTAs of modern era including a fall of non-tariff and behind the border regulatory measures will be helpful to achieve the target of trade costs reduction. Empirical analysis allowed to identify those trade facilitation measures and policies which are most effective determinants of trade costs. It suggests that an increase in geographical distance between trading partners, and tariffs are positively linked with the trade costs. However, land area and common border between trading partners, nominal depreciation of exchange rate, liner shipping connectivity index and membership of a free trade area all because a decline in trade costs.

The benefits of trade as an engine of economic growth and sustainable development as well as means of poverty reduction can only be achieved if these high trade costs are controlled. Higher trade costs lower the competitiveness, thus limiting the potential benefits of trade. Pakistan is a developing country and trade can turn out to be a helpful instrument to achieve sustainability and economic welfare provided these large trade costs are taken care of.

The study evidently shows that there is ample room for reduction in trade costs if proper policy actions are taken. Findings of the study have the following implications for policy making:

- Pakistan should actively participate in WTO's agreement on trade facilitation and reduce the red tape at border crossings to cut down the trade costs.
- Shipment of perishable agricultural goods must be expedited and releasing these goods at the earliest could help reduce trade costs.
- Improve port connectivity, cargo handling and means of transportation, i.e., roads, railways and air links.
- In addition to tariff reduction, NTB's must be streamlined and harmonized to reduce trade costs.
- Effect of longer distance can be limited by the development of both hard and soft infrastructures by applying modern technological methods: internet, publicity campaigns and electronic media.
- Initiation of mega projects like CPEC can bring about the much needed trade costs reduction.

APPENDIX

A. Empirical Results of FMOLS: Agricultural Sector Trade

Variable	Coefficient	Std. Error	t-Statistics	p-values
TARIFF(TR_i*TR_j)	0.072242	0.052622	1.372851	0.1732
EXCH	-0.052983	0.011580	-4.575206	0.0000*
LSCI($LSCI_i$*$LSCI_j$)	-0.171619	0.054041	-3.175734	0.0020 *
DIST	0.149250	0.071237	2.095166	0.0389 **
AREA($Area_i$*$Area_j$)	-0.059225	0.012518	-4.731075	0.0000 *
CONT	-0.040529	0.030851	-1.313729	0.1922
FTA	-0.144177	0.067401	-2.139099	0.0351**
C	4.578977	0.260851	17.55403	0.0000*
R-squared	0.586571	Mean dependent var		5.257956
Adjusted R-squared	0.554769	S.D. dependent var		0.146936
S.E. of regression	0.098044	Sum squared resid		0.874743
Durbin-Watson stat	0.728349	Long-run variance		0.021633

*significant at 1%, ** significant at 5%.

B. Empirical Results of FMOLS: Non-Agricultural Sector Trade

Variable	Coefficient	Std. Error	t-Statistics	p-values
TARIFF(TR_i*TR_j)	0.004906	0.037630	0.130386	0.8965
EXCH	-0.027262	0.013489	-2.021037	0.0462**
LSCI($LSCI_i$*$LSCI_j$)	-0.186992	0.070409	-2.653159	0.0094 *
DIST	0.282673	0.069443	4.070551	0.0001*
AREA($Area_i$*$Area_j$)	-0.049181	0.012387	-3.970405	0.0001*
CONT	-0.009774	0.079129	-0.123524	0.9020
FTA	-0.292959	0.077992	-3.756287	0.0003*
C	6.164287	1.114648	5.530256	0.0000*
R-squared	0.524590	Mean dependent var		5.660031
Adjusted R-squared	0.488020	S.D. dependent var		0.149255
S.E. of regression	0.106796	Sum squared resid		1.037896
Durbin-Watson stat	0.520878	Long-run variance		0.029268

*significant at 1% ,** significant at 5% .

C. Z-scores for Cross Model Coefficients

Variable	Calculated Z- score
Tariff	1.041
EXCH	-1.44
LSCI	0.173
DIST	4.33
AREA	0.570
CONT	0.36
FTA	0.828

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