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PAKISTAN'S POTENTIAL TRADE AND 'BEHIND THE BORDER' CONSTRAINTS

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Pakistan's Potential Trade and 'Behind the Border' Constraints

Adil Khan Miankhel

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ABSTRACT

Institutions are source of comparative advantage or disadvantage in international trade. Socio-economic and political constraints also matter for creating comparative advantage and affect the trade pattern of a country. These diverse 'beyond the border' and 'behind the border' constraints are often not fully captured in the literature on international trade and institutions. The existence of such institutional, socio-economic, and political constraints to Pakistani exports is empirically investigated in this paper through a cross-sectional analysis employing a trade Stochastic Frontier Gravity Model. Aggregate data for 2006-08 and 2009-11 show lower exports in the latter period. This is attributed to demand-suppressing effects emanating from the 2008 global financial crisis and supply-suppressing effects emanating from energy shortfalls and input constraints, due to floods, in Pakistan. The model estimation then demonstrates that behind the border constraints in Pakistan are statistically significant in explaining total exports during 2009-11. The estimation is also presented for four single-digit SIC categories of products for this period. Behind the border constraints are evident for SIC 0 (agriculture, forestry and fish products) and SIC 2 (manufactured products) that combined account for approximately 80 percent of Pakistan's exports. The estimation results by country further demonstrate that behind the border constraints affect the pattern of trade through the non-realization of bilateral trade potential. In the post-financial crisis era, Pakistan needs to further develop its institutional capacity to promote competitive exports given the explicit and implicit beyond the border trade barriers it faces and work to remove political obstacles to regional trade.

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INTRODUCTION

Recent literature on international trade has focused on the effects of institutions on trade performance and vice versa. The literature has shown that institutions can be a source of comparative advantage. Nunn (2007) examines this hypothesis based on one specific institution: a country's ability to enforce contracts. He argues that countries with better contract enforcement would have less underinvestment, resulting in a cost advantage in the production of goods requiring relation-specific capital. Nunn (2007) further describes that contract enforcement explains more of the global pattern of trade than countries' endowment of capital and skilled labor. Conversely, Levchenko (2013) examines the effect of international trade on economic institutions. He builds upon the incomplete contract literature of Williamson (1985) and Grossman and Hart (1986). In his framework, when countries share the same technology, trade leads to a 'race to the top' in institutional quality. Countries improve institutions as a result of trade opening if doing so allows them to retain or attract the institutionally-dependent sectors. Levchenko (2013) employs the Frankel and Romer (1999) methodology of using exogenous variables to predict countries' export patterns, combining this with the Nunn (2007) index of institutional intensity at the industry level, to estimate a predicted institutional intensity of exports. A high value in this measure implies that a country is expected to export more in sectors that rely on institutions, while low values imply the opposite.

In most of the empirical work analyzing the causal effects of institutions and international trade, indexes have been formed to capture the quality of institutions related to the inputs used in the production processes of the respective final goods. The basic idea revolves around the issue of hold-ups and relation-specific investments (Klein et al. 1978; Williamson 1979, 1985; Hart et al. 1990). However, there are also other institutions that matter for creating comparative advantages for exports. For example, Yeaple and Golub (2007) find, indirectly, that transportation and communication infrastructure are both important and affect comparative advantage. Beck (2003) and Manova (2005) examined institutions associated with financial development. Others have studied labor-market institutions affecting comparative advantage (Costinot 2009; Cunat and Melitz 2012; Davidson et al. 1999; Helpman and Itskhoki 2010). Furthermore, Essaji (2008) finds empirically that less developed countries, with limited human resources and bureaucratic capital, have a comparative disadvantage in the production of goods that are heavily subject to technical regulations.

There are also socio-economic and political sources of comparative advantage for exports which have not been captured in theoretical and empirical models of institutions and international trade. For example, in the presence of socio-political obstacles to trade, a country could have a high institutional intensity of exports (demonstrating how easy it is for a country to export in an institutionally intensive sector) and, despite lack of institutional weakness in the respective sectors, a country would still not realize its trade potential, and its pattern of trade would be different from the predicted one.

Most empirical work on international trade and institutions involves multi country cross-sectional analysis, and the conclusions regarding patterns of trade are drawn accordingly. However, at an individual level, some countries conduct trade heterogeneously with their partners as a matter of policy. This differential treatment may be the result of historical developments, geo-politics, or other factors. Therefore, due to the presence of the socio-economic and political obstacles to trade, some products may lose their comparative advantage, as just described. The resultant pattern of trade is thus different from the multi country cross-sectional pattern partly due to the high transaction costs involved in the movement of goods between specific countries where these unique factors matter.

An example of this would be that Pakistan has not given Most Favoured Nation (MFN) status to India and conducts its trade with India using a negative list approach. Appendix G of Import Policy Order 2012-15 bans 1,209 items on the HS 8 digit level. Similarly, trade for 137 items is only allowed through one land route at Wagah border crossing point. There is clearly a political obstacle to trade. Even at Wagah, there are non-tariff barriers (NTBs) in the form of loading and unloading restrictions on both sides of the border and regulatory requirements for the movement of goods across the border. All of these barriers to trade obstruct the realization of export potential by affecting the comparative advantage of the products.

Even if improvements are made in the critical institutions (property rights, contract enforcement, and others) captured in the institutional indexes of the international trade and institutions literature, the Pakistan-India pattern of trade would remain different from projections unless the political obstacles to trade are removed. Similarly, Pakistan's

bilateral trade with the Central Asian Republics (CARs) is constrained due to the non-signing of certain conventions.[1] CARs are landlocked countries, and not signing these conventions hampers the movement of goods across borders resulting in extra costs and limiting the use of trade instruments. Resultantly, the comparative advantage of the goods is lost, and actual trade remains much below the potential trade.

Following Kalirajan and Singh (2007) and Miankhel et al. (2014), this paper employs the Stochastic Frontier Gravity Model (SFGM) methodology and empirically investigates the presence of institutional, socio-economic, and political obstacles to trade that affect the realization of Pakistan's export potential and its pattern of trade.[2] Aggregate trade data for the periods 2006-08 and 2009-11 is shown to indicate demand-suppressing effects emanating from the global financial crisis (GFC) and supply-suppressing effects emanating from energy shortfalls and input constraints, due to floods, in Pakistan in the latter period. The model estimation for total exports then shows that behind the border constraints in Pakistan were statistically significant during 2009-11. The estimation is also presented for four single-digit SIC categories of products for this period. Behind the border constraints are evident for SIC 0 (agriculture, forestry and fish products) and SIC 2 (manufactured products) that combined account for approximately 80 percent of Pakistan's exports. The estimation results by country further demonstrate that behind the border constraints affect the pattern of trade through the non-realization of bilateral trade potential in some cases, and we can predict an exporting pattern that could be achieved by reducing transaction costs and institutional rigidities through policy measures.

The organization of the paper is as follows. The second section presents an initial summary of Pakistan's export profile and its trade regime, while the third section presents the empirical methodology of the SFGM. The fourth section exposits the data sources, and the estimation results are presented in the fifth section. Additional discussion of the results, focused on differences in Pakistan's bilateral trade performance compared to estimated potential, is given in the sixth section. The final section provides a summary and the overall conclusions from the study.

PAKISTAN'S TRADE PROFILE AND REGIME

Pakistan's total nominal exports in 2013 were approximately US$ 25.12 billion, and these were highly concentrated in a few sectors, namely agriculture, textiles, and clothing which amounted to over three-fourths of Pakistan's total exports. The combined share of these products has remained the same since 2007, however, within this group, certain changes in proportions have been observed. For example, the share of agriculture has risen due to an increase in crop yields, while the shares of textiles and clothing has decreased (WTO 2015). In 2013, manufacturing products constituted 73.6 percent of exports, agriculture constituted 22.1 percent, and mining products 4.2 percent. In manufacturing, the share of textiles was approximately 37.2 percent, with clothing representing 18.1 percent, other semi-manufactures (cement, jewelry and others) 6.4 percent, other consumer goods 6 percent, chemicals 4.4 percent, and machinery and transport equipment 1.5 percent. Within agricultural products, rice had a share of 8.1 percent of exports, while the rest of the agricultural products had a share of 14 percent (WTO 2015).[3]

[1] In order to promote use of trade instruments and facilitate road transport between Pakistan and CARs, UNESCAP have shortlisted seven following conventions which are most important in this regard.

1. Convention on Road Traffic 1968 * (Acceded by Pakistan)
2. Convention on Road Signs and Signals 1968 * (Acceded by Pakistan)
3. Customs Convention on the International Transport of Goods under cover of TIR Carnet 1975 ** (Signed by Pakistan but not yet accepted by the UN due to reservations in the submitted document)
4. Customs Convention on the Temporary Importation of Commercial Road Vehicles 1956
5. Customs Convention on Containers 1972
6. International Convention on the Harmonization of Frontier Control of Goods 1982
7. Contract for the International Carriage of Goods by Road (CMR) 1956

The most relevant one for transit traffic is TIR Carnet 1975. "TIR" stands for 'Transports Internationaux Routiers," which is French for "International Road Transport' (Khan 2005).

[2] Shiro (2007) surveyed the literature on gravity models of trade and explained the use of the SFGM for estimating trade restrictions and overcoming some of the short comings of conventional gravity models. Ravishankar and Stack (2014), Kalirajan and Findlay (2005), and Drysdale et al. (1997) also used SFGM for estimating potential trade.

[3] Product composition of merchandise trade for 2013 was taken from Trade Policy Review 2015 for Pakistan (WT/TPR/S/311.Pakistan). Product composition was based on SITC Rev.3 and were calculated on free on board (f.o.b) values.

In terms of UNCTAD 'stages of processing classification', in 2013 consumer goods accounted for 53.84 percent of Pakistan's exports, intermediate goods 33.07 percent, while raw materials and capital goods were 10.15 percent and 2.81 percent respectively (UNCOMTRADE). Within the Standard International Trade Classification (SITC), Pakistan's export profile by product composition in 2013 was textiles and clothing (54.42 percent), vegetables (14.21 percent), food products (5.07 percent), hides and skins (5.07 percent), minerals (3.42 percent), animal (2.87 percent), miscellaneous (2.79 percent), metals (2.13 percent), fuels (2.1 percent), stone and glass (2.0 percent), plastic or rubber (1.86 percent), chemicals (1.59 percent), machinery and electrical (1.17 percent), wood (0.5 percent), foot-wear (0.44 percent) and transportation (0.36) (UNCOMTRADE).

Pakistan's largest export markets continue to be the EU(28) followed by the United States (USA) and China. In 2013, 25 percent of exports were destined for the EU(28). Moreover, one half of Pakistan's exports go to only six countries: the USA (14.91 percent), China (10.56 percent), Afghanistan (7.95 percent), the UAE (7.07 percent), the UK (5.7 percent), and Germany (4.3 percent). More than one third of exports go to the USA and EU alone (WTO 2015). As more than half of Pakistan's exports are cotton and cotton manufacturing based, the Multi Fibre Agreement (MFA) and subsequent WTO Agreement on Textile and Clothing (ATC) provide a largely guaranteed market for these products, which helped in developing these markets. From January 1st, 2014, two thirds of all product categories in the export basket of Pakistan are benefiting (zero tariff) under the EU Generalized System of Preferences (GSP) scheme called GSP+. In addition, more than 78 percent of Pakistan's exports enter the EU at preferential rates (EC 2015). Additional data characterizing Pakistan's trade is presented in the analysis below.

Four countries contributed 80 percent of the remittances to Pakistan during 2013-14 (Pakistan Economic Survey 2013-14): Saudi Arabia, the UAE, the USA, and the UK. Many Pakistani immigrants have settled in these countries, and they are now also markets for Pakistani exports. In 2010, Pakistan and Afghanistan signed the Afghan Pakistan Transit Trade Agreement (APTTA) that allows duty free transit of goods through Pakistan via land routes and sea ports for exports and imports. To further promote bilateral trade, and minimize informal trade, the APTTA was updated in 2013. However, the agreement does not permit India to transit goods through Pakistan for export to Afghanistan. Pakistan intends to extend the APTTA to Tajikistan and has proposed a Pakistan Afghanistan Tajikistan Transit Trade Agreement (PATTTA). The proposed agreement could bring Pakistani goods closer to the Eurasian Economic Union (EAEU).[4] Pakistan trade seems to be more elastic to trade frictions than world averages. In the case of Pakistan, sharing a border (contiguity) appears to create costs for exports; exporting to neighboring contiguous country bears twice the cost of exporting to non-contiguous markets (Reis and Taglioni 2013).

Despite considerable potential in Pakistan's economy, high costs of doing business, complex regulations, and infrastructure bottlenecks have a detrimental effect on trade and growth (EC 2015). Pakistan's trade performance in recent years has deteriorated as indicated by the decline in its trade (sum of exports and imports) to GDP ratio over the last five years.[5] The trade to GDP ratio decreased from 32.07 in 2009 to 31.56 in 2013 (WITS, World Bank). In 2012, Pakistan had the highest trade share[6] with ASEAN+3 (30.55) followed by the Middle East (29.71), the EU (13.52), North America (7.69), SAARC (7.16), Africa (3.63), Central and West Asia (2.93) and Latin America (1.27) (ARIC ADB). Trade share with the EU and North America are low even though both are major export markets for Pakistani products. Pakistan has the highest trade intensity index[7] with the Middle East (5.74). The trade intensity with other regions, in declining order, are Central and West Asia (3.55), SAARC (2.88), ASEAN+3 (1.24), Africa (1.19), North America (0.54), European Union (0.41) and Latin America (0.20) (ARIC ADB). Pakistan's trade intensity with North America and the EU is low because other countries in the world on average trade more with these regions than Pakistan.

[4] Treaty establishing Eurasian Economic Union, comprised of Russia, Kazakhstan and Belarus came into force on 1 January 2015. Armenia joined the Union on 2 January 2015 and Kyrgyzstan is expected to join it in May 2015. Talks are also underway for Tajikistan joining the EAEU. Thus, PATTTA could facilitate movement of Pakistani goods to a single market with a population of approximately 180 million.

[5] Trade to GDP ratio demonstrates openness to foreign trade and economic integration. In 2013, countries such as Singapore and Malaysia had merchandise trade to GDP ratios of 358 percent and 154.4 percent, respectively. Relationship between trade openness and per capita income is concave (WITS, World Bank). Because of the intra-industry trade, both Singapore and Malaysia have high trade to GDP ratios.

[6] Trade share is the percentage of trade with a partner to total trade of a country. A higher share indicates a higher degree of integration between partner countries/regions.

[7] Trade intensity index is the ratio of trade share of a country/region to the share of world trade with a partner. It indicates whether a reporter exports more, as a percentage, to a partner than the world does on average. It is measured as country i's exports to country j relative to its total exports divided by the world's exports to country j relative to the world's total exports . An index of more than one indicates that trade flow between countries/regions is larger than expected given their importance in world trade.

Pakistan applies preferential tariffs to products from China, Iran, Malaysia, Mauritius, Sri Lanka, and South Asia Free Trade Agreement (SAFTA) members. These preferential rules of origin (ROO) incorporate various value addition, change in tariff classification, and product specific criteria under various agreements which increase the complexity of Pakistan's trade regime with ramifications for transparency and predictability. In addition, Pakistan bans all imports of Israeli origin in addition to its restrictions on India mentioned above (WTO 2015). Complex regulatory duties set in place to protect domestic producers from import competing products may be a source of trade diversion costs. Countries having signed PTAs with Pakistan are exempt from regulatory duties, and therefore high cost producers in Pakistan, as well as in preferential supplying markets, are protected (Pursell et al. 2011). Shallow PTAs such as SAFTA are limited to market access only and are unlikely to bring large benefits for exports. It may lead only to deepening current exports to existing markets. However, significant trade creation effects are more likely to originate from the implementation of agreements with China and Malaysia due to the deeper nature of these agreements (Reis and Taglioni 2013).

Pakistan still uses ad hoc trade policy instruments despite its focus on promoting private sector investment and export led growth, undermining the predictability of its trade regime. The high degree of overall protection still favors import substitution which reduces efficient utilization of resources, export competitiveness, and diversification (WTO 2015). Tariff escalation and complexity of the tariff structure are reflected in the effective rates of protection (ERP). In contrast to nominal rates of protection (NRP), which are based on the protection of outputs only, ERPs present tariff generated transfers to producers (Reis and Taglioni 2013). Tariffs remain the main trade policy instrument and generate approximately one fifth of Pakistan's total government revenue. In 2007/08, there were 29 different applied rates (seven main bands) and virtually all tariff rates (99.4 percent) were ad valorem. The simple average Most Favoured Nation (MFN) applied rate in 2007/08 was 14.5 percent. This was less than in 2001/02 (20.4 percent) but slightly exceeded the 2005/06 level of 14.4 percent (WTO 2008). In 2014/15, the average MFN applied tariff was 14.3 percent which is marginally lower than the 2007/08 level.

The least tariff-protected sector is mining (6.7 percent), followed by agriculture (8.7 percent), and manufacturing (14.8 percent). Approximately one-third of Pakistan's applied MFN tariff rates are at 5 percent, one fifth at 25 percent, and slightly more than 1 percent are over 50 percent (WTO 2015). Moreover, Pakistan's tariffs display significant positive escalations that can be attributed to industrial policy designed to protect domestic manufacturing. The positive escalations follow from first stage processed products (average tariff of 7.8 percent), to semi-finished goods (average 10.9 percent), and fully processed products (average 17.6 percent) (WTO 2015).[8] In Pakistan, a high anti-export bias remains in the trade regime despite trade reforms. Overall, this bias has arisen due to trade taxation (both imports and exports), tariffs on domestically produced goods, tariffs on imported inputs used in the production of exportables, and an overvalued exchange rate (Safiya 2007).

Since 2006-07, there has been an increase in the maximum level, dispersion, and complexity of Pakistan's custom duties. In 2008, regulatory duties were imposed on top of custom duties. Antidumping duties started minimally in 2002 and have expanded rapidly since 2008-09 (Sanchez-Triana et al. 2014). For this and other reasons, Pakistan's tariff regime is complex, discriminatory, and lacks transparency. This affects any analysis of the level and structure of Pakistani tariffs. This complexity is in part due to the provision of exemptions and partial exemptions through the issuance of Statutory Regulatory Orders (SROs). The government has the authority to apply tariff exemptions/concessions and add or modify import rules. The Federal Board of Revenue (FBR) issues SROs after approval from the Economic Coordination Committee (ECC) of the Cabinet (WTO 2015). Exemptions and partial exemptions provided to industries through SROs are the main source of deviation from MFN rates. SROs do not affect the duty rates shown in the customs schedule. The specific applications sometimes violate the principles of non-discrimination and national treatment. Some SROs even exempt certain specific products from sales and other taxes along with the rules and ordinances usually affecting imports. Sometimes there is so much information asymmetry, and so many complications, that certain items may be covered under multiple SROs.

[8] Pakistan MFN tariff comprises 7,018 lines out of which 97.9 percent (6,868) tariff lines are bound. With the exception of 47 tariff lines (mostly vegetable oils, silver and gold, cellular mobile phones that carry a specific tariff), all lines are ad valorem. In addition, Pakistan operates no MFN tariff quotas (except in case of FTA with Sri Lanka). In 2007/08, some 400 duty free tariff lines were registered but 2014/15 tariff structure reveals that Pakistan no longer has duty free tariff lines. All of these tariff lines have been increase to 1 percent.

By confining regulation to selected sectors, the SRO- exemptions operate as a *de facto* licensing scheme (WTO 2015). Due to opaque tariff escalations and increasing effective rates of protection, these measures create uncertainty in resource allocation which may reduce a country's production frontier through the inefficient utilization of resources.[9] In addition, the pattern of protection in Pakistan discourages production of high value added goods in Pakistan. Sectors with higher effective protection have incentives to produce low value added items and also tend to be domestic oriented, which demonstrates an inherent bias against export competing sectors (Reis and Taglioni 2013). Moreover, the rapid growth of remittances and concessionary development assistance has resulted in the building up of reserves while maintaining large trade deficits. And the exchange rate management stance has resulted in consumption led growth, appreciated the equilibrium exchange rate, and may be contributing to the 'Dutch Disease' problem of declining international competitiveness of manufactured exports (Acosta, Lartey and Mandelman 2007a, 2007b; Montiel 2006).

Pakistan bans imports of certain products for health, safety, security, moral, and environmental reasons. No licenses are required in terms of Article 1.1 of the Agreement on Import Licensing Procedures for the import of products. However, specific authorizations and No Objection Certificates (NOC) are required for the import of products listed in the Appendices B and C of Import Policy Order 1950 (WTO 2015).

Similarly, even though no export taxes are permitted, the FBR may impose regulatory duties of up to 100 percent on exports by notification without parliamentary approval. Even though it is argued that these measures are used to ensure food security, which is one of the policy objectives of the government, these export duties implicitly subsidize the consumption of affected items by lowering prices. Furthermore, with regards to export licensing and restrictions, exports of certain items are permitted only if certain conditions are met. For example, the export of rice is subject to conditions and procedures specified by the Ministry of Commerce. Similarly, cotton can be exported only after export contract registration with the Trade Development Authority of Pakistan (TDAP) and a classification certificate is issued by the Pakistan Cotton Standards Institute. Pakistan bans the export of wheat and the export of fertilizer, while allowing the import of fertilizers only through the Trading Corporation of Pakistan (TCP) in the case of shortfalls.

METHODOLOGY

Previous studies have defined the difference between observed exports and the relevant predicted values as potential exports. When an OLS estimation of the gravity equation is applied to find trade potential (for example, Baldwin 1994; Nilsson 2000) between a pair of countries, the estimation procedure produces estimates that represent the centered values of the data set. However, potential trade refers to open and frictionless trade between countries. Thus, for policy purposes, it is sensible to define potential trade as the maximum trade that can occur between any two countries which have bilaterally liberalized trade regimes given the conventional determinants of trade (size of the trading countries, the geographical distance, etc.). This means that the estimation of potential trade requires a procedure that represents the upper limits of the data and not the centered values of the data set (Kalirajan 2007).

In addition, if we consider the conventional gravity model, it is also arguable that trade costs are dependent not only on geographical distance between countries but also on other factors emanating from the existing infrastructural, institutional, socio-economic, and political rigidities in both exporting and importing countries. These latter costs are defined as 'economic distance' in the literature (Anderson 1979). Thus, the conventional gravity model given above has omitted this potentially important explanatory variable. Furthermore, this inherent omitted variable bias is overlooked by OLS estimation.

In simpler language, omission of the economic distance term leads to heteroskedastic errors which results in bias in the estimation of the model parameters. The log-linearization of the empirical model in the presence of heteroskedasticity leads to inconsistent estimates because the expected value of the logarithm of a random variable depends on higher-order moments of its distribution (Silva and Tenreyro 2003). Also, it affects the normality assumption of the error term (Matyas 1997). As a result, an OLS estimation will lead to biased results (Kalirajan 2007).

[9] On 26 June 2014, the government imposed regulatory duty of 5 percent through SRO 568 (I)/2014 on some 284 products. Agriculture and food products have also been subject to exemptions through various SROs, such as potatoes, raw poultry meat, several milk products, raw and ginned cotton, leather and articles thereof.

Following Kalirajan (2007) and Miankhel et al. (2014), the gravity equation for exports can be estimated alternatively as:

$$\boldsymbol{Ln\ X_{ij} = Ln\ f\ (Z_j\ ,\ \beta)\ exp^{(v_i - u_i)},} \qquad (1)$$

where the term X_{ij}represents the actual exports from country i (Pakistan in this study) to country j. The term $f(Z_j, \beta)$ is a function of the determinants of potential bilateral trade Z_j, which include distance, GDP, and population to represent supply and demand conditions, and β is a vector of unknown parameters. The inclusion of the composite error term in the above gravity equation, which accounts for the impact of other unobservable variables influencing exports costs, is to remove the bias that is inherent in the conventional gravity model.

To estimate equation (1), the stochastic frontier framework is used. The SFGM recognizes that there are 'behind the border constraints' and 'beyond the border constraints' to exports. The latter can be divided into explicit beyond the border constraints, which are observable, and implicit beyond the border constraints, which are not observable. Explicit beyond the border constraints, for example, can be measured from the applied tariffs of importing countries (Kalirajan and Singh 2007; Miankhel et al. 2014). Implicit beyond the border constraints, which emanate from institutional weaknesses and policy rigidities existing in the importing countries, are difficult to measure and are considered as given. However, Miankhel et al. (2014) address this issue and highlight that implicit beyond the border constraints affect the exporting countries uniformly. Through the trade balance relationship equation in Anderson's (1979) theoretical framework for the gravity model, the implicit beyond the border constraints would affect, and may probably reduce, planned expenditures in exporting countries if the exporting countries are not taking measures to overcome these constraints through conforming to, or initiating, certain measures for becoming more efficient.

In order to overcome implicit beyond the border constraints, and to maintain their market shares or realize their export potential, exporting countries need to become more efficient by removing behind the border constraints. Behind the border constraints put additional transaction costs on the smooth flow of goods. These costs include institutional costs stemming from the inefficient prevalent practices in the institutions, regulatory and legislative costs, equipment and training costs, and political costs due to the inability to take on trade facilitation measures due to geostrategic interests. Specific behind the border measures could range from product standards and conformity assessment measures, business facilitation, and trade financing, to hard (physical) and soft (regulatory) infrastructure including efficient transport links and logistics and poor governance in the regulatory institutions. Behind the border constraints could also be due to the retention of imperfect institutions, caused by rent seeking agents through lobbying, and resistance from the elite towards introducing institutional innovations. In addition, these costs could come from the stance of certain institutions aimed at achieving policy objectives.

Following the methodology given above, behind the border constraints and explicit beyond the border constraints are included within the gravity equation in the form of μ_i and trade weighted effective applied tariffs, respectively.

$$\boldsymbol{Ln\ X_{ij} = Ln\ f\ (Z_j\ ,\ \beta)\ exp^{(tarrif + v_i - u_i)},} \qquad (2)$$

The single sided error term, μ_i is the exporting country's share of the economic distance bias, referred to by Anderson (1979), which is due to the influence of the behind the border constraints. This bias, which is country-specific to the exporting country for each importer, creates the difference between actual and potential trade between the exporting and importing countries concerned. It is difficult to get full information on all behind the border constraints that exist within the exporting country. Nevertheless, drawing on Kalirajan and Singh (2007), the combined effect of these constraints can be modelled by the random variable μ_i that takes values between 0 and 1 and is usually assumed to follow a truncated (at 0) normal distribution, $N(0, \sigma_\mu^2)$. When μ_i is 0, this indicates that the constraints are not important, and the actual exports and potential exports are the same (assuming there are no statistical errors). When μ_i takes a value other than 0 (but less than or equal to 1), this indicates that the constraints are important, and they constrain actual exports from reaching potential exports. Thus, the term μ_i, which is bilateral observation-specific, represents the bias that is a function of the behind the border constraints within the exporting county's control. Unlike the conventional approach, this method of estimating the gravity model does not exclude the influence of economic distance bias on trade flows between two countries.

The error term v_i captures the influence of omitted variables on trade flows and implicit beyond the border factors, in addition to measurement errors that are randomly distributed across observations in the sample. Implicit beyond the border constraints are not controlled by exporting countries, and it is assumed that these are randomly distributed, affecting the exporting countries uniformly. The random distribution of v_i also implies efficient, conforming exporting countries could gain market share at the expense of less efficient countries in specific product markets in the importing country. The model formulation supports the assumption that v_i is a double sided and is usually assumed to be $N(0, \sigma_v^2)$.

With the stochastic framework followed in this analysis, in some cases when $v_i > 0$ due to favourable external developments, it is possible that actual exports exceed estimated potential exports. For such situations, the results need to be interpreted as the realization of Pakistan's export potential. Moreover, measurement errors could also lead to these situations. For example, there is a large statistical discrepancy in the case of reported bilateral trade between Pakistan and Kazakhstan. As per the statistics of Pakistan, the value of bilateral trade between Pakistan and Kazakhstan amounted to US$ 19 million in 2012. Kazakhstan reported a value of bilateral trade worth approximately US$ 35 million in 2012. Even if transportation lags are taken into account, this is big difference. One of the reasons for this measurement error is that Pakistan's major trade routes to Kazakhstan pass through Afghanistan. Due to the multimodal transport system, some of the difference in the statistics may be reflected in Pakistan's exports to Afghanistan. As Pakistan has not yet fulfilled the requirements of the TIR Carnet Convention, while Afghanistan and other CARs have, after the exporters bring their goods into Afghanistan they usually will avail a TIR facility, as their goods have to pass through other CARs to arrive in Kazakhstan. TIR Carnet facilities help them in avoiding customs hassles at border crossings, and this is the most widely used method for transporting goods across CARs. There is the possibility of measurement errors in such situations.

Actual exports may also be different from potential exports due to measurement errors emanating from alternative trade institutions that have evolved over time due to the weakness of formal contracting institutions. Nathan and Trefler (2013) argue that these may deal with hold-up problems and could take the form of repeat relationships, ethnic networks, culture, and vertical integration. For example, repeated interactions could lead to the creation of non-kin-based networks that act as a substitute for legal contract enforcement and also help in sharing risk and pooling information. In this case, it would have an export-enhancing effect. Conversely, these alternative institutions are not without costs, as they may create barriers to entry and, when old partnerships become less productive, may result in inefficiencies. Gould (1994), while explaining trade with the USA, finds positive a correlation between the presence of immigrant populations from a particular country and trade with that particular country. Nathan and Trefler (2013) further state that if there are underinvestment problems due to hold-up, and for example, if both parties underinvest, then this problem could be alleviated by allocating control to one party or the other. Therefore, vertical integration provides an additional tool to alleviate underinvestment. For example, in multinationals this decision could involve whether to incentivize the headquarters or supplier, with the final decision affecting the pattern of trade from a particular country.

To estimate a SFGM, maximum likelihood methods can be applied to either cross-sectional or panel data to verify how important behind the border constraints are in limiting exports from their potential. In addition, estimating with this methodology also demonstrates whether total variations from the mean in the potential exports, given as $\sigma^2 = \sigma_v^2 + \sigma_\mu^2$, are due to random factors σ_v^2 or country-specific behind the border constraints σ_μ^2. The gamma coefficient (γ) captures the total variation in the model due to the influence of country-specific institutional, socio-economic, and political factors that constitute the behind the border constraints to exports. This is given as $\gamma = \sigma_\mu^2/\sigma^2$. A large size and significance of gamma imply that country-specific behind the border constraints are responsible for a large proportion of the mean total variation in the model.

ESTIMATION PERIODS AND DATA

The empirical analysis for Pakistan has been undertaken separately on two data sets for the periods 2006-08 and 2009-11. The second period isolates the demand effects caused by the GFC and the supply effects from energy shortages and floods in Pakistan. The GFC started with the fall of Lehman Brothers in the latter part of 2008, but it had a lagged effect on the exports of developing countries. In 2009, growth in the world trade volume of goods fell by 11.8 percent compared to 2008 in which the world experienced a positive trade volume growth of 2.4 percent. In nominal terms, world exports of goods amounted to US$ 12,285 billion in 2009 against US$ 15,859 billion in 2008. Similarly, the volume of trade in goods from emerging and developing economies declined by 9.1 percent in 2009, compared to an

increase of 3.9 percent in 2008 (IMF 2010). Moreover, the GFC triggered protectionist sentiments among importing countries, and they resorted to trade restricting measures.[10] Countries relying on trade as a primary means of growth were affected, and Pakistan experienced a drop in nominal and real exports in 2009 (Table 1).

Table 1: Pakistan's Exports to the World 2006-2011 (US$ Million)

Pakistan Exports	Year	Nominal Exports	Deflated Exports, Constant 2005 Dollars		
			Annual	Mean 2006-08	Mean 2009-11
Total	2006	16,806.29	16,195.85		
	2007	17,185.96	15,903.99	15,396.78	
	2008	19,887.69	14,090.50		
	2009	17,312.89	11,288.32		
	2010	20,987.21	11,558.86		11,465.13
	2011	25,138.70	11,548.19		
Agriculture, Forestry and Fishery Products (SIC 0)	2006	408.15	393.33		
	2007	518.48	479.80	434.61	
	2008	607.92	430.72		
	2009	725.99	473.36		
	2010	817.95	450.49		613.44
	2011	1,995.00	916.46		
Mineral Commodities (SIC 1)	2006	870.04	838.44		
	2007	1,082.57	1,001.81	931.49	
	2008	1,346.80	954.21		
	2009	823.56	536.97		
	2010	1,407.59	775.24		670.43
	2011	1,521.80	699.08		
Manufactured Commodities (SIC 2)	2006	13,470.58	12,981.30		
	2007	13,330.30	12,335.95	11,988.02	
	2008	15,027.18	10,646.81		
	2009	12,965.14	8,453.51		
	2010	15,651.74	8,620.31		8,476.91
	2011	18,191.77	8,356.92		
Manufactured Commodities not identified by Kind Commodities (SIC 3)	2006	2,002.81	1,930.06		
	2007	2,199.95	2,035.85	1,995.79	
	2008	2,853.16	2,021.47		
	2009	2,732.41	1,781.58		
	2010	3,004.48	1,654.74		1,643.55
	2011	3,252.91	1,494.32		
Other Commodities (SIC 9)	2006	55.78	53.75		
	2007	56.75	52.51	48.23	
	2008	54.23	38.42		
	2009	67.31	43.89		
	2010	106.64	58.73		61.51
	2011	178.31	81.91		

Source: UNCOMTRADE

Since 2009 onwards, Pakistan has been experiencing severe energy shortfalls and, as a result, industry has faced long power outages when compared to the 2006-08 period of analysis. Energy shortfalls during 2009-11 affected

[10] WTO in its report on G-20 Trade Measures (June 2014) states that 1,185 trade restrictive measures have been recorded since October 2008 and by May 2014, 934 measures are still in place. There has been continuing upward trend in the addition of new measures. Import restrictive measures are estimated to cover 4.1 percent of world merchandise imports and around 5.2 percent of G-20 imports. All these measures are implicit beyond the border obstacles to trade and affect negatively on the demand side of the respective products.

the overall exports production possibility frontier in Pakistan. Due to long power outages, some textile firms have thought of relocating their units overseas, illustrating the severity of these shortfalls. Uncertainty in provision of electricity is a physical constraint that has an institutional dimension. When an industrial unit is set up, its management enters into a contract with the electricity supplier for an uninterrupted supply of electricity. Based on its contract, the management takes export orders, hires the requisite staff, and buys raw material to meet the orders. But when the electricity supplier stops delivery to the industry, management is left with no choice but to stop the production process and incur losses in both fixed and variable costs. In Pakistan, most of the transmission and distribution of electricity is by state owned entities. Management cannot enforce its contract for the supply of electricity. This reflects an institutional weakness in a key sector of economy. Due to electricity shortages Pakistan is incurring annual losses of approximately 4 -7 percent of GDP (WTO 2015).

Pakistan also experienced widespread floods in 2010 which resulted in almost 20 percent of agricultural land being inundated. The now-defunct federal Ministry of Food and Agriculture reported that, due to floods, Pakistan lost half a million tonnes of wheat, 1.6 million tons of rice paddy, 7.6 million tonnes of sugarcane, and 2-3 million bales of cotton. Crops losses were estimated at US$ 2.8 billion, 15-20 percent of their total output. Major gas fields and four power plants were also shut down adding a loss of 1,500 megawatts to an already existing shortfall of 4,500 megawatts (Miankhel and Nasir 2010). Floods also create a situation that could expose the weakness of contract enforcing institutions. For example, commodity exchanges are not fully developed in Pakistan, and cotton is mostly supplied to the spinning mills through informal contracts and middlemen. As the cotton crop was damaged during the 2009 floods, due to absence of formal contract enforcing institutions only informal channels were left to enforce the contracts for the supply of cotton, affecting the industrial activity in the textile sector. Absence of contract enforcing institutions depicts an institutional weakness and also shows how a drop in agricultural production will have spillover effects into the industrial sector.

The bilateral data for Pakistan's exports for the 2006-08 and 2009-11 periods were retrieved from the United Nations Commodity Trade Statistics (UN COMTRADE) database. The Gross Domestic Product (GDP), population data, as well as GDP deflators for the analysis were obtained from the World Bank's World Development Indicators (WDI). For product-classification models that were estimated, the goods deflators have been taken from the International Financial Statistics (IFS) database of the International Monetary Fund (IMF). The GDP for each country for each year, and Pakistan's bilateral exports values, have been deflated to 2005 constant prices. The trade-weighted, effective applied tariff rates have been downloaded from the Trade Analysis and Information System (TRAINS) using World Integrated Trade Solutions (WITS World Bank). The bilateral, population weighted distances are in kilometers and have been downloaded from the Mayer and Zignago (2011) working paper in GeoDIST at Centre d'Etudes Prospectives et d'Informations Internationales (CEPII).

The model is estimated at the aggregate level for both periods. For the period 2009-11, an estimation is also undertaken for broad product classification based on the codes of Standard Industrial Classification (SIC, see Appendix Table A1). Accordingly, estimates are provided for agriculture, forestry, and fishery products (SIC 0), mineral products (SIC 1), manufactured products (SIC 2), and manufactured products not identified by kind (SIC 3) for the later period. The pattern of trade is different for each category of products. Data for estimation has been retrieved for only those countries to which Pakistan was exporting its products in each category during 2009-11; zero observations data points are not incorporated in the analysis.

All the variables in the model are in natural logs except tariffs. Data for the periods 2006-08 and 2009-11 have been averaged to deal with the non-stationary values and to remove specific-year bias. Computer software FRONTIER 4.1 was used to estimate the SFGM (Coelli 1996).

ESTIMATION RESULTS

The results from the SFGM (equation 2) are presented in Table 2. During 2006-08, when there were no demand effects due to the GFC nor supply constraints in Pakistan due to energy shortages and floods, SIC 2 was 77.86 percent of total real exports, SIC 3 was 12.96 percent, SIC 1 was 6.05 percent, and SIC 0 was 2.82 percent. Pakistan's total real exports during 2006-08 were approximately US$ 15.4 billion, dropping to approximately US$ 11.5 billion during 2009-11.

Shares of total exports during 2009-11 were 73.94 percent for SIC 2, 14.33 percent for SIC 3, 5.85 percent for SIC 1, and 5.35 for SIC 0.[11]

The estimation results demonstrate whether the variation from the mean in the potential exports is due to random factors (σ_v^2) or due to behind the border constraints (σ_μ^2). The significance and level of γ reflects the presence of institutional, socio-economic, and political constraints in Pakistan which are obstacles to exporting and impose transaction costs on traders.

Table 2: Estimation Results of the Trade Stochastic Frontier Gravity Model

Dependent Variable	Total Exports	Total Exports	Agriculture, Forestry and Fishery Products	Mineral Products	Manufactured Products	Manufactured Products not Identified by Kind
	2006-08	2009-11	2009-11			
			SIC 0	SIC 1	SIC 2	SIC 3
Constant	6.96***	10.344***	24.14***	21.18***	14.8***	9.96***
	(1.97)	(1.78)	(2.78)	(5.50)	(1.46)	(2.26)
GDP	0.53***	0.51***	0.38*	0.25	0.41***	0.83***
	(0.09)	(0.10)	(0.20)	(0.19)	(0.07)	(0.09)
Population	0.16	0.21*	0.5***	0.58**	0.42***	0.18
	(0.11)	(0.12)	(0.19)	(0.21)	(0.12)	(0.11)
Tariff	-0.03	0.006	0.005	-0.06	-0.01	0.03
	(0.03)	(0.04)	(0.01)	(0.05)	(0.01)	(0.02)
Distance	-0.69***	-1.03***	-2.22***	-2.25***	-0.7***	-0.78***
	(0.18)	(0.18)	(0.34)	(5.50)	(0.16)	(2.26)
σ_v	1.14**	0.75**	1.06***	2.3**	0.43***	1.53**
	(0.08)	(0.18)	(0.45)	(0.20)	(0.22)	(0.09)
σ_u	0.03	1.27**	2.86**	0.04	2.91**	0.03
	(1.47)	(0.35)	(0.67)	(4.04)	(0.29)	(1.73)
σ^2	1.3**	2.18*	9.36**	5.3**	8.7***	2.33**
	(0.19)	(0.68)	(3.05)	(0.98)	(3.60)	(0.29)
γ	0	0.73**	0.87**	0	0.97**	0.04
Log likelihood	-148.74	-128.73	-167.67	-137.43	-229.45	-248.76
Wald chi2	140.6	148.75	77.75	30.61	147.73	220.78
Observations	96	87	82	61	120	135

Source: Author's estimation
Note: Missing data on tariffs limits the number of observations for total exports compared to SIC 2 and SIC 3 categories.

The estimation is first presented for Pakistan's total exports for the periods 2006-08 and 2009-11. The parameters of GDP and population of the importing countries, and distance from Pakistan, have the expected signs in both periods. The results for 2006-08 show that σ^2 is significant, but this variation in potential exports is due to random factors σ_v^2 only. In contrast, in addition to the previous parameters, the values of both σ_μ^2 and γ are not only large but also statistically significant for the period 2009-11. The significance and level of γ suggests that three-fourths of the estimated variations in Pakistan's potential exports with its trading partners were due to behind the border constraints in the latter period. The demand effects arising out of the GFC and supply constraints in the form of input shortages and energy shortfalls had a direct impact on the reduction of real exports. Indirectly, these conditions also made behind the border constraints show up in the estimation. This could be caused, for example, by institutional weaknesses for contract enforcement or lack of ability to meet the requirements of trade restrictive measures arising after GFC, although the specific effects cannot be isolated from the model results.

[11] Shares have been calculated based on real exports SIC classifications. Product shares are different from the product composition on page 2 because different a product classification has been used been used and calculations on page 2 are based on f.o.b values.

Tariffs are estimated to be insignificant during both estimation periods. A similar result was found by Mi-ankhel et al. (2014) in their analysis for exports of Australia. This repeated result may reflect limitations of the estimated model, since tariffs are found to be a significant determination of trade in many other studies. Insignificance of tariffs may also be explained in part because most countries have engaged in bilateral/regional and/or multilateral trade liberalization processes in the past decade, so tariffs are generally lower than in previous periods. However, use of implicit beyond the border constraints in the form of trade restrictive measures has increased, as discussed above, and NTMs have been found to have larger effects on trade than tariff barriers in more general studies (Kee, Nicita, and Olarreaga 2006). The non-tariff types of measures require extra costs in conforming to technical standards, and non-compliance constitutes a behind the border constraint in the exporting countries. There is the possibility that some private traders may try to avoid these types of technical barriers, and the costs involved in their compliance, by engaging in informal trade. In the case of Pakistan's trade with India, there are behind the border constraints on both sides, including delays in clearances and cumbersome procedures. There are also political obstacles such as the negative list approach already discussed. This may encourage traders to engage in informal trade to avoid all such measures.

The estimation at the total bilateral trade level is not fully informative for policy makers, as Pakistan is a labour intensive country. Therefore, for the 2009-11 period the estimation was undertaken for products at four single digit codes of SIC. Estimation was not undertaken for SIC 9 due to the low level of Pakistan's exports in that category (Table 1).

The parameters of GDP, population, and distance have the expected signs in all estimations (Table 2) at the broad product classification levels while tariffs remain insignificant in all estimations. The results suggest that Pakistan trades more in labour intensive manufactured products (SIC 2), and especially in manufactured products not identified by kind (SIC 3), with countries with high levels of GDP. In addition, SIC 2 and SIC 3 products are traded more with far away countries as compared to agriculture, forestry, and fishery products (SIC 0) and mineral products (SIC 1). The distance coefficients for SIC 2 and SIC 3 are approximately three times less than the distance coefficients for SIC 0 and SIC 1 products. Pakistan exports SIC 0 and SIC 1 products more to countries which are in close proximity and populous. Population is also significant in the case of SIC 2 products, and Pakistan exports more in these products to countries with large populations.

In terms of behind the border constraints, there are variations in the potential exports in all four estimation models at the single digit SIC classification levels with σ^2 significant in all the models. However, behind the border constraints due to institutions, socio-economic, and political factors are significant only in the case of SIC 0 and SIC 2 products. The γ coefficient is significant and close to 1 in both of these cases as well, showing that the transaction environment is not smooth in these two categories because of behind the border constraints.

In the case of SIC 1 and SIC 3 products, γ is insignificant. As described earlier, the SFGM estimation provides a procedure that considers the upper limits of potential trade and defines potential trade as the maximum trade that can occur between any two countries with bilateral liberalization given the conventional determinants of trade. Therefore, when the actual exports are below the potential trade, it indicates the presence of beyond the border and/or implicit behind the border constraints to trade. The realization of Pakistan's potential trade in SIC 1 and SIC 3 products is much better compared to SIC 0 and SIC 2 products by looking at ratio of actual to potential exports for different countries, as given in the appendix for the respective categories (and discussed in the section below). SIC 1 and SIC 3 products in the export basket of Pakistan are mostly raw materials (minerals, etc.) or semi-processed products (hides and skins, rubber products, etc.) and are less affected by country-specific behind the border constraints.

BILATERAL TRADE RESULTS

Based on the SIC single-digit empirical models in Table 2, potential trade has been calculated for each trading partner and is presented in Appendix Tables A2-A5. The comparison between actual trade and the potential trade for each country provides an estimate of the realization trade with the respective countries and the extent to which trade is limited by behind the border constraints. Discussion will focus on SIC 0 and SIC 2, where there is evidence that behind the border constraints have impeded Pakistan's exports.

The results for SIC 0 (Table A2) suggest that in this category, due to behind the border constraints to trade (except for the UAE with actual exports at 90% of estimated potential), Pakistan has not been able to realize its trade potential in its five other major markets (the USA, China, Afghanistan, the UK, and Germany). However, during the same period, Pakistan has been able to increase its exports by achieving its potential in the markets of Bangladesh,

Hong Kong, Indonesia, Kenya, Malaysia, Paraguay, Sri Lanka, Thailand, Vietnam, and Yemen. Realization of potential trade with India in SIC 0 is negligible, an empirical result that reflects the many obstacles to this bilateral trade.

In terms of regional trade with Kazakhstan, Uzbekistan, Turkmenistan, and Kyrgyz Republic, the realization of potential trade in SIC 0 products is also very low. These countries are landlocked countries and make extensive use of TIR Carnets and other conventions that facilitate the movement of goods through land routes. Pakistan has signed the TIR Convention, but it has not yet been accepted by the UN. Because of this, most of the trade instruments, such as Letter of Credit (L/C), cannot be extensively used for trading in the region. These trade instruments help in the movement of physical goods. Presently, most of the products in this category, for example mandarins and potatoes, are transported in open trucks from Pakistan to Afghanistan, and from that point onwards they utilize TIR Carnets. Therefore, there are many measurement errors in the regional trade statistics, as goods meant for export to CARs are reflected in Pakistan as exports to Afghanistan. However, exports to Afghanistan also show a relatively low realization of trade potential in Table A2.

In addition, exports of some other items, such as livestock, remained banned during the period 2009-11. This is another specific example that demonstrates that restrictive trade with India, banning exports, and the non-signing of the TIR Convention, as per United Nations (UN) requirements, are behind the border constraints to trade for Pakistan. As well, Pakistan has been unable to realize its trade potential with developed countries such as EU members, Australia, or Japan. Some of these developed countries increased technical barriers to trade after the GFC. Pakistan needs to raise its technical capacity to meet the regulatory burden it faces in these countries to realize its trade potential.

SIC 2 manufactured products (Tale A4) account for approximately three-quarters of Pakistan's total export profile. The empirical estimation suggests that behind the border constraints hamper Pakistan's realization of its export potential in important markets. The results show that Pakistan has been able to realize its full potential in three of its six main markets (the USA, Afghanistan, and the UAE) but not in most other traditional markets, nor in most non-traditional markets. Some of the products in SIC 2, such as pharmaceuticals, require high regulatory technical compliance, and Pakistan needs to develop institutional capacities to export these products to non-traditional markets. The performance of SIC 2 products is better in countries which are traditional markets and some countries where a sizeable number of Pakistanis live, for example, the USA, the UAE, Belgium, and, to a lesser extent, the Netherlands and the UK. Again, Pakistan has not realized its potential trade with India.

SIC 2 products are labour intensive, and exports could contribute significantly to job creation if efforts are focused on it. Policy makers need to create awareness regarding export culture, simplify procedures, and take other measures to reduce transaction costs for entrepreneurs who do not have the resources to internalize these negative externalities. The products included in this category can also help in the growth of small and medium enterprises (fruits and food products, meat products, food preparations, grain mill products, and others), but the existence of cumbersome procedures lead to potential exporters avoiding formal trading channels and engaging in informal trade.

In the other two categories (SIC 1 and SIC 3) the estimation results suggest that behind the border constraints to trade are not significant for Pakistan during 2009-11. The estimation results by country are shown Table A3 and Table A5, respectively. For SIC 1, Pakistan's realization of its potential is estimated to be phenomenally high in the main markets of Afghanistan, China, the UAE, and the UK, as well as in other traditional markets such as Italy, Japan, South Korea, Spain, and others. Behind the border constraints are estimated to be insignificant in the category of mineral products that are not consumer goods, which often face restrictions, nor are they intermediate products with characteristics that are exposed to different institutional obstacles.

In the SIC 3 category Pakistan is estimated to have well realized its potential in various countries including Afghanistan and the UAE among its main markets, as well as Comoros, Hong Kong, Guyana, Madagascar, Sri Lanka, Tanzania, Yemen, Former Sudan, and others. While behind the border constraints are not estimated to be significant, the methodology may be helpful in verifying statistical discrepancies with respect to countries where the ratio of actual exports to potential exports is very high. Sometimes governments introduce policies for the promotion of exports in non-traditional products and for making in-roads in non-traditional markets, one example is through freight subsidy schemes in Pakistan. The results from this methodology could help in the monitoring process of such scenarios.

CONCLUSIONS

Empirical estimation were carried out to investigate the presence of institutional, socio-economic and political behind the border constraints to trade in Pakistan for the periods 2006-08 and 2009-11. The presence of these constraints exerts a negative influence on the trading environment, as it entails high transaction costs. Furthermore, a comparison of the two periods is important as the global economy went into recession as a result of the GFC, triggering protectionist sentiments against imports. As the income of many countries decreased, importing countries resorted to trade restrictive measures affecting the demand side of the respective products in exporting countries through implicit beyond the border constraints. In addition, Pakistan experienced supply constraints from 2009 onwards due to energy shortages and floods. In the SFGM framework, which considers both the demand and supply effects, the empirical estimations performed suggests that there were statistically significant behind the border constraints in Pakistan that became evident in 2009-11 as compared to 2006-08.

Analysis at a single digit SIC level was undertaken for the period 2009-11 to highlight different product characteristics that affected trade patterns and the estimated significance and level of the behind the border constraints. In the case of agriculture, forestry, and fishery products (SIC 0) and manufactured commodities (SIC 2), there is evidence of behind the border constraints, while in case of mineral products (SIC 1) and manufactured products not identified by kind (SIC 3), these effects were not significant. SIC 0 and SIC 2 combined constituted nearly 80 percent of Pakistan's total exports during 2009-11 in real terms.

The results also show that Pakistan trades more in labour intensive products, such as SIC 2 and SIC 3 products, with countries which have high levels of output and are far away, as compared to SIC 0 and SIC 1 products. In addition, population is significant except in the case of SIC 3 products. Pakistan exports SIC 0 and SIC 1 products more to countries which are in close proximity and populous.

The presence of behind the border constraints imposes transaction costs on potential exporters. Pakistan needs to further develop its own institutional capacity to deal with trade restrictive measures that have arisen after the GFC in the form of beyond the border constraints. The empirical results also demonstrate that Pakistan is not realizing its full trade potential with its neighboring countries. Pakistan needs to further liberalize its trading regime by removing political obstacles to regional trade with India and the CARs. Liberalization of trade with neighboring countries, and adopting a regional focus, would help to smooth consumption across borders and insulate the region from future shocks.

When behind the border constrains exist, private traders will try to avoid them by trading through informal channels. Once informal trading channels are established within a country, informal trade takes place both ways across the border. But these informal trade channels are not as beneficial as a well-operating formal trade regime. This study can be extended in future research to examine how the high level of transaction costs due to behind the border constraints are incentivizing traders in Pakistan to opt for informal channels. The study could also propose a theoretical framework that may envisage reducing incentives for traders to engage in informal channels through policy reforms.

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APPENDIX TABLES

Table A1: Standard Industrial Classification (SIC)

SIC Code	Division
0	**Agricultural, Forestry and Fishery Products**
1	Agricultural Products
2	Livestock and Livestock Products
8	Forestry Products, nspf
9	Fish, Fresh, Chilled, or Frozen, and other Marine Products
1	**Mineral Commodities**
10	Metal Ores and Concentrates
12	Coal and Lignite
13	Crude Petroleum and Natural Gas
14	Nonmetallic Minerals, Except Fuels ·
2	**Manufactured Commodities**
20	Food and Kindred Products ·
21	Tobacco Products ·
22	Textile Mill Products ·
23	Apparel and Other Finished Products Made From Fabrics and Similar Materials ·
24	Lumber and Wood Products, Except Furniture ·
25	Furniture and Fixtures
26	Paper and Allied Products ·
27	Printing, Publishing, and Allied Industries
28	Chemicals and Allied Products ·
29	Petroleum Refining and Related Industries
3	**Manufactured Commodities not Identified by Kind Commodities**
30	Rubber and Miscellaneous Plastics Products
31	Leather and Leather Products ·
32	Stone, Clay, Glass, and Concrete Products
33	Primary Metal Industries
34	Fabricated Metal Products, Except Machinery and Transportation Equipment
35	Industrial and Commercial Machinery and Computer Equipment
36	Electronic and Other Electrical Equipment and Components, Except Computer Equipment ·
37	Transportation Equipment
38	Measuring, Analyzing and Controlling Instruments; Photographic, Medical and Optical Goods; Watches
39	Miscellaneous Manufacturing Industries

Source: WITS

Table A2: Pakistan's Actual and Estimated Potential Real Exports of Agriculture, Forestry, and Fishery Products (SIC 0) by Trade Partner Country, 2009-11 (US$ Thousand)

Partner Name	Actual Exports	Potential Exports	Ratio of Actual to Potential Exports
Main Overall Markets			
Afghanistan	89,058.14	229,638.75	38.78
China	60,177.95	243,835.42	24.68
Germany	2,586.33	29,317.46	8.82
United Arab Emirates	52,202.89	57,845.01	90.25
United Kingdom	6,969.23	17,621.01	39.55
United States	2,761.73	17,581.11	15.71
Others			
Algeria	354.86	4,566.78	7.77
Angola	17.36	1,664.38	1.04
Armenia	32.93	2,665.26	1.24
Australia	481.76	2,233.16	21.57
Austria	24.21	4,722.27	0.51
Azerbaijan	1,447.04	11,084.27	13.05
Bahrain	2,536.29	4,908.61	51.67
Bangladesh	74,902.45	90,634.49	82.64
Belarus	2.65	3,357.64	0.08
Belgium	2,691.93	4,244.23	63.43
Benin	22.65	470.61	4.81
Brazil	207.53	4,618.19	4.49
Brunei	66.33	240.42	27.59
Bulgaria	51.65	2,791.68	1.85
Canada	1,078.21	2,831.08	38.08
Czech Republic	64.26	3,930.57	1.63
Denmark	50.29	3,026.80	1.66
Egypt, Arab Rep.	10,159.05	19,763.44	51.4
Ethiopia (excludes Eritrea)	9.04	10,442.92	0.09
Fiji	15.26	35.10	43.46
France	1,378.35	19,152.35	7.2
Georgia	15.93	3,171.84	0.5
Ghana	20.73	1,048.55	1.98
Greece	318.04	6,719.78	4.73
Haiti	7.28	120.28	6.06
Hong Kong, China	5,960.06	5,241.08	113.72
India	6,900.94	3,768,311.55	0.18
Indonesia	24,877.10	24,001.38	103.65
Iraq	321.19	20,942.41	1.53
Ireland	82.23	1,630.01	5.04
Italy	2,757.43	21,897.05	12.59
Japan	3,163.75	34,626.76	9.14
Jordan	802.91	3,455.83	23.23
Kazakhstan	604.46	32,134.23	1.88
Kenya	14,709.19	5,228.25	281.34
Korea, Rep.	10,723.34	31,960.88	33.55
Kuwait	6,989.52	11,249.11	62.13

Table A2: Continued

Kyrgyz Republic	23.49	11,981.91	0.2
Lebanon	883.37	3,580.36	24.67
Madagascar	174.10	1,361.84	12.78
Malaysia	29,677.34	9,219.04	321.91
Mauritius	312.34	362.80	86.09
Mexico	39.43	2,953.65	1.33
Morocco	62.15	3,005.02	2.07
Mozambique	26.55	1,300.01	2.04
Nepal	8.57	300.46	2.85
Netherlands	1,310.95	7,129.51	18.39
Norway	266.71	67,673.53	0.39
Oman	3,390.68	23,396.56	14.49
Paraguay	800.10	115.75	691.22
Philippines	6,989.68	10,019.50	69.76
Poland	646.24	12,085.22	5.35
Portugal	888.58	2,061.81	43.1
Qatar	5,298.28	11,729.66	45.17
Romania	156.73	7,418.41	2.11
Russian Federation	16,599.61	66,181.01	25.08
Saudi Arabia	20,074.31	40,909.95	49.07
Senegal	13.44	486.84	2.76
Singapore	3,388.68	3,422.10	99.02
Slovenia	126.76	1,015.09	12.49
South Africa	406.61	4,260.39	9.54
Spain	243.83	10,327.85	2.36
Sri Lanka	24,363.64	15,051.95	161.86
Swaziland	2.80	152.53	1.84
Sweden	204.56	5,048.25	4.05
Switzerland	143.05	3,991.14	3.58
Tanzania	683.44	4,101.36	16.66
Thailand	28,120.14	26,231.68	107.2
Tunisia	243.36	1,939.54	12.55
Turkey	7,924.42	37,564.78	21.1
Turkmenistan	213.67	15,786.00	1.35
Uganda	11.01	3,339.86	0.33
Ukraine	2,664.09	12,969.61	20.54
Uruguay	12.43	102.42	12.14
Uzbekistan	67.77	72,515.77	0.09
Vietnam	29,661.93	14,955.95	198.33
Yemen	12,141.94	8,339.85	145.59

Source: Author's Estimation

Table A3: Pakistan's Actual and Estimated Potential Real Exports of Mineral Products (SIC 1) by Trade Partner Country, 2009-11 (US$ Thousand)

Partner Name	Actual Exports	Potential Exports	Ratio of Actual to Potential Exports
Main Overall Markets			
Afghanistan	325,656.09	5,956.03	5467.67
China	77,660.03	5,428.41	1430.62
Germany	610.39	571.35	106.83
United Arab Emirates	168,072.36	1,008.74	16661.67
United Kingdom	164.37	344.83	47.67
United States	3,595.65	303.50	1184.72
Others			
Australia	104.70	45.16	231.83
Austria	5.38	103.28	5.21
Bahrain	47.82	100.80	47.44
Bangladesh	888.99	835.02	106.46
Belgium	108.17	91.81	117.82
Brazil	10.25	75.72	13.54
Canada	78.70	56.77	138.63
Colombia	7.86	13.98	56.21
Czech Republic	3.21	96.78	3.32
Denmark	9.25	66.08	14
Egypt, Arab Rep.	36.08	432.91	8.34
Finland	53.22	78.80	67.54
Former Sudan	8.20	87.69	9.35
France	34.54	379.69	9.1
Greece	462.55	157.19	294.26
Hong Kong, China	63.33	120.09	52.73
Hungary	28.75	99.61	28.86
India	13,389.42	79,350.21	16.87
Indonesia	253.22	570.19	44.41
Ireland	9.61	35.75	26.89
Italy	2,796.34	446.34	626.5
Japan	5,635.86	150.05	3755.89
Jordan	10.90	62.94	17.31
Kazakhstan	1.41	790.11	0.18
Kenya	54.34	73.39	74.04
Korea, Rep.	20,927.50	307.46	6806.62
Kuwait	61.21	198.67	30.81
Madagascar	3.29	33.59	9.79
Malawi	8.74	25.36	34.46
Malaysia	959.19	238.66	401.9
Maldives	70.34	4.62	1522.09
Mauritius	3.09	6.80	45.46
Mexico	10.38	53.87	19.27
Mozambique	39.20	29.39	133.36

Table A3: Continued

Netherlands	2,118.67	148.81	1423.77
Norway	1.21	9.06	13.38
Oman	3,924.59	26.32	14912.01
Poland	42.44	121.47	34.94
Portugal	95.96	959.56	10
Qatar	87.10	31.87	273.28
Russian Federation	1,724.37	2,521.73	68.38
Saudi Arabia	828.34	251.12	329.85
Singapore	2,374.58	73.24	3242.38
Slovak Republic	5.99	54.93	10.91
Slovenia	1,340.29	24.98	5365.84
South Africa	63.35	93.86	67.5
Spain	1,106.60	215.55	513.39
Sri Lanka	107.83	215.76	49.98
Sweden	15.37	328.65	4.68
Tanzania	168.97	96.15	175.74
Thailand	213.95	341.75	62.6
Turkey	2,582.64	59.77	4321.18
Ukraine	75.21	384.11	19.58
Vietnam	386.72	112.81	342.79
Yemen	21.51	138.67	15.51

Source: Author's Estimation

Table A4: Pakistan's Actual and Estimated Potential Real Exports of Manufactured Products (SIC 2) by Trade Partner Country, 2009-11 (US$ Thouand)

Partner Name	Actual Exports	Potential Exports	Ratio of Actual to Potential Exports
Main Overall Markets			
Afghanistan	355,994.50	287,013.42	124.03
China	518,484.17	4,642,884.03	11.17
Germany	447,118.62	1,014,943.78	44.05
United Arab Emirates	383,326.52	349,534.45	109.67
United Kingdom	529,498.44	754,489.92	70.18
United States	1,823,691.41	1,800,072.21	101.31
Others			
Albania	631.99	28,150.95	2.25
Algeria	13,477.28	160,577.47	8.39
Angola	6,661.02	75,534.16	8.82
Armenia	39.88	35,867.53	0.11
Australia	67,372.19	217,068.40	31.04
Austria	5,746.82	166,106.52	3.46
Azerbaijan	2,352.60	106,059.04	2.22
Bahrain	33,830.82	46,615.17	72.57
Bangladesh	244,714.65	492,179.89	49.72
Belarus	122.70	78,429.72	0.16
Belgium	251,823.00	182,414.79	138.05
Benin	38,229.35	21,576.78	177.18
Bolivia	9.30	18,132.06	0.05
Bosnia and Herzegovina	88.07	30,144.18	0.29
Botswana	756.59	15,389.38	4.92
Brazil	20,723.70	379,641.39	5.46
Bulgaria	5,942.86	59,594.82	9.97
Burkina Faso	179.39	30,379.48	0.59
Cameroon	16,194.85	67,210.96	24.1
Canada	100,905.35	272,444.55	37.04
Chile	34,117.09	73,625.27	46.34
Colombia	20,072.38	113,901.78	17.62
Congo, Rep.	1,049.33	18,507.56	5.67
Costa Rica	527.01	19,674.66	2.68
Cote d'Ivoire	25,288.58	47,674.49	53.04
Croatia	3,860.74	67,865.81	5.69
Czech Republic	8,172.44	131,942.80	6.19
Denmark	34,670.49	120,793.73	28.7
Dominican Republic	8,963.59	45,698.69	19.61
Ecuador	3,746.98	37,447.55	10.01
Egypt, Arab Rep.	51,371.46	338,032.15	15.2
El Salvador	1,073.79	20,576.63	5.22
Ethiopia (excludes Eritrea)	885.90	155,183.75	0.57
Finland	20,564.77	117,112.58	17.56
Former Sudan	13,343.51	116,095.51	11.49
France	157,706.68	768,395.39	20.52
Gabon	625.19	11,117.14	5.62
Georgia	2,031.63	47,427.77	4.28
Ghana	7,534.63	46,473.56	16.21
Greece	30,392.59	182,998.45	16.61
Guinea	21,295.17	18,304.86	116.34
Haiti	3,255.22	16,270.13	20.01
Hungary	5,943.93	118,924.94	5

Table A4: Continued

India	79,099.34	6,563,287.92	1.21
Indonesia	23,970.42	675,681.53	3.55
Ireland	23,244.68	88,614.13	26.23
Italy	290,231.35	735,593.01	39.46
Japan	51,988.71	1,437,703.55	3.62
Jordan	14,855.61	62,690.32	23.7
Kazakhstan	1,573.50	258,201.92	0.61
Kenya	77,387.77	68,887.89	112.34
Korea, Rep.	105,793.18	469,704.60	22.52
Kuwait	34,497.56	123,628.43	27.9
Kyrgyz Republic	465.02	53,695.42	0.87
Lao PDR	79.06	29,918.68	0.26
Lebanon	7,521.70	68,561.99	10.97
Lesotho	2,178.66	6,212.44	35.07
Madagascar	27,870.81	45,716.37	60.96
Malawi	468.34	26,695.37	1.75
Malaysia	60,698.94	196,833.28	30.84
Mali	14.34	29,233.24	0.05
Mauritania	2,039.84	12,587.74	16.2
Mauritius	15,894.69	17,125.18	92.81
Mexico	38,975.81	300,325.45	12.98
Mongolia	30.68	21,484.74	0.14
Morocco	8,803.99	104,170.76	8.45
Mozambique	33,864.77	48,821.07	69.37
Namibia	427.11	14,141.52	3.02
Nepal	299.53	148,907.85	0.2
Netherlands	205,293.15	273,079.11	75.18
New Zealand	16,875.55	45,858.64	36.8
Nicaragua	10,040.88	13,187.34	76.14
Niger	568.02	27,310.21	2.08
Nigeria	11,743.14	321,713.04	3.65
Norway	24,171.94	128,613.65	18.79
Oman	62,361.85	125,166.32	49.82
Panama	4,718.72	18,489.53	25.52
Papua New Guinea	90.32	22,950.87	0.39
Paraguay	3,157.49	16,397.36	19.26
Peru	9,098.85	73,815.97	12.33
Philippines	48,417.83	268,224.31	18.05
Poland	22,417.33	347,493.15	6.45
Portugal	68,800.89	117,017.65	58.8
Qatar	48,809.14	111,951.33	43.6
Romania	11,929.56	159,307.90	7.49
Russian Federation	48,948.08	1,061,309.69	4.61
Saudi Arabia	177,492.61	516,963.90	34.33
Senegal	10,999.24	30,381.54	36.2
Sierra Leone	12,011.47	12,124.32	99.07
Singapore	15,263.50	120,488.42	12.67
Slovak Republic	4,489.60	79,015.77	5.68
Slovenia	4,203.00	38,081.59	11.04

Table A4: Continued

South Africa	108,803.50	207,882.29	52.34
Spain	239,436.74	481,994.89	49.68
Sri Lanka	102,784.53	168,187.24	61.11
Swaziland	307.46	6,203.86	4.96
Sweden	40,354.00	183,150.92	22.03
Switzerland	5,511.01	186,877.33	2.95
Tajikistan	429.03	72,072.48	0.6
Tanzania	11,378.21	84,999.48	13.39
Thailand	17,276.53	400,153.19	4.32
Togo	12,158.76	13,718.65	88.63
Trinidad and Tobago	1,174.72	56,645.09	2.07
Tunisia	8,561.59	27,801.63	30.8
Turkey	294,698.24	658,156.25	44.78
Uganda	942.27	56,026.22	1.68
Ukraine	25,693.43	259,245.01	9.91
Uruguay	5,393.45	15,907.03	33.91
Uzbekistan	1,173.89	234,151.43	0.5
Venezuela	8,448.10	89,367.38	9.45
Vietnam	39,755.22	264,197.72	15.05
Yemen	40,757.25	124,749.69	32.67
Zambia	261.89	39,913.26	0.66
Zimbabwe	2,066.01	26,406.38	7.82

Source: Author's Estimation

Table A5: Pakistan's Actual and Estimated Potential Real Exports of Manufactured Products not Identified by Kind (SIC 3) by Trade Partner Country, 2009-11 (US$ Thousand)

Partner Name	Actual Exports	Potential Exports	Ratio of Actual to Potential Exports
Main Overall Markets			
Afghanistan	237,546.45	1,887.49	12585.32
China	50,240.37	120,877.62	41.56
Germany	78,863.35	46,258.36	170.48
United Arab Emirates	327,461.18	9,103.50	3597.09
United Kingdom	51,481.18	33,022.48	155.9
United States	109,397.98	110,715.37	98.81
Others			
Albania	49.66	377.15	13.17
Algeria	1,180.03	3,900.15	30.26
Angola	326.72	1,639.01	19.93
Armenia	111.91	274.69	40.74
Australia	9,896.93	7,894.70	125.36
Austria	3,738.78	5,179.73	72.18
Azerbaijan	354.96	1,775.28	19.99
Bahrain	2,866.53	763.76	375.32
Bangladesh	20,753.70	7,716.64	268.95
Belarus	82.54	1,344.97	6.14
Belgium	20,596.23	5,744.27	358.55
Belize	5.31	19.68	26.97
Benin	1,282.74	210.45	609.52
Bolivia	183.96	185.49	99.18
Bosnia and Herzegovina	23.88	354.65	6.73
Botswana	264.98	229.82	115.3
Brazil	13,112.94	19,450.97	67.42
Brunei	60.48	149.94	40.34
Bulgaria	874.20	987.79	88.5
Cambodia	1,898.33	406.01	467.55
Cameroon	928.35	1,142.56	81.25
Canada	9,409.97	11,519.86	81.68
Chad	11.45	224.36	5.1
Chile	2,371.92	1,437.74	164.97
Colombia	1,138.92	2,451.49	46.46
Comoros	3,792.36	19.30	19646.26
Congo, Dem. Rep.	1,040.77	544.73	191.06
Costa Rica	465.08	287.24	161.91
Cote d'Ivoire	223.75	519.17	43.1
Croatia	714.32	932.03	76.64
Czech Republic	2,518.45	2,784.26	90.45
Denmark	8,304.66	3,734.02	222.41
Dominica	15.55	9.44	164.73
Dominican Republic	262.23	649.24	40.39
Ecuador	529.54	609.92	86.82
Egypt, Arab Rep.	5,699.88	8,743.21	65.19

Table A5: Continued

El Salvador	81.42	228.02	35.71
Equatorial Guinea	80.70	186.98	43.16
Ethiopia (excludes Eritrea)	792.02	1,261.26	62.8
Fiji	25.87	51.45	50.28
Finland	7,524.25	3,339.34	225.32
Former Sudan	23,132.63	2,499.93	925.33
France	32,431.35	32,471.78	99.88
Gabon	141.04	420.36	33.55
Gambia, The	20.31	21.75	93.39
Georgia	108.33	325.19	33.31
Ghana	630.10	554.49	113.64
Greece	4,122.77	4,707.47	87.58
Guatemala	810.00	413.01	196.12
Guinea	356.36	127.95	278.51
Guyana	184.23	14.97	1230.58
Haiti	191.45	74.38	257.38
Honduras	94.58	166.20	56.91
Hong Kong, China	60,091.20	3,856.97	1557.99
Iceland	74.65	234.48	31.84
India	37,824.67	148,871.95	25.41
Indonesia	6,116.85	10,442.66	58.58
Ireland	1,984.49	2,591.61	76.57
Italy	56,063.83	28,997.58	193.34
Japan	11,895.13	67,290.46	17.68
Jordan	2,277.77	698.98	325.87
Kazakhstan	588.03	4,101.56	14.34
Kenya	4,484.83	1,252.37	358.11
Korea, Rep.	23,322.10	17,984.91	129.68
Kuwait	7,013.73	3,167.24	221.45
Kyrgyz Republic	87.13	307.33	28.35
Lao PDR	11.32	187.56	6.03
Lebanon	886.34	1,019.52	86.94
Luxembourg	37.13	500.63	7.42
Madagascar	3,404.57	257.51	1322.09
Malawi	307.63	174.16	176.64
Malaysia	3,780.07	4,313.54	87.63
Maldives	223.79	90.79	246.48
Mali	18.27	283.51	6.45
Mauritania	13.93	71.70	19.42
Mauritius	1,021.13	153.64	664.64
Mexico	7,655.26	12,685.40	60.35
Moldova	17.92	134.47	13.32
Mongolia	6.67	143.47	4.65
Morocco	1,207.58	2,674.66	45.15
Mozambique	7,952.42	354.58	2242.76
Namibia	228.10	186.03	122.61
Nepal	164.54	1,429.29	11.51
Netherlands	23,379.30	9,760.42	239.53
New Zealand	1,413.66	999.65	141.42
Nicaragua	97.86	103.78	94.29
Niger	102.98	192.87	53.39
Nigeria	5,908.02	4,519.07	130.74
Norway	2,936.11	4,032.31	72.81
Oman	12,866.33	2,408.70	534.16
Panama	664.22	232.71	285.43

Table A5: Continued

Papua New Guinea	7.62	115.72	6.58
Paraguay	328.37	145.35	225.93
Peru	1,353.71	1,153.34	117.37
Philippines	3,639.64	3,802.03	95.73
Poland	5,278.63	8,078.46	65.34
Portugal	3,473.66	2,687.39	129.26
Qatar	15,528.33	3,301.36	470.36
Romania	1,219.13	3,408.42	35.77
Russian Federation	7,841.96	29,406.83	26.67
Rwanda	41.07	157.68	26.05
Saudi Arabia	31,770.99	15,352.11	206.95
Senegal	1,964.96	254.08	773.36
Sierra Leone	48.31	67.74	71.32
Singapore	4,752.92	2,716.72	174.95
Slovak Republic	192.14	1,485.23	12.94
Slovenia	1,814.87	674.44	269.09
South Africa	21,983.71	5,629.62	390.5
Spain	21,164.33	16,840.05	125.68
Sri Lanka	24,522.29	1,566.08	1565.84
Swaziland	38.86	60.31	64.44
Sweden	8,548.18	6,431.41	132.91
Switzerland	1,802.43	5,597.57	32.2
Tajikistan	4.61	502.40	0.92
Tanzania	13,446.25	1,935.99	694.54
Thailand	5,529.39	7,740.28	71.44
Togo	495.15	115.07	430.3
Trinidad and Tobago	933.89	168.09	555.59
Tunisia	1,115.36	2,613.67	42.67
Turkey	16,331.07	15,389.19	106.12
Uganda	3,322.48	712.96	466.01
Ukraine	2,559.40	3,906.09	65.52
Uruguay	518.49	332.81	155.79
Uzbekistan	252.93	2,466.36	10.26
Venezuela	1,324.14	2,400.75	55.16
Vietnam	9,028.46	3,245.92	278.15
Yemen	8,933.97	1,091.34	818.63
Zambia	121.94	312.67	39
Zimbabwe	341.77	265.90	128.54

Source: Author's Estimation

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