Recent Trends and Prospects of Bilateral Trade between Pakistan and Turkey: A Gravity Model Approach

Farrukh Suvankulov¹ and Wazir Ali

Zirve University, Turkey

Abstract: Pakistan’s economic ties with Turkey have improved in the past few years. A recently stated pledge to create a free trade agreement between Pakistan and Turkey is likely to trigger a further expansion of economic integration. This paper starts by reviewing trends in Pakistan’s bilateral trade with Turkey since 1996. Next, it estimates an augmented gravity model aiming to project Pakistan’s trade potential with Turkey and compare them with the actual flows in 1996-2009 period.

We find that export flows from Pakistan to Turkey have grown sharply since 2001 outpacing both Turkish exports to Pakistan and projections generated by the augmented gravity model. The success of Pakistani exports is largely explained by the booming performance of textile industry in Pakistan. Turkey’s exports to Pakistan feature goods with greater added value although they still remain significantly below the model predictions.

Trade complementarity analysis indicates that overall Turkish exports match better with Pakistan’s import structure than Pakistan’s exports with Turkish import structure. Given the results from the augmented gravity model and complementarity analysis it is likely that Turkey will benefit to a larger extent from the proposed free trade agreement.

Keywords: Pakistan, Turkey, gravity model, free trade agreement, economic integration

JEL Codes: F10, F15, F17

1. Introduction

The relations between Pakistan and Turkey are entrenched deeply. In addition to an overlapped cultural and religious heritage, the countries share a common vision on many regional and international affairs. Turkey has acknowledged on many forums the contribution offered by the Pakistani nation and its army in waging a war on terror and came all out for Pakistan’s assistance in the hour of natural distress. Moreover, Turkey has been frequently cited as a role model as Pakistan seeks to cope with the demands of democratization, economic modernization, and political transformation. In recent years, the relations have also intensified as a part of so called “turning to east” policy in Ankara.

Bilateral trade was a key ingredient of the success story. Trade turnover increased from about 150 million USD in 2000 to over 570 million USD by 2009. According to Farhatullah Babar, a spokesman to President of Pakistan, in new future the nations aim to double the bilateral trade by addressing issues related to a free trade agreement, joint financial instruments and preferential treatment through special mechanisms and stepping up contacts between the relevant ministries.
The rapid increase in trade has been also supported on the diplomatic front. Frequent official visits have played a key role in promoting economic cooperation and facilitating bilateral trade. In October 2009 the Turkish Prime Minister Erdogan came to Pakistan on a two-day visit. Gillani and Erdogan agreed to boost their strategic partnership to fight militancy and to congeal the political and economic cooperation. Both signed a joint declaration on trade investment, agriculture, industry, culture, education and defense.

The President Zardari conferred Nishan-e- Pakistan, the highest of civil awards, on President Gul in April 2010 when he came on his visit to Pakistan and the honorary degree in International Relations by the Quaid-E-Azam University Islamabad. Earlier in October 2009 the President of Pakistan had conferred the same award on Tayyip Erdogan in recognition of his visionary leadership and his outstanding contributions in strengthening Pakistan-Turkey relations. Next, Pakistan and Turkey signed a memorandum under which the business community was given exemption from visa requirements. The businessmen from the two countries with valid documents were allowed to visit and stay in each other countries without visa for 90 days.

In October 2010 the countries arranged a currency swap that has further facilitated business and trade transactions. The leaders of the both countries have articulated the resolve that Turkey wants to invest on permanent basis to help infrastructure of Pakistan. Recently approved joint projects include an upgrade of the existing Islamabad-Tehran-Istanbul railway route under the framework of Economic Cooperation Organization. Five Turkish bank branches were recently opened in Pakistan.

Given increased level of a bilateral cooperation the aim of this paper is twofold. First, we investigate a surge in bilateral trade in recent years. To do so we rely on a standard analytical framework of a comparative political economy: the gravity model of international trade. The idea is to assess whether trade volumes have been in line with benchmarks generated by the augmented gravity model. Second, we explore prospect of bilateral trade in connection with a proposed free trade agreement between Pakistan and Turkey. We apply a trade complementarity analysis aiming to explore whether export and import baskets of Pakistan and Turkey are compatible. A free trade agreement leads to a better outcome if trading partners have high trade complementarities. In other words, the trade turnover increases if goods produced by some members are demanded for consumption by other member of the free trade agreement.

The paper is organized as follows. Section 2 covers recent trends of bilateral trade between Pakistan and Turkey. Section 3 reviews gravity model applications in international political economy. Section 4 describes our modeling strategy for a panel-data environment. Section 5 shows and discusses the main estimation results. It also lists findings from trade complementarity analysis. Section 6 concludes.

2. Recent Trends of Bilateral Trade between Pakistan and Turkey

The timeframe of the analysis is 1996 -2009. We use UN Comtrade dataset of international trade freely available via UN affiliated website. The data shows that overall trade between Pakistan and Turkey has been on a rise (Figure 1). However, the exports lines clearly show the differentiation in growth rates. Initially, up until 2000 Turkey featured a positive trade balance.
against Pakistan. However, since 2001 Pakistan exports to Turkey consistently exceed its imports from Turkey.

By 2009 Pakistan’s total export to Turkey have reached USD 407.9 million whereas Turkey’s exports to Pakistan were about USD 163 million which is almost less than 50% exports of Pakistan to Turkey.

The export structure of Pakistan to Turkey is quite concentrated. The main items are textile yarn, fabrics, and related items. In 2009 they were worth almost USD 250 million accounting for 61.4 percent of total exports. Export of apparel and clothing accessories worth of almost USD 48 million stood for another 11.8% of total shipments to Turkey. Overall, textile related exports accounted for more than 73 percent of Pakistan’s export to Turkey. Other sizable items included plastics in primary forms worth USD 30 million, and cereals worth USD 18 million.

In contrast, Turkish export structure to Pakistan has been much diversified. It regularly includes iron, steel, metalworking equipment, organic and other chemicals including fertilizers, apparel, clothing accessories, footwear, plastic, rubber items, power-generating and other industrial machinery, road vehicles including automobiles, telecommunication and office equipment, home appliances, furniture and selected finished food items. In 2009 for example Turkey exported iron and steel worth USD 13 million, machinery specialized for particular industries worth USD 11 million and organic chemicals worth USD 10 million.

Overall, the comparison of export structure favors Turkey. In addition to a more diversified nature of exports, Turkish products have higher added value, technologically more advanced as well as more prone to ad-hoc natural hazards such as droughts that frequently damage Pakistan’s cotton and cereal plantations.

3. Gravity Model Applications in International Political Economy

The findings from section 2 indicate that a bilateral trade between Turkey and Pakistan has been increasing in recent years. To analyze this issue further we rely on a standard analytical framework of a comparative political economy: the gravity model of international trade. The gravity model has been employed to study several aspects of the international political economy including migration, FDI and bilateral trade flows. The model establishes a baseline for the extent of connectivity between countries, whereby bilateral trade is a function of the distance between the countries and their joint income. The empirical studies that tried to explain trade flows by the market size of the trading partners and the distance between them go back to early 1960s (Tinbergen, 1962; Poyhonen, 1963). The standard specification of the gravity model estimation involves GDP per capita (to account for intra-industry trade and level of income), a measure of remoteness (this captures the idea that it is the relative cost of trading that matters), adjacency and geographical characteristics. The gravity model is quite flexible, and has seen numerous empirical applications to test for border effects (McCallum, 1995; Anderson and van Wincoop, 2003), the impact of regional trade blocks (Schiff and Winters, 2003), or the impact of a common currency on bilateral trade flows (Frankel and Rose, 2000). Recently, researchers have also looked at which kinds of institutions promote international trade and at the impact of protectionism on trade flows in the context of a gravity model (Koukhartchouk and Maurel, 2003; Rose, 2002; Subramanian and Wei, 2003). Theoretical foundations of the gravity equation relying on very different modeling
assumptions can be found in Anderson and van Wincoop (2003), Eaton and Kortum (2002), and Chaney (2008).

Previous studies that involve Turkey focused on EU-Turkey bilateral. For example, Lejour et al. (2004) first estimate a gravity model of sectoral trade flows for a large set of countries, including both merchandise and services exchanges. They find that the EU dummy must be included in most of the sectoral regressions to take into account the special intensity of trade relations between EU members. Subsequently, they use the statistically significant estimated coefficients of the dummy to evaluate the potential increase in EU–Turkey bilateral trade. Even though the empirical results differ considerably across sectors, they estimate that the sectoral weighted average of EU–Turkey bilateral trade could increase by 34 percent if Turkey were a member of the EU. Adopting a different framework, Flam (2003) points to an even larger impact of Turkey’s accession on its aggregate trade volume with the EU (plus 46 percent). Antonucci and Manzocchi (2006) apply the gravity model to Turkey's trade flows over 1967–2001. The study finds that the gravity model provides a good fit of Turkey's trade patterns. The 1963 Association agreement and the customs union launched in 1996 didn’t lead to an additional trade flows between Turkey and the EU.

There have been several studies that incorporate a gravity model to analyze Pakistan’s trade flows. Using the gravity model approach Hassan (2001) assesses the prospects of Intra-South Asian Association for Regional Cooperation (SAARC) that includes Pakistan. The gravity model results suggest that SAARC member countries are yet to achieve mutual trade level predicted by the model. Similarly, Rahman et al (2006) focus on potential benefits of South Asian Free Trade Agreement (SAFTA). The gravity model predicts that Bangladesh, India and Pakistan are expected to gain from joining the SAFTA, while Nepal, Maldives and Sri Lanka are likely to be negatively affected.

Many recent studies deal with estimating trade potential for other developing countries. Batra (2004) estimated trade potential for India using the gravity model approach for the year 2000. Author found that the magnitude of India’s trade potential is highest with the Asia-Pacific region followed by Western Europe and North America. Bhattacharyya (2006) also applied the gravity model to India’s bilateral trade flows for the years 1950-2000. He found that India’s trade responds less than proportionally to size and more than proportionally to distance. Colonial heritage is still an important factor in determining India’s direction of trade at least in the second half of the twentieth century. Also India trades more with developed rather than less-developed countries. Rahman (2003) analyzed the Bangladesh’s trade with its major trading partners. The results showed that Bangladesh’s trade is positively determined by the size of the economies, per capita GNP differential of the countries involved and openness of the trading countries. Sohn (2005) estimating foreign trade of Korea found that in order to expand bilateral trade volumes, it appears to be more desirable for Korea to promote bilateral trade with countries in close proximity and having large economies.

Most economists agree that the gravity model of trade has been a success from the empirical point of view. Over the years, it has played an important role in the estimation of trade patterns although none of the previous studies attempt to assess Turkey-Pakistan trade flows. This paper contributes to the existing literature by focusing on bilateral trade between Turkey and Pakistan using a gravity model approach.
4. An Augmented Gravity Model

Our methodology builds upon a standard analytical framework of comparative political economy: the gravity model. We follow the common practice of estimating expected trade volumes between countries using a single equation. For the values of $X_{ijt}$, the exports from exporting country $i$ to importing country $j$ in year $t$, the gravity equation can be formulated as following:

$$X_{ijt} = M_{it}^{ex}M_{jt}^{im}\theta_{ijt}$$  \hspace{1cm} (1)

$$\ln X_{ijt} = D_{ijt} + \epsilon_{ijt}$$ \hspace{1cm} (2)

where $M_{it}^{ex}$ and $M_{jt}^{im}$ are vector of monadic characteristics of countries $i$ and $j$. These are conventionally measured by some functional form of the total population and income per capita.

$D_{ijt}$ is a dyadic term that captures observable and unobservable characteristics of a bilateral trade between countries $i$ and $j$. In line with previous literature, observable characteristics of a dyadic term $D_{ijt}$ include variables for geographic remoteness (common border, distance between the largest cities), cultural and institutional commonalities (common language and legal system), past and present colonial links as well as economic cooperation (regional trade agreement, common currency and membership in WTO). Finally, $\epsilon_{ijt}$ is an error term.

The conventional approach to estimation is to take logs of (1) and substitute in (2) to obtain:

$$\ln X_{ijt} = \ln M_{it}^{ex} + \ln M_{jt}^{im} + D_{ijt} + \epsilon_{ijt}$$ \hspace{1cm} (3)

The estimation of equation (3) using standard econometric models generates the set of parameter estimates $\theta$. More specifically, we estimate the following equation:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln N_{it} + \beta_2 \ln N_{jt} + \beta_3 \ln y_{it} + \beta_4 \ln y_{jt} + \beta_5 \ln D_{ijt} + \beta_6 \ln Border_{ijt} + \beta_7 \ln Lang_{ijt} + \beta_8 \ln Law_{ij} + \beta_9 \ln Col_{ij} + \beta_{10} \ln RTA_{ijt} + \beta_{11} \ln WTO_{ijt} + \beta_{12} \ln Blurred_{ijt} + \epsilon_{ijt}$$ \hspace{1cm} (4)

We use the CEPII’s definition of these explanatory variables. This allows us to double-check the similarity of our findings with previous gravity studies that rely on CEPII resources.

Trade flow. Our dependent variable is a log of trade flow from country $i$ to country $j$ in U.S. dollars. Theoretically, this could be measured as exports from country $i$ to country $j$ or imports of country $j$ from country $i$. However in practice, these two numbers deviate from each other due to exchange rate fluctuations, treatment of transportation costs and differences in customs procedures. To deal with this issue we follow the procedure used by Head, Mayer and Ries (2010) and take the larger of two numbers.

Population. $N_{it}$ is a product of population for countries $i$ and $j$ that are obtained from the World Bank’s World Development Indicators. For various reasons countries with larger
population are likely to import and export more than countries with lower population. Thus we expect positive sign for the coefficients of $N_{ij}$. 

*Income.* $N_{i}$ and $N_{j}$ are nominal GDPs per capita that also come from the World Bank’s World Development Indicators. These variables are included to measure economic well-being of the trading partners. We also expect positive sign for the coefficients of $N_{i}$ and $N_{j}$.

*Distance.* $Dist$ stands for a distance in kilometers between the main cities in countries $i$ and $j$. Greater distance between two countries leads to increased transportation costs for trade flows. We expect a negative sign for the coefficient of $Dist$. The data is generated by the CEPII.

*Common border / single currency / common language / colonial ties* positively influence bilateral trade flows. These variables may account for the historical, cultural, economical and political relations between trading countries both at state and firm levels that may lead to reduction in transaction costs. For example, common language is expected to reduce transaction costs in international trade as speaking the same language simplifies and promotes trade negotiations. Similarly colonial ties provide shared history for countries and this is also expected to reduce transaction costs caused by cultural differences. Thus we expect that the signs of the coefficients for $Border_{ij}$, $Lang_{ij}$, $Cur_{ij}$, and $Col_{ij}$ to be positive.

*Common legal origins.* Several recent gravity studies (e.g. see La Porta et al, 1998; Portes and Rey, 2005; Aviat and Coeurdacier, 2007; Daude and Fratzscher, 2008) find that shared origin of a legal system positively affects the volume of bilateral trade. $Law_{ij}$ is included to capture such a relationship. We use data on common legal origins of the two countries generated by Andrei Shleifer and available at the CEPII website. Shleifer distinguishes five legal origins, namely, English, French, German, Scandinavian and Socialistic. In our analysis $Law_{ij}$ takes the value of one if countries share these legal origins.

*WTO membership* tends to positively influence bilateral trade flows. Taking into account the fact that trade policy is more liberal in the countries that are WTO members than for non-members, we expect that bilateral trade flows between WTO members will be greater than between non-members. $WTO_{ij}$ takes the value of one if both trading partners are WTO members. Its coefficient is likely to be positive.

*Membership in bilateral or regional trade agreements* positively influences bilateral trade flows. Countries join traded blocks and integrated groupings aiming to simplify and expand their trade relations. Thus we expect the positive sign for the coefficient of this variable. Bilateral trade agreements are quite common. They are fairly easy to negotiate, and give those two nations favored trading status between each other. Regional trade agreements are more complicated to negotiate, but are very powerful once all parties sign the agreement. Cases of regional trade agreements include ASEAN Free Trade Area, Greater Arab Free Trade Area, Gulf Cooperation Council, North American Free Trade Agreement, Southern African Development Community, and South Asia Free Trade Agreement.
Finally, our specification include *real exchange rate* for a country’s currency. Arguments for the inclusion of the real exchange rate into model has been well documented in Egger (2000) and Martinez-Zarzoso and Novak-Lehman (2003). We expect the positive sign for the estimated coefficient since a depreciation of the currency (increase in RER) are associated with a rise in country’s exports indicating on a fact that the price competitiveness is an important factor when it comes to exports.

To estimate (4) we extend CEPII gravity dataset. The original CEPII dataset available online at http://www.cepii.fr at no cost features information for all pairs of countries for the period 1948 to 2006. We supplement data for time-varying variables for the period 2007 to 2009 using the definitions provided by the CEPII.

Early empirical studies used cross-sectional data to estimate a gravity model; in most recent years, researchers started using panel data. The use of panel data instead of cross-sectional analysis allows us to remove some biases stemming from unobserved country-pair heterogeneity and to estimate the parameters of the model with greater precision (Shepotylo, 2009). Therefore, our analysis will be based on export panel data for the years 1996-2009 for 165 countries. To control for multilateral trade resistances we use country fixed effects for importers and for exporters and run pooled panel model. This approach enables us to estimate parameter estimates for the time–invariant regressors in our model $Borden_{f}$, $Lang_{f}$, $Col_{f}$, and $Law_{f}$.

Table 1 lists parameter estimates for the coefficients of our interest. The full model includes all the right-hand side variables described earlier. In the base model we drop $Lang_{f}$ and $Law_{f}$ to check the robustness and fit of our estimates to specification changes. Variance inflation factor (VIF) test for multicollinearity shows that our regressors are not correlated with each other.

Overall, our gravity model is well fit and the estimated coefficients are in line with most recent studies (e.g. Head, Mayer and Ries, 2010). The R-squared of the model is around 0.759. The estimates are robust to model specification. We find sizeable positive effect of population, GDP per capita both in country of origin and destination of exports. Consistent with myriad previous publications we find a negative effect of the distance between trading partners. Despite decreased transportation cost and development of communication technologies the distance effect has been persistent in gravity studies for decades.

We also find that colonial history between trading partners has a very strong positive effect on bilateral trade. Common language has a positive impact as well. Our regressions show that bordering countries have higher trade turnover notwithstanding the fact that we control for a distance between major cities in two countries. All variables that indicate a closer trade and monetary cooperation have a positive effect on trade flows. Finally, we find a positive relationship between currency depreciation and exports pointing out on importance of the price factor across export markets.

5. Discussion of Results

Having estimated the gravity model for bilateral trade flows in the world for the period of 1996-2009, we proceed to analyze the trade potential between Turkey and Pakistan. We use parameter
estimates from the full model to predict export volumes for the same time period. The resulting
numbers can be viewed as export potential. Next, we compare projected potential with actual
export flows in this period. The difference between potential and actual export numbers can be
interpreted as an un-exhausted export potential. Such technique has been frequently used in the
literature (e.g., Baldwin, 1994; Wang and Winters, 1991; Breuss and Egger, 1999; Bruhlart and
Kelly, 1999). Table 2 lists actual exports and gravity model predictions.

For Turkish exports to Pakistan the gravity model projections grew from 251.3 million USD in
1996 to 749.2 million USD in 2009. Factual numbers were substantially lower than the projected
potential despite the twofold increase from 77.7 to 163.1 million USD. Pakistan’s exports on the
other hand performed better than the projections. They increased from 76.1 million USD in
1996 to 407.1 million in 2009 while the gravity model predicted the growth from 93.2 million
USD to 294.3 million USD. Most notably, export flows from Pakistan to Turkey have grown
sharply since 2001 outpacing both Turkish exports to Pakistan and projections generated by the
augmented gravity model.

These findings imply an existence of extensive unexploited potential for Turkish exports in
Pakistan. The free trade agreement will facilitate the partnership and provide momentum for
Turkish businesses in their effort to tap Pakistani markets. For Pakistan, the prospects are more
limited although it is likely that free trade agreement will further increase export of non-textile
items to Turkey.

To analyze the prospects of bilateral trade further we have calculated trade complementarity
indices (TCI) in the region. The index measures degree of similarities between the export basket
of one country and the import basket of another (Michaely, 1996). The intuition behind TCI is
the fact that economic integration arrangements such as a free trade agreement lead to a better
outcome if trading partners have high trade complementarities. In other words, the trade turnover
increases if goods produced by some members are demanded for consumption by other members
of the free trade agreement. TCI values range between 0 and 100. Higher TCI between two
countries is associated with a better product complementarity so countries feature a high
potential for a bilateral trade.

Formally, a bilateral TCI is defined as

$$\text{TCI}_{ij} = 100 - \sum_k \frac{|m_{jk} - x_{ik}|}{2}$$

where $x_{ik}$ is country $i$’s total export of product $k$, and $m_{jk}$ is country $j$’s total imports of product
$k$. The index takes value of zero when one country imports no goods exported by another country
whereas the index is 100 if the structure of exports in one of the countries is identical to the
structure of imports in the other country. Tsikata (1999) and Khandelwal (2004) argue that TCI’s
above 25 could be considered as a sign of strong trade complementarity. As the world economy
becomes more integrated the benchmark obviously could be adjusted upward. To calculate TCI
for trade flows between Turkey and Pakistan we utilize 2009 UN COMTRADE data using two-
digit SITC Rev 4 classification of goods and commodities. Table 3 presents the matrix of the
trade complementarity indices for Pakistan and Turkey.
Overall, complementarity analysis indicates on good opportunities for a bilateral trade under the free trade agreement. Both of the TCIs exceed benchmark level of 0.25. However, once again the calculations point out Turkey’s untapped export potential. Its export structure matches very well with Pakistan’s makeup of importing goods. TCI for Turkish exports to Pakistan is 0.41 while Pakistan’s TCI to Turkey is only 0.27. In other words, overall Turkish exports match better with Pakistan’s import basket than Pakistan’s exports with Turkish import basket. Such results are not surprising given a diversified nature of Turkish export and textile oriented shipments from Pakistan. Under such conditions, the free trade agreement is likely to benefit Turkey to a larger extent, the conclusion that confirms the findings from the gravity model.

6. Conclusions

In recent years Pakistan’s relationships with Turkey have intensified across many dimensions. Bilateral trade was a key ingredient of improved relationship. Trade turnover increased from about 150 million USD in 2000 to over 570 million USD in 2009. Given increased level of a bilateral cooperation this paper placed trade volumes into standard analytical framework: the augmented gravity model of international trade. In other words, we assessed whether trade volumes have been in line with prediction of the augmented gravity model.

Our results suggest that between 1996 and 2009 Pakistan registered growth of exports to Turkey well beyond numbers predicted by the gravity model. Despite an excellent potential, Turkish exports were significantly lower than those predicted by our augmented gravity model. For 2009, the model predicts Turkish exports for the total value of 749.2 million USD whereas the actual exports to Pakistan were equal to 163.1 million USD. We believe that further trade facilitation of trade through the free trade arrangements by Turkish government may increase the volume of shipments to Pakistan to align with model benchmarks.

The structure of exports favors Turkey. About 80 percent of Pakistan’s exports to Turkey are related to textile industry and cereal productions; both of which have limited potential to grow due to land and water constraints and frequent droughts. Turkish export structure to Pakistan is well diversified. It includes iron, steel, metalworking equipment, organic and other chemicals including fertilizers, apparel, clothing accessories, footwear, plastic, rubber items, power-generating and other industrial machinery, road vehicles including automobiles, telecommunication and office equipment, home appliances, furniture and selected finished food items. Such makeup will allow Turkey to extend its exports significantly under the free trade agreement.

A free trade agreement leads to a better outcome if trading partners have high trade complementarities. Therefore, we explored prospect of bilateral trade in connection with a proposed free trade agreement between Pakistan and Turkey. We applied a trade complementarity analysis aiming to explore whether export and import baskets of Pakistan and Turkey are compatible. The trade turnover increases if goods produced by some members are demanded for consumption by other member of the free trade agreement. Trade complementarity analysis indicates that overall export structure of Turkey matches very well with the import baskets of Pakistan. TCI for Turkish exports to Pakistan is 0.41 while
Pakistan’s TCI to Turkey is only 0.27. This confirms our findings from the gravity model that Turkey will benefit to a larger extent from the proposed free trade agreement.
Endnotes

1 Corresponding author: Dr. Farrukh Suvankulov, Kizilhisar Kampusu, Room 424, Zirve University, Gaziantep, 27260, Turkey. fsuvankulov@aya.yale.edu, tel: 0 537 459 3265.

2 CEPII is a non-profit research institute in France that specializes on international trade.

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Figure 1. Recent trends of bilateral trade between Pakistan and Turkey

Source: Turkish Statistical Institute, 2011
### Table 1. Estimated gravity model of log exports, 1996-2009

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<thead>
<tr>
<th></th>
<th>Base Model</th>
<th>Full Model</th>
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<tr>
<td>log of population</td>
<td>0.635*** (0.075)</td>
<td>0.623*** (0.074)</td>
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<tr>
<td>log of GDP per capita (export origin)</td>
<td>0.444*** (0.035)</td>
<td>0.448*** (0.032)</td>
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<tr>
<td>log of GDP per capita (export destination)</td>
<td>0.508*** (0.024)</td>
<td>0.503*** (0.026)</td>
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<tr>
<td>log of distance</td>
<td>-1.652*** (0.022)</td>
<td>-1.513*** (0.022)</td>
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<tr>
<td>common border</td>
<td>0.994*** (0.100)</td>
<td>0.941*** (0.093)</td>
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<td>common language</td>
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<td>0.667*** (0.045)</td>
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<td>common legal system</td>
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<td>0.439*** (0.028)</td>
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<td>colonial history</td>
<td>1.211*** (0.078)</td>
<td>0.789*** (0.089)</td>
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<td>regional trade agreements</td>
<td>0.244*** (0.040)</td>
<td>0.260*** (0.038)</td>
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<td>WTO membership</td>
<td>0.353*** (0.036)</td>
<td>0.334*** (0.039)</td>
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<td>common currency</td>
<td>0.317 (0.178)</td>
<td>0.008 (0.199)</td>
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<tr>
<td>real exchange rate</td>
<td>0.314*** (0.031)</td>
<td>0.329*** (0.033)</td>
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<tr>
<td>Constant</td>
<td>8.218*** (1.075)</td>
<td>7.307*** (1.112)</td>
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<tr>
<td>Observations</td>
<td>216,337</td>
<td>216,337</td>
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<tr>
<td>R-squared</td>
<td>0.759</td>
<td>0.775</td>
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Robust standard errors in parentheses; ***p<0.01, ** p<0.05, * p<0.1
Table 2. Factual and gravity model projected trade flows between Turkey and Pakistan

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<tr>
<td><strong>Turkey's exports to Pakistan</strong></td>
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<tr>
<td>Factual</td>
<td>77.7</td>
<td>58.2</td>
<td>63.5</td>
<td>128.5</td>
<td>52.1</td>
<td>31.2</td>
<td>57.3</td>
<td>70.4</td>
<td>86.4</td>
<td>187.6</td>
<td>129.6</td>
<td>157.0</td>
<td>155.1</td>
<td>163.1</td>
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<tr>
<td>Gravity model projections</td>
<td>251.3</td>
<td>258.6</td>
<td>298.7</td>
<td>293.6</td>
<td>327.1</td>
<td>290.3</td>
<td>310.4</td>
<td>382.0</td>
<td>459.6</td>
<td>540.7</td>
<td>618.4</td>
<td>714.2</td>
<td>810.0</td>
<td>749.2</td>
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<td><strong>Pakistan's export to Turkey</strong></td>
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<tr>
<td>Factual</td>
<td>76.1</td>
<td>59.3</td>
<td>58.9</td>
<td>39.4</td>
<td>101.1</td>
<td>87.2</td>
<td>110.1</td>
<td>200.3</td>
<td>219.4</td>
<td>299.5</td>
<td>339.2</td>
<td>446.3</td>
<td>470.9</td>
<td>407.1</td>
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<td>124.4</td>
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<td>116.3</td>
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<td>177.6</td>
<td>211.0</td>
<td>248.0</td>
<td>278.3</td>
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<td>294.3</td>
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Table 3. Trade complementarity indices for trade flows between Turkey and Pakistan

<table>
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<tr>
<th>Importer</th>
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<th>Pakistan</th>
</tr>
</thead>
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<td>Turkey</td>
<td></td>
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</tr>
<tr>
<td>Pakistan</td>
<td>0.269</td>
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