SECTION 1 – DEVELOPMENT OF SCIENTIFIC ACTIVITY

JEL Classification: F10, M21, R15

TRADE COSTS AND TRADE COMPOSITION: A CASE STUDY OF PAKISTAN'S TRADING PARTNERS

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Abstract

The article deals with the trade costs impact on conducting international business. Developing countries with high trade costs can find the results of the empirical findings rather helpful for their economies as developing countries generally incur higher costs of conducting international business compared to developed ones. The author emphasizes that these relatively high costs put the industries located in developing countries at a comparative disadvantage, which in turn affects not only their trade volumes but also their export mix. Using the World Bank's Bilateral Trade Costs Dataset, this study finds that trade costs influence trade composition, and that this effect is heterogeneous across industries and countries. The developing countries in Asia, Africa and South America are much more prone to the effect of high trade costs. Within developing countries this effect, however, is far higher for the low trade cost intensive sectors, such as the food, minerals and textiles. These industries located in high trade cost countries gain a relatively smaller share in their exports of manufactured goods compared to their counterparts situated in low trade cost countries.

The main attention is paid to Pakistan as a country with 136 trading partners. These empirical findings have implications for prioritising countries and industries with regard to the post-Bali trade facilitation agenda.

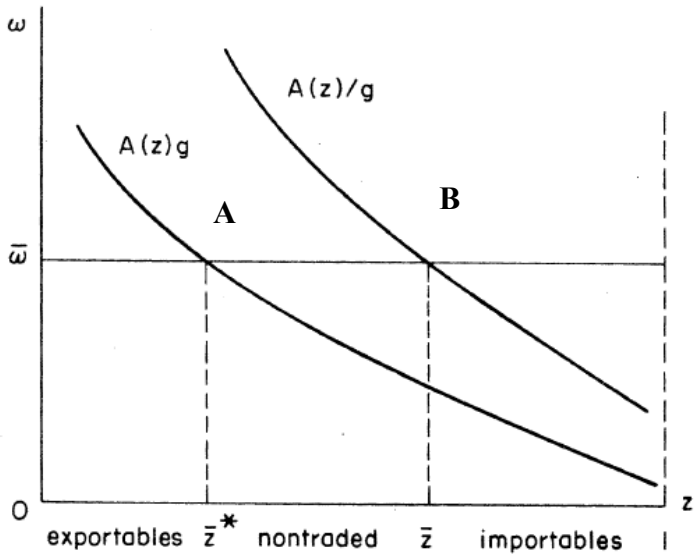
Key words: trade cost, trade composition, Pakistan's trading partners, Agreement on Trade Facilitation.

Introduction

The successful reductions in tariffs under various GATT/WTO Rounds of trade negotiations have drawn the attention of policy makers and researchers to other factors impeding international trade flows. In this context, empirical evidence has repeatedly suggested that the trade restricting effects of non-trade policy barriers are much higher than those of tariffs (Anderson & Van Wincoop, 2004). This evidence, in turn, has influenced policy makers at national and international levels to elevate the issue of reduction in trade costs to the top of the trade facilitation agenda. In 2007, the World Bank allocated almost 20% of its lending to infrastructure projects, a larger share than that on education and social spending (World Bank, 2007). Most of these projects are aimed at reducing the cost of doing international business. Similarly in 2013, WTO members, who did not make much breakthrough on the Doha Round, adopted a multilateral Agreement on Trade Facilitation (ATF). These developments indicate the high priority of this issue at the international and national levels.

The notion that trade costs give rise to a range of commodities that are not traded is well established in international trade literature. Dornbusch, Fischer, and Samuelson (1977) in their landmark study illustrate that countries only trade those commodities for which domestic unit labour

costs fall short of foreign unit labour requirements adjusted for transportation costs. Figure 1 shows the effect of trade cost adjusted unit labour requirements on the pattern of trade between two countries. Home country produces and exports goods on the left of curve A(z)g, whereas foreign country produces and exports goods on the right of curve A(z)/g, and the intermediate range contain goods that both countries produce but are not traded.



Source: Dornbusch, Fischer, and Samuelson (1977)

Figure 1: Effect of trade costs on pattern of trade

Similarly in the Krugman (1980) model trade costs influence the relative consumption of goods and pattern of specialisation. A key insight from these studies is that trade costs are one of the determinants of trade flows.

The subsequent scholarly and technical literature has looked into the effects of trade costs mainly from the perspective of their impact on trade volumes (Helpman, Melitz, & Rubinstein, 2008; Limao & Venables, 2001). Some studies explore the role of fixed costs and sunk costs on the entry and exit decisions of firms in export markets (Bernard, Jensen, & Schott, 2006). Another strand of literature investigates the role of these costs on reallocation of market share at country, industry and firm levels (Melitz, 2003; Chaney, 2008). Overall, the dominant theme of the literature in this area has been that high costs of doing international business reduce trade volumes. But trade costs may have many other consequences for trading partners.

A recent work, by Milner and McGowan (2013) finds that, in addition to reducing trade volumes, trade costs influence the export mix of trading partners. Using a sample of 15 manufacturing industries in 37 OECD countries for the period between1995 to 2004 these authors found that industries located in high trade cost countries gain relatively less share in the export of manufactured goods. To the best of our knowledge, so far, there is no such study of developing countries. Thus we extend this work by increasing the coverage of countries, and industries to developing world. Moreover, we use more recent trade flow data (from 2003 to 2011).

The investigation of impact that trade costs have on trade composition is important because the mix of goods a country exports can have implications for economic growth. All goods are not the same in terms of their economic importance; specialising in some products brings higher growth than

specialising in others. Rodrik et al. (2007) argues that export product mix is one of the determinants of income level and subsequent economic development. This study suggests that countries which specialise in rich-country products grow faster than those which specialise in poor-country products. Similarly, Hummel and Klenow (2002) find that richer countries export more units at higher prices, as well as they export a wider set of goods. The extensive margin (the larger set of goods) accounts for two-thirds of exports in larger economies and one-third of their imports.

Our main hypothesis is that trade costs impact the export mix of trading partners. To test this theory we construct a panel dataset of trade costs and the trade share of industries of 136 trading partners of Pakistan and investigate the correlation between these variables in a regression framework. In our identification strategy, we exploit the variation of trade costs between countries and the differences in trade cost sensitivity among industries. After baseline estimation, we test our findings on sub-sets of countries, industries, and regions.

The road map of the paper is as follows. The first section discusses the nature and measurement of trade costs, and trade composition. The second and third sections introduce the data, estimation technique and briefly debate other econometric issues. The fourth section explains the estimation results and robustness checks. The fifth section concludes by outlining the key policy implications and suggestions for further work in this area. In all subsequent discussion we use 'costs' and 'trade costs' interchangeably.

1. Measurement of trade costs and trade composition

This section briefly explains the nature of trade costs and trade composition as used in this work and the rationale of selecting Pakistan as a reference country.

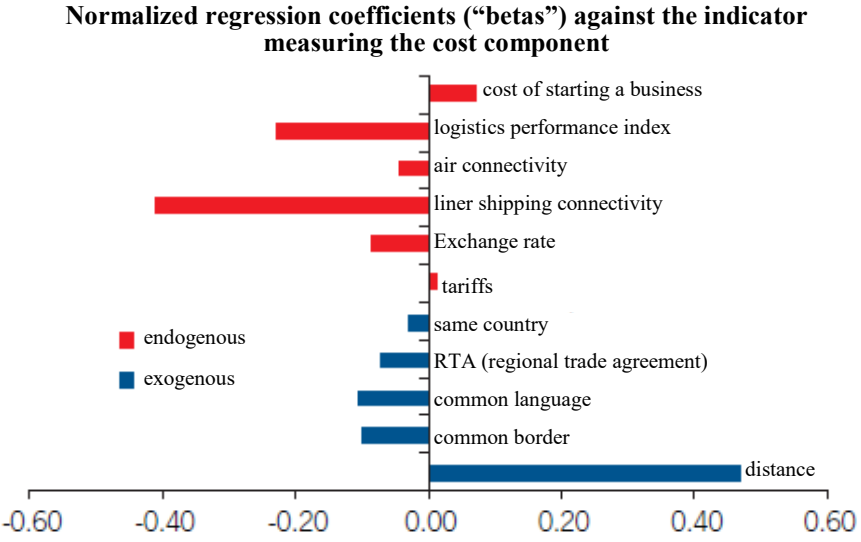
The concept of trade costs used here is different from the traditional approach of computing these using gravity models. Studies using gravity models employ proxy variables for different components of multilateral resistance. Commonly included variables are the cost of transportation, documentation, shipping, and tariff and non-tariff barriers at the ports of origin and destinations. Some authors incorporate additional controls for common language, culture, geography, and colonial heritage (Andrew Rose, 1999). This bottom up approach is criticized for not being completely purgative of omitted variable bias, and for not providing aggregate figures for cross country comparisons.

In contrast to the above, in this work trade costs are based on an inverse gravity (top down) approach. These are measured in terms of the trade depressing effect of national borders relative to the domestic trade. To compute those, Novy (2008) developed a theoretical model, and subsequently Arvis et al. (2013) formalized it and generated a trade cost dataset, which we use in this paper. In this dataset, the trade restricting effect of borders is measured as the difference between observed trade and actual trade potential. The potential is estimated from the pattern of production, consumption, and trade in origin and destination countries. This micro-founded approach of measuring trade cost is operationalized as follows:

$$\tau_{ijkt} \equiv \left(\frac{t_{ijkt} t_{jikt}}{t_{iikt} t_{jjkt}} \right)^{\frac{1}{2}} - 1 = \left(\frac{x_{iikt} x_{jjkt}}{x_{ijkt} x_{jikt}} \right)^{\frac{1}{2(\sigma_k - 1)}} - 1$$

Where T is trade cost between country *i* and country *j* at time t, in sector *k* (Agriculture or Manufacturing), *x* is exports, σ is elasticity of substitution, subscripts *ii/jj* indicate intra-country trade and subscripts *ij/ji* designate inter-country trade. Bilateral trade costs computed using this procedure are ad valorem (tariff) equivalents, and are symmetric in nature.

This methodology is considered to be devoid of omitted variables bias. Moreover, it is theoretically consistent as it includes all components of trade costs discussed in Anderson and van Wincoop (2004). In this approach, two key components of the trade costs are policy barriers (endogenous), and non-policy or natural barriers (exogenous). The former includes tariffs and non-tariff measures, shipping line connectivity and infrastructure performance, whereas the latter comprises geographical or natural factors, such as distance, and the lack of common language, etc. The relative importance of these components is shown in Figure 2 below.



Source: Economic Premise 104, the World Bank

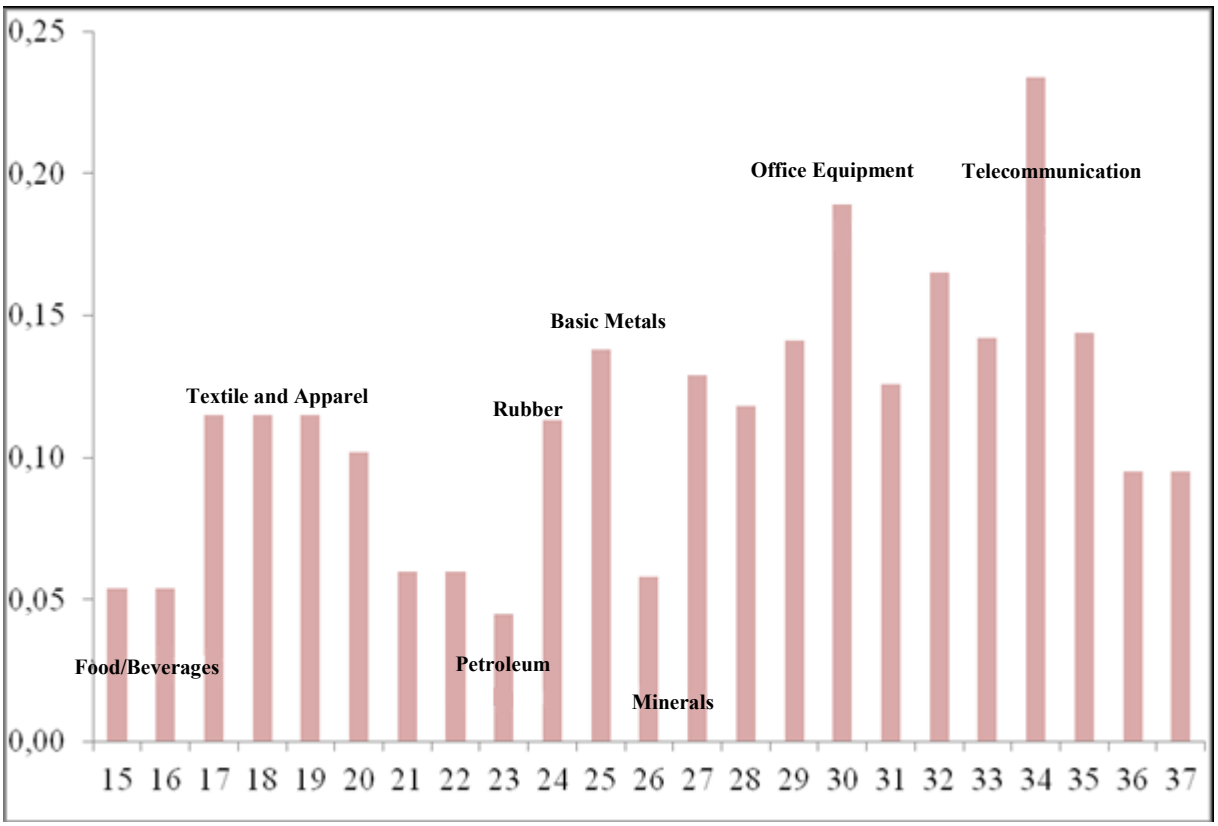
Figure 2: Relative impact of different sources of trade costs

The diagram shows that policy interventions can even out the effect of exogenous and endogenous barriers. For example, distance is the most significant exogenous barrier but improved shipping line connectivity and a good logistic network can offset its trade depressing effect.

To measure trade composition in this work, we use International Standard Industrial Classification (ISIC Rev. 3). This classification system categorizes all industrial activities in 22 groups (Annex 1). These categories differ in terms of share of imported inputs (trade cost sensitivity) used in their manufacturing exports. Figure 3 illustrates this variation. It shows that the auto sector and the telecommunication sector are high trade cost intensive, whereas food and mineral sectors are low trade cost intensive. We exploit this variation across industries in our estimation strategy.

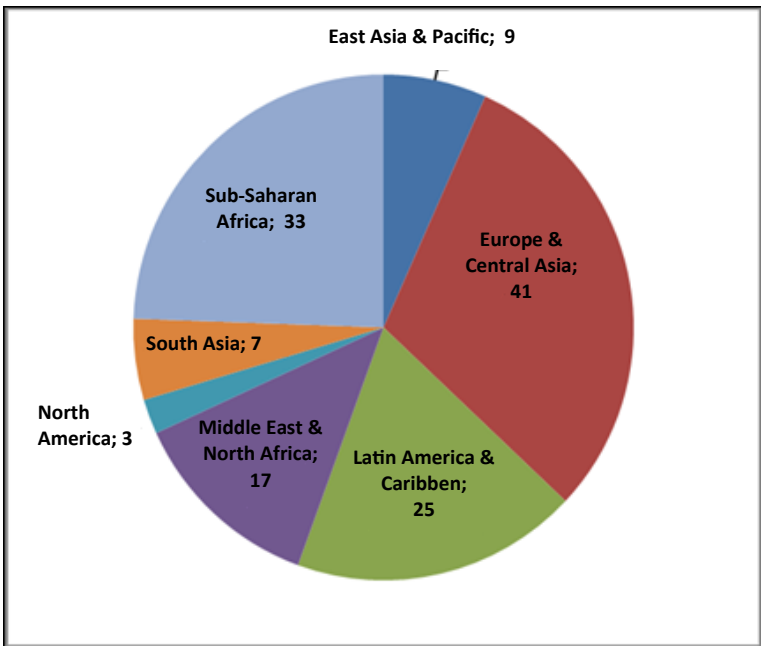
Our research question is do trade costs impact trade composition. For the purpose of this analysis we need a reference country to compare these variables across countries. We select Pakistan as a reference point. This setting is unique for the following reasons:

Pakistan is the 6th largest market in the world with a population of 200 million but it has narrow industrial base and very small regional trade. As a result, this country imports almost all industrial goods from 136 trading partners across the globe (Figure 4), which provides a reasonably large sample for an econometric analysis. The detailed list of the trading partners is provided in Annex 2.



Source: OECD Structural Database for the US

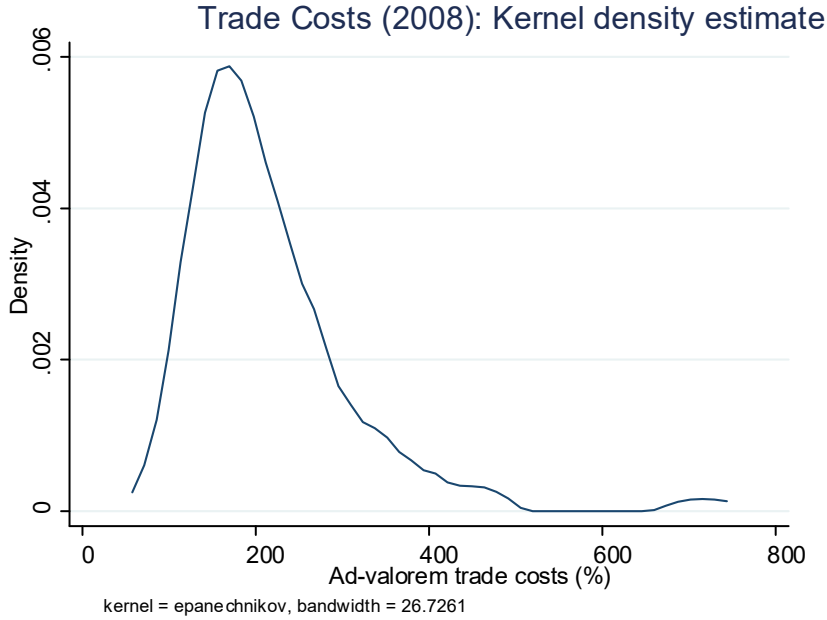
Figure 3: Variation of trade cost intensity across industries



Source: WITS, Comtrade database

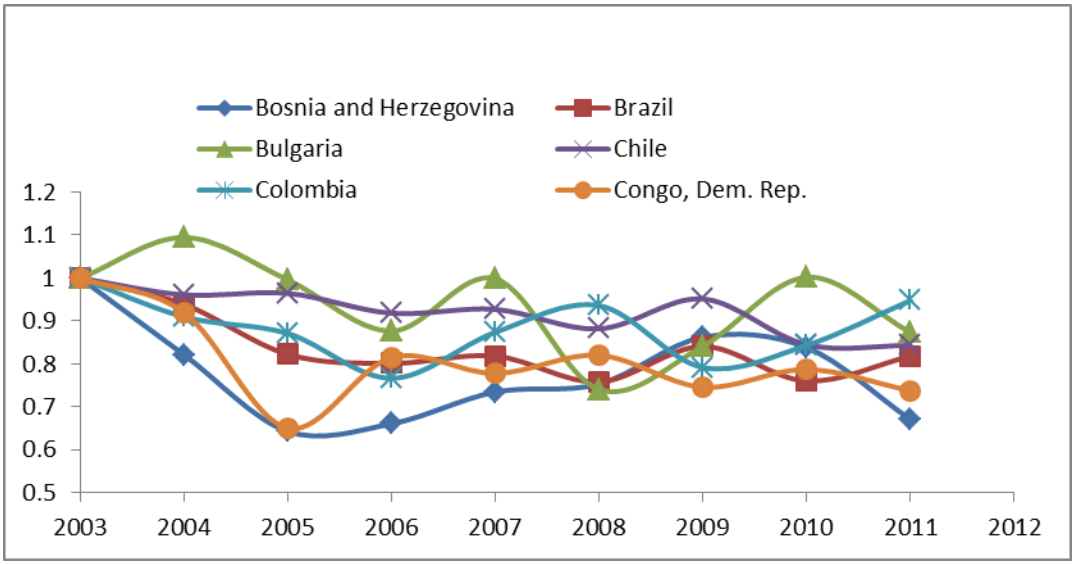
Figure 4: Trading partners of Pakistan

Second, Pakistan's bilateral trade costs vary a lot (Figure 5): ranging from 70% ad valorem (for Qatar) to 850% (for Armenia). Pakistan's five lowest cost trading partners with trade cost less than 100% ad valorem are Qatar, Hong Kong, Afghanistan, Netherlands, and Malaysia (in ascending order), and its five highest trade cost partners, with trade cost greater than 700% ad valorem, are Mongolia, Armenia, Botswana, and Macedonia (in descending order).



Source: Bilateral trade cost dataset, the World Bank

Figure 5: Variation of trade costs across countries, Kernel density estimate



Source: Bilateral trade cost dataset, the World Bank

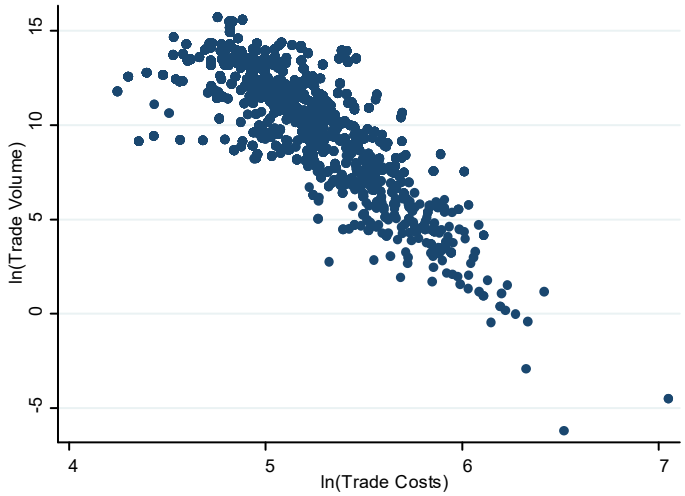
Figure 6: Variation of trade costs across countries and across time

Third, the data suggests that these costs are gradually falling but the variation across countries and across time is uneven; between variation[1] in our sample ranges from 80% to 800% and within variation[2] ranges from -50% to 500%. Figure 6 illustrates this pattern for a few trading partners of Pakistan. For expositional purpose we normalize the figure of trade cost in the year 2003 to '1'. The diagram shows that overall these costs follow a downward trajectory but the trend varies a lot across countries, which provides a nice setting for the quantitative analysis using a panel data.

Fourth, the issue of reverse causality arises in this kind of empirical work. The common concern is that countries usually negotiate preferential trade agreements (PTAs), or free trade agreements (FTAs) with their major trading partners to reduce trade costs. In that case trade share (explanatory variable) becomes a determinant of trade costs (dependent variable), and generates a feedback effect. Hence, the presence of FTA affects both the dependent and explanatory variables and creates simultaneity bias. This is of less concern in this setting since Pakistan is not a part of any major network of FTAs and PTAs. The country's trade regime is mainly MFN based; therefore, choosing it as a reference point helps in overcoming the endogeneity problems.

2. Methodology, data and econometric issues

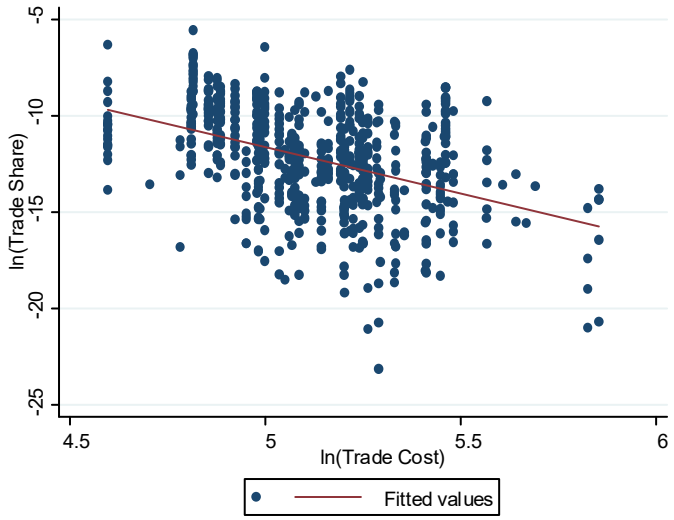
Graphs manufacturing exports of trading partners of Pakistan against trade costs (on logarithmic scale). The chart clearly shows the inverse correlation between these variables. The relationships my not be perfect, nevertheless the resistance trade cost impose comes through clearly. The same pattern holds when we disaggregate the trade share into various industrial categories (Figure 8). The disaggregated data suggests that the impact of trade cost is heterogeneous across industries, too.



Source: Author's working

Figure 7: Manufacturing trade share

[1] Variation across mean of these countries
[2] Variation across time between these countries



Source: Author's working

Figure 8: Trade share at industry level

Based on these descriptive statistics we hypothesize that high trade cost intensive industries located in high trade cost countries gain a relatively small proportion of trade compared with their low trade cost counterparts. To investigate this hypothesis our baseline regression specification is as follows:

$$trade\_share_{ict} = \beta_0 + \beta_1 (trade\_cost\_intensity)_{it} * (trade\_cost)_{ct} + \gamma_c + \delta_i + Y_t + \varepsilon_{ict}$$

The dependent variable is the share of exports of an industry (i) of a country (c) at a time (t). To make it comparable across countries, we normalize it by total world exports in that industry on the pattern adopted in Eaton and Kortum (2002). Moreover, to control for any unobservable variation, we include fixed effects for trading partners, industries and years. In this framework, the effect of trade costs on trade composition is determined by the variation of trade costs across countries and time, and the variation of trade cost sensitivity across industries as well as across time. We estimate this baseline equation in a panel structure. The coefficient on the interaction terms is the main focus of our investigation. A negative value of the coefficient would mean that high trade cost intensive industries located in high trade cost countries gain a relatively small share in exports of manufactured goods.

This functional form is quite standard in international trade literature. Rajan and Zingales (1998) used it to investigate the effect of financial development on the industrial sectors reliant on external financing. Levchenko (2007) also employed the same to explore the relationship between institutional quality and the pattern of specialization. Recently, Nunn (2007) also estimated a similar model to explore the effect of contract enforcement on the exports of relationship-specific industries. We build on these well-grounded approaches. In terms of the structure of the model our specification is closer to Levchenko (2007) but for the construction of the dependent variable it is closer to Milner and McGowan (2013).

To operationalize the equation (1), we use data from multiple sources. We retrieve trade flow data at industry level from the COMTRADE database and extract bilateral trade cost figures from the recently released dataset by the World Bank. The World Bank dataset contains bilateral trade cost values for all trading partners from 1995 to 2011. We extract the information on trade cost intensity

from the OECD structural database for the USA, as it is exogenous to all other trading partners. We use factor endowment (physical capital, human capital and labour) from the Penn World Tables (PWT 08). This new generation of Penn World Tables constructed by Feenstra and others (2013a) computes physical capital using the data of initial assets, investment and depreciation for 167 countries. Similarly it generates Human Resources Index based on the average years of schooling of the population aged between fifteen and above, and the assumed returns to education as discussed in Barro and Lee (2013) and Psacharopulos (1994).

The dataset so generated contains these variables for 22 industries of 136 countries for 9 years, from 2003 to 2011. Overall, the dataset contains 10603 observations but for the balanced sample the number drops to 5320. The reason is that trade flow observations for many countries and industries are missing in this period. We restrict econometric investigation to a balanced sample and also compare the estimation results with the full sample. In order to minimize the endogenity problem caused by measurement errors, serial correlation, selection bias, reverse causality and omitted variables, we take following measures:

1. Measurement errors arise from the aggregation of data across countries, products and industries. This is less likely to be a problem in our analysis as we measure the dependent and explanatory variables using the same classification system. The trade cost values released by the World Bank have been computed using ISIC Rev. 3 classification system (Arivis et al. 2013). We match transform the trade flows at industry level to the same classification system using the built in filters in WITS database.

2. The issue of sample selection also arises because the number of countries and industries exporting to this destination varies across time. Since this entry and exit is not random, it creates a selection bias. To overcome that we run regressions on a balanced sample containing those countries and industries that appear continuously in the data.

3. To mitigate the problem of serial correlation we cluster the standard errors at country level since trade shares between countries tend to be highly persistent due to the presence of sunk costs. Moreover, to account for other omitted variables we include fixed effects for countries, industries and time.

4. Finally, as argued earlier, high export share of some trading partners could be a determinant of low trade costs. This feedback effect can create the problem of a reverse causality. As discussed above, this is less likely to be a problem in this scenario as our reference country's trade regime is mainly MFN based. However, we still control for the import tariff of Pakistan in the robustness checks. Moreover, in robustness checks we drop China, Iran, Sri Lanka and Malaysia from the analysis, are these are the only countries with which Pakistan has free trade agreements.

3. Limitations of the study

In contrast to earlier streams of research focusing on fixed costs or sunk costs, we concentrate on the impact of variable trade costs. Second, rather than exploring the effect of these costs on trade volumes we investigate their impact on export mix. We, however, restrict the scope of the work to manufacturing sectors only. These industrial sectors include tobacco, textile and apparel, paper, wood, chemical, rubber, basic metals, motor vehicles, electronics, medical equipment and office furniture. We deliberately exclude the agriculture sector because, in addition to trade costs, it is riddled with a plethora of other barriers to market access, such as tariff-rate quotas, sanitary and phyto-sanitary issues and quality control measures, which create complication in their modelling. Third, we focus on the study of industries, not firms, since countries negotiate trade policy at industry level. Moreover, from the trade facilitation perspective, it may be better to think of industries at the world level, rather than focusing on firms at national levels.

4. Discussion of results

Due to the time series dimension of our panel, we start by conducting augmented Dickey-Fuller (ADF) test as well as Maddala and Wu unit root tests. Both of these tests confirm stationarity of our data series at 1% significance level.

Table 1 presents Ordinary Least Squares (OLS) estimates of our baseline equation (1). These results imply that the trade share of industries varies inversely with the interaction of trade costs and trade cost intensity. This effect is statistically significant at 1% significance level. Since these regressions are in logs, the coefficient on the interaction term can be interpreted as elasticity. Column (1) indicates that the elasticity of our interaction variable is (-) 2.16. These results hold even when controlling for unobservable variables by including the country, industry and time dummies as shown in column (2) and column (3). These basic findings are in line with those of Milner and McGowan (2013) that performs a similar analysis for 30 OECD countries.

As mentioned above, due to the fluctuating nature of trade composition in Pakistan, the trade flows for a few countries and industries are missing in the dataset for some years. Therefore, in column (4) of the table we restrict the estimation to a balanced sample only. This regression contains only those countries and industries which appear in the data continuously from 2003 to 2011. Restricting the sample does not change the sign and significance level of our coefficient of interest but decreases its magnitude.

In the part II of the table we perform the same analysis by normalizing the export share of trading partners (dependent variable) by their own total manufacturing exports to the world. The original estimation results hold even to this change in the construction of dependent variable.

Table 1

Trade Costs and Trade Share

I: Trade Share in World Exports

Dependent Variable: Export Share	(1)	(2)	(3)	(4)
Trade Costs x Trade cost intensity	-2.126***	-1.971***	-1.985***	-1.194***
	(0.0616)	(0.206)	(0.209)	(0.232)
Country & Industry dummies		Yes	Yes	Yes
Time dummies		No	Yes	Yes
N	10187	10187	10187	6674
R^2	0.11	0.56	0.56	0.55

II. Trade Share in Country's Exports

Dependent Variable: Export Share	(1)	(2)	(3)	(4)
Trade Costs x Trade cost intensity	-0.733***	-1.612***	-1.582***	-0.786***
	(0.0533)	(0.198)	(0.201)	(0.211)
Country & Industry dummies		Yes	Yes	Yes
Time dummies		No	Yes	Yes
N	10187	10187	10187	6674
R^2	0.02	0.39	0.39	0.43

Standard errors in parentheses, specification (4) is a balanced sample * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In the following sub-sections we further investigate the robustness of our findings at country, industry, and regional levels.

First, it can be argued that the above results are driven by some high or low trade cost countries. To investigate this possibility we divide the countries in two parts, on the basis of mean trade cost .i.e. 186% ad valorem. In these samples, 46 countries have trade costs above the mean, while 50 countries have that below the mean. Table 2 presents the estimation results for these samples. The comparison of column (1) and column (2) of the table reveals that the coefficients of interaction term are similar in magnitude and sign in both these samples, but they differ in the level of significance. For low trade cost countries significant level is 1% but for high trade cost countries it is 10%.

This difference suggests that the industries located in low trade cost countries are much more prone to the effect of high trade costs. The obvious reason for this variation is that the low trade cost countries (mostly developed economies) have a large number of trading partners. If the bilateral trade costs of any of their trading partner rise, the export share of industry to that partner will substantially drop. For example, if Pakistan increases bilateral trade costs with the US, it will adversely affect the industrial exports of the US to Pakistan. It may not affect the US since its firms can export to the rest of the world (ROW) at relatively low trade cost compared to that of Pakistan. By contrast, high trade cost countries may not have a similar choice. This is in line with the model of Anderson and Van Wincoop (2003) which predicts that a rise in multilateral resistance between two trading partners reduces their trade flows and may increase that with the rest of the world. Intuitively, this can occur because industries of low trade cost countries can export to multiple other low trade cost destinations.

Table 2

High and low trade cost partners

Dependent Variable: Export Share	**(1)**	**(2)**
Trade cost x trade cost intensity		
High cost partners	-0.940*	
	(0.486)	
Low cost partners		-0.921***
		(0.289)
Country & industry dummies	Yes	Yes
Time dummies	Yes	Yes
N	1844	4830
Countries	46	50
R-squared	0.43	0.54

Standard errors in parentheses,* p < 0.10, ** p < 0.05, *** p < 0.01. Regression contains country, industry and time fixed effects

Second, it can also be argued that the results are driven by a particular set of industries as industries differ in terms of their trade cost intensiveness. To explore that we again divide the sample in two parts, high trade cost intensive industries (such as fruit and vegetables, textile, minerals) and low trade cost intensive industries (such as electronics, telecommunication, and auto sector). Table 3 presents the estimation results for these samples. The comparison of the column (1) and column (2)

reveals that the sign and significance level of our coefficient of interest remains the same but the magnitude of the coefficient is slightly higher for low trade cost intensive sectors.

Table 3

High and low trade cost intensive industries

Dependent Variable: Export Share	**(1)**	**(2)**
Trade cost x trade cost intensity		
High trade cost intensity industries	-1.225***	
	(0.334)	
Low trade cost intensity industries		-1.886***
		(0.385)
Country & industry dummies	Yes	Yes
Time dummies	Yes	Yes
N	3273	4830
Countries	65	71
Industries	12	15
R^2	0.60	0.58

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Regression contains country, industry and time fixed effects

A t-test indicates that the difference between these coefficients is statistically significant implying that the low trade cost intensive industries are much more prone to the effect of high trade costs compared to their high trade cost intensive counterparts. It is important to mention that the former industries are mainly located in developing countries. One explanation for this heterogeneous effect could be the high weight to value ratio of the goods manufactured by these industries. For instance, weight to value ratio is higher for cotton or food sector goods compared to the products of the auto or telecommunication sectors. Therefore, the former is more prone to high trade costs than the latter.

We estimate the same equation by grouping countries according to their geography. These regressions shown in the Table 4 indicate that the effect of trade costs is higher on the industries located in South Asia, and Sub-Saharan Africa compared to those located in East Asia or Europe. Again, a t-test confirms that the difference among these coefficients is statistically significant.

Additional robustness tests have been conducted that are not reported here. These can be requested from the author. First, as Romalis (2004) and many other studies suggest the factor endowments are one of the main source of comparative advantage and drivers of trade flow. We augment baseline model with the interaction of physical capital and physical capital intensity, and human capital and human capital intensity for each industry. Second, we include trade costs and trade cost intensity as additional regressors. Third, we also add exchange rates of trading partners and import tariffs of the destination market in these estimations. Our regression results hold even after controlling for all these variables. Finally, we estimate our baseline equation using first differenced model[3] as well as including fixed effects. The variation in the estimation techniques does not change the original results.

[3] Baier and Bergstrand (2007) argue for the first differenced estimator as the trade costs are gradually falling

Table 4

Regional grouping

Dep. Variable: Export Share	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trade cost x trade cost intensity	-0.86***						
East Asia & Pacific	(0.277)						
Europe & Central Asia		-0.76***					
		(0.141)					
Latin America & Caribbean			-1.16***				
			(0.686)				
Middle East & North Africa				-1.499**			
				(0.591)			
North America					-0.330		
					(0.466)		
South Asia						-1.45***	
						(1.083)	
Sub-Saharan Africa							-2.69***
							(1.181)
N	1835	3315	386	270	294	333	232
R^2	0.59	0.55	0.65	0.47	0.68	0.41	0.66

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Regression contains country, industry and time fixed effects

In contrast to baseline findings, the results of the Table 3 are partially in line with those of Milner & McGowan (2013). Although the sign and significance level of coefficient of interest is the same in both the studies, the magnitude of coefficients is much higher for developing countries (almost three folds). This variation could be either because of the use of a different set of countries or industries or the periods of study in the dataset. The earlier study covered 15 industries of 37 OECD countries for the period 1990 to 2004, whereas our sample contains 22 industries of 136 developed and developing countries and uses more recent data (from 2003 to 2011). The variation in results could also arise from the differences in the measurement of trade costs: these authors computed trade costs themselves, whereas we use the WB-UNESCAP bilateral trade cost data set.

Summary and concluding remarks

Trade theory suggests that relatively high costs of conducting international business restrict trading of a range of commodities as these costs put some industries at a comparative disadvantage. Unfortunately, despite the emphasis on reducing trade costs in economic theory and aid efforts, we lack rigorous understanding of the ways these costs affect trade composition in developing countries. To fill this gap in the literature, this study has investigated the impact of trade costs on export composition of Pakistan's 136 trading partners. It finds that trade costs influence the export mix of these countries in that trade share of industries varies inversely with the trade costs. The industries located in high trade cost countries gain a relatively smaller share of the exports of manufactured goods compared to those located in the low trade cost countries. These findings are robust to the

different sampling of countries on the basis of trade cost level or regional level, as well as to a grouping of industries on the basis of trade cost sensitivity.

These results imply that trade costs are strongly correlated with the export mix of trading partner because they put industries located in high trade cost countries at a comparative disadvantage. Although these findings hold for developed and developing countries alike, their magnitude is far higher for primary industries in developing countries. It suggests that the existing trade cost structure is biased against developing countries and this bias is particularly strong against primary industries within these countries.

Results of these estimations help in improving our understanding of the differential impact of trade costs on industries, countries, and regions. The work is, however, limited to trade in the manufacturing sector and to the trading partners of only one country. The same approach can, however, be applied for analysing trading pattern of other countries and other sectors. Future studies therefore need to look into the effects of trade costs in agricultural and services sectors. Second, research is required to explore which types of trade costs affect different industries. For instance, swift clearance at the border may be more important for just-in-time industries, while shipping line and airline connectivity may be more significant for perishable goods.

Turning to policy, this study has highlighted a number of issues. First, these findings may have implications for setting priorities of the WTO led trade facilitation agenda, since they help in identifying countries and industries more prone to the effect of high trade costs. Developing countries in Asia, Africa and South America are at the lower end of the distribution of bilateral trade costs and most of these countries have primary industries, which are more sensitive to high trade costs. Multilateral institutions devote a great deal of efforts in liberalization of industries of these countries. This study suggests that to promote industrialization in these economies, reduction in variable trade costs merits further consideration. Second, disaggregation of various components of trade costs (Figure 2) implies that only a few sources of the trade costs are in the domain of nation states. Therefore collective action at the international level has to gear up to circumvent this phenomenal barrier to trade flows.

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ANNEXES

Annex 1

Trade composition as per ISIC Rev.3 classification

S.No.	Industry Code	Industry	Trade Cost Intensity
1	15	Coke, refined petroleum products and nuclear fuel	0.045
2	16	Food products and beverages	0.054
3	17	Tobacco products	0.054
4	18	Other non-metallic mineral products	0.058
5	19	Paper and paper products	0.060
6	20	Publishing, printing and recorded media	0.060
7	21	Furniture; manufacturing n.e.c.	0.095
8	22	Wood and of products of wood	0.102
9	23	Chemicals and chemical products	0.113
10	24	Textiles	0.115
11	25	Wearing apparel; dressing and dyeing of fur	0.115
12	26	Tanning and dressing of leather	0.115
13	27	Fabricated metal products, except machinery	0.118
14	28	Electrical machinery and apparatus n.e.c.	0.126
15	29	Basic metals	0.129
16	30	Rubber and plastics products	0.138
17	31	Machinery and equipment n.e.c.	0.141
18	32	Medical, precision and optical instruments, watches	0.142
19	33	Other transport equipment	0.144
20	34	Radio, television and communication equipment	0.165
21	35	Office, accounting and computing machinery	0.189
22	36	Motor vehicles, trailers and semi-trailers	0.234

Source: UN, ISIC Rev.3

Annex 2

Trading partners of Pakistan

Afghanistan	Denmark	Kyrgyz Republic	Rwanda
Algeria	Dominican Republic	Latvia	Saudi Arabia
Argentina	Ecuador	Lebanon	Senegal
Armenia	Egypt, Arab Rep.	Lithuania	Singapore
Australia	El Salvador	Luxembourg	Slovak Republic
Austria	Eritrea	Macao	Slovenia
Azerbaijan	Estonia	Macedonia, FYR	South Africa
Bahrain	Ethiopia	Madagascar	Spain
Bangladesh	Fiji	Malawi	Sri Lanka
Barbados	Finland	Malaysia	Suriname
Belarus	FM Sudan	Malta	Swaziland
Belgium	France	Mauritius	Sweden
Benin	Gabon	Mexico	Switzerland
Bolivia	Gambia, The	Moldova	Syrian Arab Republic
Bosnia Herzegovina	Georgia	Mongolia	Tanzania
Botswana	Germany	Morocco	Thailand
Brazil	Ghana	Mozambique	Togo
Brunei	Greece	Namibia	Trinidad and Tobago
Bulgaria	Guatemala	Nepal	Tunisia
Burkina Faso	Honduras	Netherlands	Turkey
Burundi	Hong Kong, China	New Zealand	Uganda
Cambodia	Hungary	Niger	Ukraine
Cameroon	Iceland	Nigeria	United Arab Emirates
Canada	India	Norway	United Kingdom
Central African	Indonesia	Oman	United States
Chile	Iran, Islamic Re	Panama	Uruguay
China	Ireland	Papua New Guinea	Venezuela
Colombia	Italy	Paraguay	Vietnam
Congo, Rep.	Jamaica	Peru	Yemen
Costa Rica	Japan	Philippines	Zambia
Cote d'Ivoire	Jordan	Poland	Zimbabwe
Croatia	Kazakhstan	Portugal	
Cuba	Kenya	Qatar	
Cyprus	Korea, Rep.	Romania	
Czech Republic	Kuwait	Russian Federation	