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Pakistan-India Trade in the Negative List

Abstract. In a large number of circumstances, trade policy modelers turn to partial equilibrium modeling in an imperfect substitutes framework. This paper develops a formal representation of this imperfect substitutes model and applies it to trade liberalization within the negative list between Pakistan and India following Pakistan's decision to grant MFN status to India. It provides estimates for ranges of output and welfare effects for a number of sectors of interest. It sets these results within the history of Pakistan-India trade and the political economy of the negative list.

JEL Codes: F13, F14, F15

Keywords: imperfect substitutes model, Pakistan, India, trade, liberalization

Introduction

From both theoretical and empirical points of view, trade policy analysis should ideally be conducted in a general equilibrium framework. However, there are circumstances in which applied, partial equilibrium modeling becomes a necessity. As pointed out by Francois and Reinert (1997), the most common of these circumstances is when the trade policies under question are at a level of sectoral disaggregation that makes applied general equilibrium analysis impossible. Despite appearances from standard textbooks, the actual partial equilibrium modeling done in applied trade policy analysis uses the *imperfect substitutes model* (ISM). The ISM has its origin in Armington (1969) and the well-known "Armington assumption" that imported and domestic competing goods are imperfect substitutes for each other. It was further developed by Baldwin and Murray (1977), Rousslang and Suomela (1988), Francois and Hall (1997) and Francois and Reinert (2009) among others. The application of the model here is in the South Asian context of Pakistan-India trade, more specifically the liberalization of the negative list maintained by Pakistan against imports from India.

In late 2011, Pakistan decided in principle to grant India Most Favoured Nation (MFN) status, a gesture that is expected to open up avenues for significant trading opportunities between

the two countries. Despite India and Pakistan both being long-term members of the World Trade Organization (WTO), trade between the two countries has remained appallingly low with bilateral trade at approximately US$2.5 billion in 2010. This represents an insignificant fraction of the total potential trade between the two countries. A number of studies have estimated significant potential gains from greater trade between the two countries and all suggest that it would prove a mutually beneficial relationship.[2] Close geographical proximity between the two countries should provide an ideal platform for greater trade flows, and there is the hope that increased trade could also lead to more peaceful relationships between the two countries (e.g., Herge et al., 2010; Murshed & Mamoon, 2010) and therefore in the South Asian region as a whole.

The Pakistan-India Trade Relationship

As a result of the partition of the sub-continent in 1947, the borders between Pakistan and India cut straight through the historical socioeconomic relationships and trading routes that characterized the region. In this process, the relatively prosperous Punjab province was partitioned between the two countries, causing major disruptions in trading activities. Today, all but one of these major routes stand closed. The one open route, the increasingly vibrant Wagah-Attari border crossing, is a reminder of the historic linkages that once reflected the economic dynamism of this region. The partition led to a virtual standstill of trading activities between Pakistan and India. However, before all economic relations came to a grinding halt, both countries continued to trade heavily with each other. For example, in 1948-1949, 50.6 percent of Pakistan's imports and 23.6 percent of its exports came from India, but by 1975-1976, these shares had fallen to a paltry 1.3 percent and 0.03 percent, respectively (Ghuman & Madaan, 2006; Maini & Vaid, 2012). Annual trade volumes fell from US$250 million in 1948-1949, to less than half in 1951-1952 and to less than one-fourth by 1954-1955 (Naqvi et al., 2007). This striking collapse reflected not just the 1949 currency devaluation in India but also the increasingly hostile political relations between the two countries.

In the aftermath of the partition, bitter disputes emerged between the two governments on issues ranging from responsibility for violence during mass migration to the division of military and civilian assets. Within months of independence, the once-unitary armies were embroiled in

[2] See, for example, Nabi and Nasim (2001), Naqvi et al. (2007), Khan (2009) and Nabi (2012).

an armed conflict in Kashmir, leading to the cessation of government-to-government contacts (Nawaz, 2009; Wolpert, 2011). As soon as the movement of refugees halted in the early-1950s, all cross-border rail and road links were severed, forcing traders to explore alternative partners. The fate of economic relations between South Asia's two largest countries was sealed for the next several decades.

As illustrated in Figure 1, trade volumes between India and Pakistan remained extremely low even as both economies continued to grow. Following the first full-scale war over Kashmir in 1965, official bilateral trade stopped completely. Soon thereafter, Pakistan underwent a period of internal turmoil, leading to the second Indo-Pak war in 1971 and resulting in the creation of Bangladesh. The extent of antagonism of that era is symbolized by Pakistan's 1965 ban on Indian cinema despite its immense popularity within the country. For the next three decades, even as both economies saw growth in overall trade and GDP, annual bilateral trade did not exceed the US$100 million mark before 1994-1995. Despite the peak of tensions over the Kashmir insurgency in the mid-1990s, India unilaterally granted MFN status to Pakistan in 1996. Due to a combination of factors, including pressure from local business communities and the generally turbulent regional security environment, the government of Pakistan decided not to reciprocate the gesture. It was not before 2011 that Pakistan finally decided to move away from its positive list to a negative list approach that is expected (at the time of this writing) to be phased out completely by the end of 2012 and complete the process of granting MFN status to India.

The stage for these changes was set in 2004 when Pakistan began expanding the positive list items from just 577 items to 1938 items in 2008. As a result, bilateral trade levels soared to historical highs, touching the US$2 billion mark in 2010-2011. As evident from Figure 1, however, even recent developments remain vulnerable to the security situation and the consequent political relations between the two countries. Much like in the case of the 1999 Kargil conflict, bilateral trade witnessed a steep drop of 22 percent following the Mumbai terrorist attacks in 2008. Even as bilateral trade is anticipated to grow further in the near future, deeper economic ties will depend enormously on the security situation in the region.

In the past decade, as India's economy has continued on the path of high levels of growth, Pakistan's share of global trade has been diminishing. According to WTO (2012) statistics, since 1999, Pakistan's share of global trade has fallen by one-third, whereas during the

same period, India's share has almost doubled. Since 2007 in particular, the structural inadequacies of Pakistan's economy have been exposed in the form of historically low GDP growth rates. With dwindling foreign direct investment and slowing export growth, Pakistan's economic strategists appear to view trade liberalization with India as the logical next step towards revitalizing the economy (Khan, 2012; Beteille & Kochhar, 2012).[3]

Despite indications of potential gains from greater bilateral trade, economic ties between India and Pakistan have been held hostage to the continuous rivalry on the political front. Consequently, the series of positive developments since April 2011 have raised hopes that, much to the benefit of ordinary citizens and businesses in India and Pakistan, trade liberalization will finally become a reality. One of the last vestiges of past mistrust is Pakistan's negative list to which we now turn.

The Negative List

Pakistan's decision to embrace trade liberalization with India was historically significant. According to Pakistan Ministry of Commerce officials, in early 2011, the government had decided in principle to "take the plunge" towards complete trade liberalization, realizing that "some industries might go out of business."[4] Yet they were convinced that, in the long-run, the government must not unconditionally subsidize uncompetitive firms. They would much rather invest freed-up subsidies to enhance business credit availability to "small scale yet innovative entrepreneurial ventures."

Since granting MFN status to India was not expected to command unanimous support across the business spectrum, several industries convinced the government to include items of interest on a negative list. Officials at the Ministry of Commerce were ready for an immediate MFN announcement without the negative list, yet "the hue and cry over massive disruptions for struggling industries" forced them to adopt a more gradual policy. The negative list was therefore seen as providing a year-long breathing space for uncompetitive industries, yet industrialists in Lahore pointed that this time period was "simply not enough" for them to

[3] For a now-dated but still valuable historical view of trade liberalization in South Asia, see Panagariya (1999).
[4] Quotation marks without citations refer to interviews conducted by the authors.

reengineer manufacturing processes and overcome economy-wide structural shortcomings. Therefore, they continue to lobby for an extension of the negative list to at least the year 2015.

Regardless of whether such an extension is granted or not, the existing protection extended to lobbying industries is clearly reflected in the allocation of products in the negative list. Figure 2 provides a snapshot view of the percentage shares of the major negative list items considered in this paper based on a broad industry classification. As the figure illustrates, over one-third of all items on the negative list belong to the auto parts industry, with about 12 per cent distributed among clothing, leather and related industries and about 8 percent of the negative list dedicated to the paper industry.

This allocation of products in the negative list reveals some interesting political economy dynamics. Pakistan remains an economy dominated by services and agriculture, which together account for about 75 percent of Pakistan's output and 85 percent of Pakistan's employed labor force in 2011-12. This implies that manufacturing represents just about 25 percent of Pakistani output and employs only about 15 percent of the labor force. The manufacturing sector's expansion in the last decade or so has also been in part a result of the growth of the "large scale" segment within manufacturing, including textiles, food and tobacco, pharmaceuticals, motor vehicles and metal industries. Among these, in terms of manufacturing value-added, textiles and clothing and footwear have accounted for roughly 24 per cent of manufacturing value added over the years, while auto parts has contributed to roughly about 15 per cent. Given this breakdown, it is rather surprising that the auto parts industry corners a disproportionate representation in the negative list, raising questions about the economic basis for its inclusion. This suggests that political economy factors are a crucial part of the story of the formation of the negative list.

While Pakistan may be an emerging market for automobiles and automotive parts, the total contribution of the auto industry to the economy's output stands at less than 3 percent. It employs only 0.2 million people directly, a miniscule fraction of the labor force employed in the manufacturing sector. The Government of Pakistan has also undertaken two major initiatives or domestic industrial policies designed to specifically promote and expand the significance of the auto industry to the economy's output.[5] The Government also raised several ad-valorem tariffs in 2006-07 to protect the engineering industry, particularly the motor vehicles segment that falls

[5] The two major initiatives are National Trade Corridor Improvement Program (NTCIP) and Auto Industry Development Program (AIDP) for the development of the automotive industry in Pakistan.

under the large-scale segment of manufacturing. For instance, from 2005-06 to 2006-07, there was an average 30 percent increase in the tariffs on imports of auto parts. However, as the WTO (2007) pointed out, such protection has only bred inefficiency (including rent seeking by powerful vested interests), worked against global competitiveness, perpetuated low capacity utilization and resulted in higher prices.

With a history of protection favoring auto manufacturing and assembly sectors in Pakistan, it comes as no surprise that the representatives of the auto parts industry declared the pre-MFN posturing as an "emergency." Without "adequate and immediate government support," they argued, Japanese motorbike and car manufacturers like Honda would immediately resort to purchasing cheaper Original Equipment Manufacturer (OEM) parts from India. Pakistan's "struggling manufacturing environment" was no match for India's "world class" auto parts industry, and hence granting the MFN to India would serve as a "death warrant" for auto parts manufacturing in Pakistan. An official involved in the formation of the list confirmed that auto parts manufacturers posed the "most effective" opposition to this policy change. However, the factors underlying the sector's lack of competitiveness have remained unaddressed.

Proponents of granting MFN status to India cite the Pakistan-China Free Trade Agreement (FTA) of 2006 as a case in point to drive home the exaggerated nature of concerns on the part of the Pakistani manufacturing sector. They argue that, despite China's enormous comparative advantage in manufacturing, not a single business in Pakistan had been "wiped out" as a result of this competition. On the contrary, the FTA has resulted in greater availability of cheaper motorbikes, home appliances and other manufactured items, which have in turn benefited Pakistani consumers (Shabir & Kazmi 2007). In terms of the impact on industry, several assembly plants for China-made parts of home appliances and motorbikes have appeared in Pakistan, generating thousands of new jobs. In addition, many parts manufacturers have begun producing specialized parts for these new products.

The Model

As mentioned above, our analysis of the liberalization of Pakistan's negative list is conducted using an ISM approach. The ISM used here treats Pakistan's imports and domestic competing goods in any sector *i* as imperfect substitutes for each other in Pakistan's demand. More

specifically, we take a *nested approach* as illustrated in Figure 3.[6] At the lower level in this diagram, Pakistan's imports from India and the rest of the world (ROW) are aggregated together into imports as a whole. At the upper level in this diagram, Pakistan's aggregate imports are further aggregated with Pakistan's output in sector *i* to compose a top-level, aggregate good. Consider first the *lower-level aggregation* of imports from India and the ROW into aggregate imports. This is done via a constant elasticity of substitution (CES) functional form for sector *i* as follows:

$$D_{i,imp} = \alpha_{i,imp}\left[\beta_{i,imp} D_{i,ind}^{(\sigma-1)/\sigma} + \left(1-\beta_{i,imp}\right) D_{i,row}^{(\sigma-1)/\sigma}\right]^{\sigma/(\sigma-1)} \tag{1}$$

where $D_{i,imp}$ is aggregate imports, $\alpha_{i,imp}$ is the lower-nest intercept parameter, $\beta_{i,imp}$ is the lower-nest share parameter, $D_{i,ind}$ is imports from India, $D_{i,row}$ is imports from the ROW, and σ is the elasticity of substitution between imports from India and the ROW. For simplicity, we assume that σ is constant across sectors.[7]

The behavioral assumption for this lower nest is that the representative Pakistani household minimizes the cost of securing $D_{i,imp}$ from the two sources (India and ROW). The first-order condition for this minimization problem is:

$$\frac{D_{i,ind}}{D_{i,row}} = \left[\frac{P_{i,row}\beta_{i,imp}}{P_{i,ind}\left(1-\beta_{i,imp}\right)}\right]^{\sigma} \tag{2}$$

where $P_{i,ind}$ is the intra-Pakistan price of the good imported from India and $P_{i,row}$ is the intra-Pakistan price of the good imported from ROW.

The price of this aggregate import good is given by:

$$P_{i,imp} D_{i,imp} = P_{i,ind} D_{i,ind} + P_{i,row} D_{i,row} \tag{3}$$

Next consider the *upper-level aggregation* of aggregate imports (from both India and the ROW) and the domestic, Pakistani good into a top-level, aggregate consumption good. This is also done via a constant elasticity of substitution (CES) functional form for sector *i* as follows:

$$Q_i = \alpha_i\left[\beta_i D_{i,imp}^{(\varphi-1)/\varphi} + (1-\beta_i) D_{i,pak}^{(\varphi-1)/\varphi}\right]^{\varphi/(\varphi-1)} \tag{4}$$

[6] On the difference between nested and non-nested approaches, see Shiells and Reinert (1993).
[7] Two central references on the estimation of these "Armington elasticities" are Reinert and Roland-Holst (1992) and Shiells and Reinert (1993).

where Q_i is the aggregate consumption good, α_i is the upper-nest intercept parameter, β_i is the upper-nest share parameter, $D_{i,imp}$ is aggregate imports from Equation 1, $D_{i,pak}$ is domestic, Pakistani goods, and φ is the elasticity of substitution assumed to be constant across all sectors.

The behavioral assumption for this upper nest is that the representative Pakistani household minimizes the cost of securing Q_i from the two sources (imports and domestic goods). The first-order condition for this minimization problem is:

$$\frac{D_{i,imp}}{D_{i,pak}} = \left[\frac{P_{i,pak}\beta_i}{P_{i,imp}(1-\beta_i)}\right]^{\varphi} \tag{5}$$

where $P_{i,pak}$ is the price of the domestic, Pakistani good.

The price of this aggregate good is given by:

$$P_i Q_i = P_{i,imp} D_{i,imp} + P_{i,pak} D_{i,pak} \tag{6}$$

We next need the overall demand for Q_i. This is given by the following constant elasticity of demand function:

$$Q_i = \gamma_i P_i^{\epsilon} \tag{7}$$

where γ_i is a constant and ϵ is the price elasticity of demand assumed to be constant across all sectors.

Define $S_{i,pak}$ as the domestic supply in sector i in Pakistan. $S_{i,pak}$ is given by a constant elasticity of supply function:

$$S_{i,pak} = \delta_i P_{i,pak}^{\tau} \tag{8}$$

where δ_i is a constant and τ is the price elasticity of supply assumed to be constant across all sectors.

Equilibrium in the domestic, Pakistani market is given by:

$$D_{i,pak} = S_{i,pak} \tag{9}$$

Define S_i^{ind}as the supply in sector i from India. S_i^{ind} is given by a constant elasticity of supply function:

$$S_{i,ind} = \theta_i \pi_{i,ind}^{\mu} \tag{10}$$

where θ_i is a constant, π_i is the intra-India price, and μ is the price elasticity of supply assumed to be constant across all sectors.

Equilibrium in market for imports from India is given by:

$$D_{i,ind} = S_{i,ind} \tag{11}$$

Define π_{ik}, $k = ind, row$, as the foreign prices of Pakistan's imports from India and the ROW. The domestic prices of these imports are given by:

$$P_{i,ind} = (1 + t_{i,ind})\pi_{i,ind} \tag{12}$$

$$P_{i,row} = (1 + t_{i,row})\pi_{i,row} \tag{13}$$

where $t_{i,ind}$ and $t_{i,row}$ are the ad valorem tariffs in sector i .

These 13 equations determine 13 endogenous variables. Seven of these are quantity variables: $D_{i,imp}$, $D_{i,ind}$, $D_{i,row}$, $D_{i,pak}$, Q_i , $S_{i,pak}$, and $S_{i,ind}$. Six of them are price variables: $P_{i,ind}$, $P_{i,row}$, $P_{i,imp}$, $P_{i,pak}$, P_i , and $\pi_{i,ind}$. Note that $\pi_{i,row}$ is exogenous.

With this framework, we can analyze Pakistan's import behavior using the three markets described in Figure 4. The top diagram in Figure 4 is the domestic market for sector *i* and consists of a domestic demand curve implied by Equations 4 and 5 and a domestic supply curve given in Equation 8.[8] The middle diagram in Figure 4 is the Indian import market for sector *i* and consists of a domestic demand curve implied by Equations 1 and 2 and the import supply curve given by Equation 10. Finally, the bottom diagram in Figure 4 is the imports from ROW market for sector *i* and consists of a domestic demand curve implied by Equations 1 and 2 and a perfectly-elastic import supply curve given by the fact that $\pi_{i,row}$ is exogenous.

The middle diagram in Figure 4 reflects an arbitrarily high tariff (200 percent ad valorem equivalent) that corresponds to the import bans in Pakistan's negative list with a corresponding arbitrarily small level of imports (US$ 10 million).[9] The bottom diagram also contains a tariff, but this is a much lower, MFN tariff. The simulations reported here consider the reduction of the high tariff in the middle diagram to the lower MFN tariff ($t_{i,row}$). The reduction of the tariff in the middle diagram reduces the domestic price of item *i* from India. Through cross-price effects, this shifts the demand curves in the top and bottom diagrams to the left as Pakistani consumers substitute towards imports from India. The consequent reduction in the domestic price in the top diagram has a second-order substitution effect in the middle diagram where the demand curve also shifts to the left.

[8] Note that the demand and supply curves drawn in Figure 4 are presented a linear for simplicity but are actually non-linear given the functional forms and elasticities used.

[9] Note that Pakistan has MFN tariffs of over 100 percent on some items and that, with the aggregation necessary to accommodate the country's available output data (see below), imports from India exceed US$10 million in one sector.

It is also possible to engage in a welfare analysis of the changes in Figure 4. In the top diagram, there is a reduction in producer surplus equal to trapezoid A (which extends to the supply curve). The reduction in producer surplus is completely offset by an equivalent gain to consumers, however, and therefore nets to zero.[10] In the market for the Indian good in the middle diagram, there are no domestic producers to account for. However, the estimation of the consumer welfare effect is complicated by the fact that the price has changed and the demand curve has shifted. The standard approach to this is to measure the change in consumer surplus along a presumed path between the initial and final equilibria points.[11] This presumed path is given by the arrow directed in the southeast direction in the diagram, and the gain in consumer surplus is given by rectangle B and triangle C. We therefore report the gain in consumer surplus as B + C. Given the fixed, exogenous nature of $\pi_{i,row}$ in the model, there is no consumer surplus change in the bottom diagram in Figure 4.

There are also tariff revenue changes to keep track of in the model. In the middle diagram in Figure 4, there are losses in revenue equal to rectangles B and E and a gain in revenue equal to rectangle D.[12] Because areas B and E are constructs of the model to deal with the initial zero-level imports from India in the negative list, we exclude them from our analysis of tariff change. We must also include the loss in tariff revenue in the bottom diagram as demand for imports from the rest of the world decreases, area F. We calculate the total tariff revenue change as D – F. An approximation of the new welfare effect is therefore B + C + D – F.

Data and Simulations

As always in trade policy analysis, our analysis is limited by data availability. In order to undertake the simulations, the following data points for the negative list items were brought together: Pakistan's economic output; its corresponding imports from the rest of the world; and the ad valorem equivalent, MFN tariff on those products maintained by Pakistan. However, this compilation exercise was constrained by the lack of disaggregated data for the variables of interest. While the negative list items are reported at the 8-digit disaggregated level, the relevant

[10] See Burns (1973) and Rousslang and Suomela (1988).

[11] See Burns (1973), Rousslang and Suomela (1988) and Francois and Reinert (2009). Burns (1973) noted that "path dependence is usually of greater theoretical than practical importance" (p. 342).

[12] Areas B and E reflect the loss in tariff revenue due to the reduction in the tariff rate itself. Area D reflects the gain in in tariff revenue due to the quantity effect of the reduction in the tariff. Note that are D is negatively affected by the leftward shift of the demand curve for the Indian good.

trade and output data for those items are available only at higher levels of aggregation. In addition, there are also significant differences in the classification system used to report such data which meant that concordance between the different variables had to be developed first before proceeding with the simulations.

To briefly illustrate, Pakistan's economic output data reported by the Pakistan Bureau of Statistics (PBS) is available only at a mix of 3-, 4-, and 5-digit levels of disaggregation and is based on the Pakistan Standard Industry Classification (PSIC).[13] The trade data sourced from UNCTAD is reported at the 3-digit level and follows the Standard International Trade Classification (SITC) classification. Hence, we had to match each negative list item with its relevant PSIC and SITC categories to develop a degree of concordance. However, since we were constrained by the lack of output and trade data at that level of disaggregation, we eventually focused only on the *sensitive sectors* that emerged from grouping individual products on the negative list.[14] Even though the ad valorem, MFN tariffs sourced from WTO's Applied Tariffs Database follows a Harmonized System (HS) classification, consistent with what is reported in the negative list, considering the unavailability of corresponding output or import data, we averaged the MFN tariffs for the relevant sector by grouping the individual products. The initial values for the resulting sectors are presented in Table 1.

There are also a number of behavioral elasticities in the model described above. These are ϵ, σ, φ, τ, and μ. We set these elasticities using the following considerations. In the case of ϵ, we use the low value of 0.2. To understand this choice, it must be appreciated that setting ϵ too high (i.e. making it relatively elastic) implies that demand can easily and unrealistically shift from other sectors into the sector under consideration, ignoring the fact that empirical realities reflect *general equilibrium* (rather than partial equilibrium) realities and therefore suppressing the estimated impacts of liberalization.[15] In the cases of σ and φ, we set these at 6.0 and 5.5, respectively.[16] In the cases of τ and μ, we use values of 3.0 and 1.5 respectively. In the case of μ,

[13] The most recent output data available dates back to 2005-06. The Pakistan Bureau of Statistics is in the process of updating these date to 2011.

[14] The importance of these sectors was confirmed through interviews with policy and business stakeholders in both Pakistan and India.

[15] This consideration is especially important in the case of constant elasticity of demand functions where the percent change in price can translate into very large changes in *absolute* quantity along the relatively flat portion of the function.

[16] In Armington-style, imperfect substitutes models, the lower-nest elasticity of substitution needs to exceed the upper-nest elasticity of substitution for intuitive results.

the price elasticity of supply from India, there is ample evidence of continued, border impediments that would advise against setting this value too high.

We implement simulations of Equations 1 to 13 using the General Algebraic Modeling System (GAMS).[17] The simulated results of liberalizing imports from India in Pakistan's negative list are presented in Table 2 for two scenarios: the granting MFN status to India (lowering tariffs to the MFN ad valorem equivalent) and full liberalization under the South Asia Free Trade Area (SAFTA).[18] Table 2 reports impacts on Pakistan's imports from India and the ROW, Pakistan's output, consumer surplus, tariff revenue and net welfare. The results presented should be interpreted as *order-of-magnitude values* that can suggest where the largest changes in trade and domestic output are likely to occur. In terms of *absolute* changes, the largest domestic adjustment issues appear in the tobacco, pharmaceuticals and cloth sectors. In terms of *percentage* changes, the largest domestic adjustment issues appear in the leather, sporting goods and footwear sectors. Each sector is associated with net welfare gains on the order of a few million $US. Tariff revenue impacts differ between the MFN and SAFTA scenarios because there are not tariff revenues collected on imports from India under SAFTA.

The whole premise of the lobbying on the part of sectors included in the negative list relates to reduced domestic output due to increased imports from India. However, as is evident from the simulated results on domestic output changes is that neither of the scenarios reflects a drastic drop in Pakistani domestic output in any of the sensitive sectors (in terms of absolute values or percentage changes).

Conclusions

The ISM is a standard feature in the applied trade policy analysis toolkit but is not always explicitly described in terms of a complete set of equations. This article has done so in order to make its structure more explicit in a way that is conformable with applied general equilibrium trade policy modeling. The model has been applied to an evolving issue in the South Asian context, namely trade liberalization between Pakistan and India in a number of "sensitive" sectors on Pakistan's negative list. Despite positive net welfare gains, there do appear to be potentially-significant sectoral adjustment issues in the leather, sporting goods and footwear

[17] See www.gams.com.
[18] See, for example, Bandara and Yu (2003).

sectors. These adjustment issues would potentially need to be addressed in order to ensure continued buy-in from the Pakistani private sector through the process of trade liberalization with India, particularly if the liberalization proceeds to a zero-tariff SAFTA scenario.

While standard economic welfare benefits to be gained from liberalizing trade in the negative list between Pakistan and India are significant, the real gains from trade liberalization will be found in the non-economic realm through increased trust and engagement between the governments of Pakistan and India and their respective business communities.[19] The costs of mistrust have been huge in terms of wasted resources and wasted lives. With some commitment on both sides, increased trade flows can contribute to normalized relations based on multilateral principles and reduced political tensions in the critical South Asian region.

References

Armington, P. (1969). A theory of demand for products distinguished by place of production. *IMF Staff Papers*, 16(3): 159-176.

Baldwin, R.E. & Murray, T. (1977). MFN tariff reductions and developing country trade under the GSP. *Economic Journal*, 87(345): 30-46.

Bandara, J.S. & Yu, W. (2003). How desirable is the South Asian Free Trade Area? A quantitative economic assessment. *World Economy*, 26(9): 1293-1323.

Beteille, T. & Kochhar, K. (2012). India-Pakistan trade: Making borders irrelevant. *End poverty in South Asia* (World Bank Blog), April 26.

Brenton, P., Newfarmer, R., Shaw, W. & Walkenhorst, P. (2009). Breaking into new markets: Overview." In Newfarmer, R., Shaw, W. & Walkenhorst, P. (Eds.), *Breaking into new markets: Emerging lessons for export diversification* (pp. 1-35). Washington, DC: World Bank.

Burns, M.E. (1973). A note on the concept and measure of consumer's surplus. *American Economic Review*, 63(3): 335-344.

Francois, J.F. & Hall, H.K. (1997). Partial equilibrium modeling. In Francois, J.F. & Reinert, K.A. (Eds.), *Applied methods for trade policy analysis: A handbook* (pp. 122-155). Cambridge: Cambridge University Press.

[19] See Hegre et al. (2010) and Murshed and and Mamoon (2010).

Francois, J.F. & Reinert, K.A. (1997). Applied methods for trade policy analysis: An overview. In Francois, J.F. & Reinert, K.A. (Eds.), *Applied methods for trade policy analysis: A handbook* (pp. 3-24). Cambridge: Cambridge University Press.

Francois, J.F. & Reinert, K.A. (2009). Partial equilibrium models. In Reinert, K.A., Rajan, R.S., Glass, A.J. and Davis, L.S. (Eds.), *The Princeton encyclopedia of the world economy* (pp. 891-894). Princeton: Princeton University Press.

Ghori, U.H. (2012). Winner or loser? A post-quota case study of Pakistan's textile and clothing exports. *South Asia Economic Journal*, 13(1): 105-129.

Ghuman, R.S. & Madaan, D.K. (2006). Indo-Pakistan trade cooperation and SAARC. *Peace and Democracy in South Asia*, 2(1/2): 71-87.

Hegre, H., Oneal, J.R. & Russett, B. (2010). Trade does promote peace: New simultaneous estimates of the reciprocal effects of trade and conflict. *Journal of Peace Research*, 47(6): 763-774.

Khan, M.S. (2009). India-Pakistan trade: A roadmap for enhancing economic relations. Policy Brief 09-15, Peterson Institute for International Economics.

Khan, M.S. (2012). India-Pakistan trade breakthrough? *East Asia Forum*, March 11.

Maini, T. and Vaid, M. (2012). Indo-Pak trade: A visit to historical relations. *CUTS International Briefing Paper* 5.

Murshed, S.M. & Mamoon, D. (2010). Not loving thy neighbour as thyself: Trade, democracy and military expenditure explanations underlying India-Pakistan rivalry. *Journal of Peace Research*, 47(4): 463-476.

Nabi, I. (2012). Pakistan-India trade: Preparing for a better future. Woodrow Wilson Center.

Nabi, I. & Nasim, A. (2001). Trading with the enemy. In Lahiri, S. (Ed.), *Regionalism and globalization* (170-198). London: Routledge.

Naqvi, Z.F., Schuler, P. & Richter, K. (2007). Pakistan–India trade: Overview and key issues. In Naqvi, Z.F. and Schuler, P. (Eds.), *The challenges and potential of Pakistan-India trade* (pp. 1-28). Washington, DC: World Bank.

Nawaz, S. (2009). *Crossed swords: Pakistan, its army, and the wars within*. Oxford: Oxford University Press.

Panagariya, A. (1999). Trade policy in South Asia: Recent liberalization and future agenda. *World Economy* 22(3): 353-378.

Pursell, G. (2007). Pakistan-India trade: Impact on the textile sector. In Naqvi, Z.F. and Schuler, P. (Eds.), *The challenges and potential of Pakistan-India trade* (pp. 123-142). Washington, DC: World Bank.

Reinert, K.A. & Roland-Holst, D.W. (1992). Armington elasticities for United States manufacturing sectors. *Journal of Policy Modeling*, 14(5): 631-639.

Rouslang, D.J. & Suomela, J.W. (1988). Calculating the welfare costs of import restrictions in the imperfect substitutes model. *Applied Economics* 20(5): 691-700.

Shabir, S., and Kazmi, R. (2007). Economic effects of the recently signed Pak-China Free Trade Agreement. *Lahore School of Economics Journal*, Special Edition: 173-202.

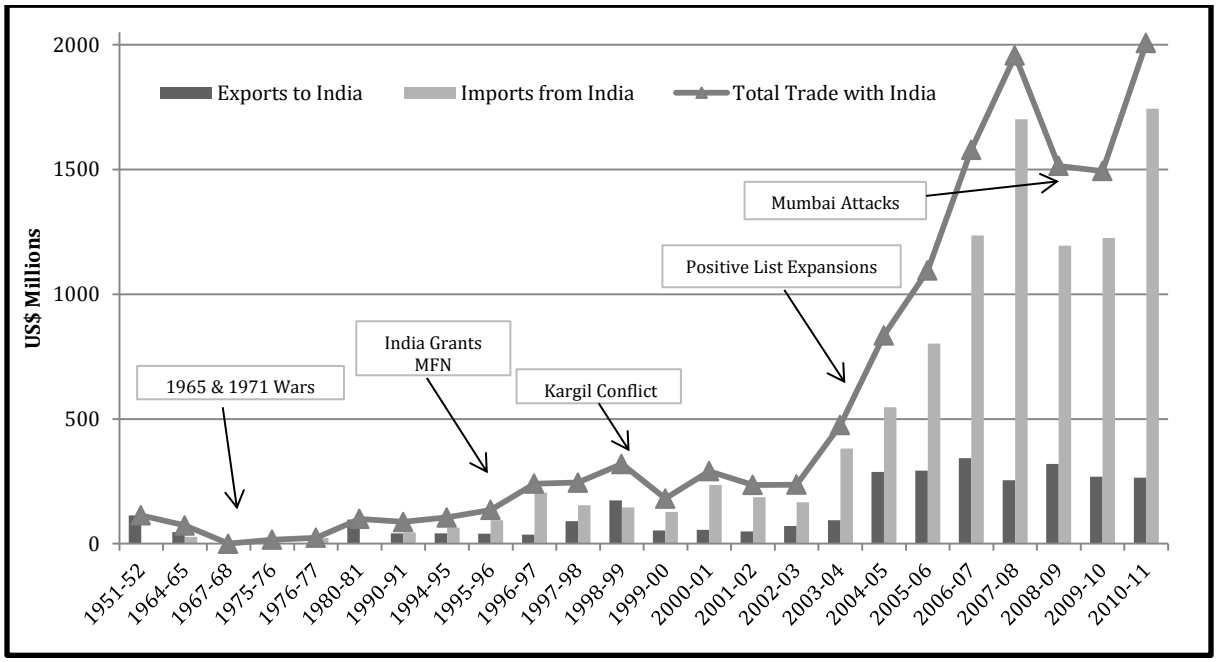
Shiells, C.R. & Reinert, K.A. (1993). Armington models and terms-of-trade effects: Some econometric evidence for North America. *Canadian Journal of Economics*, 26(2): 299-316.

Wolpert, S. (2011). *India and Pakistan: Continued conflict or cooperation?* Berkeley: University of California Press.

World Trade Organization (2007). *Trade policy review of Pakistan*. Geneva.

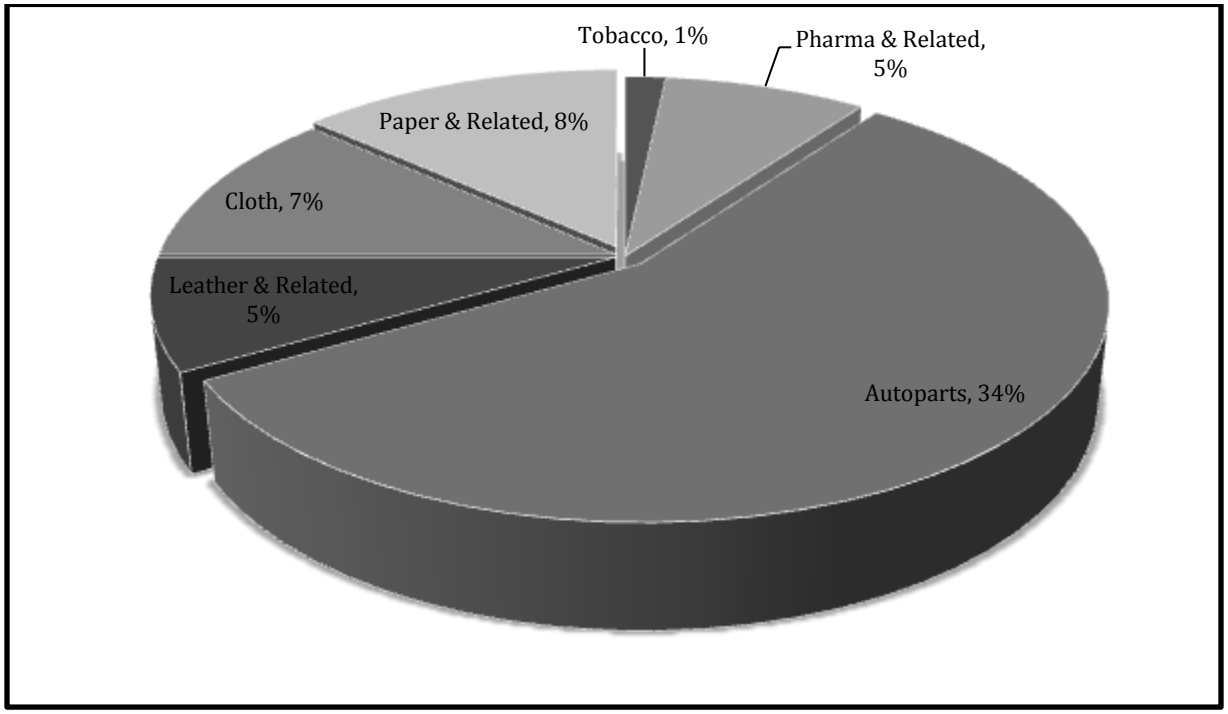
World Trade Organization (2012). *World trade report*. Geneva.

Figure 1: History of Pakistan-India Trade (millions of US$)



Source: Compiled from State Bank of Pakistan and Pakistan Federal Bureau of Statistics

Figure 2: Composition of the Negative List (percent)



Source: Authors' computations based on Pakistan's negative list. The total in this figure represents 60 percent of the items in the negative list. The remainder is spread across other sectors.

Figure 3: The Nested Aggregation Structure

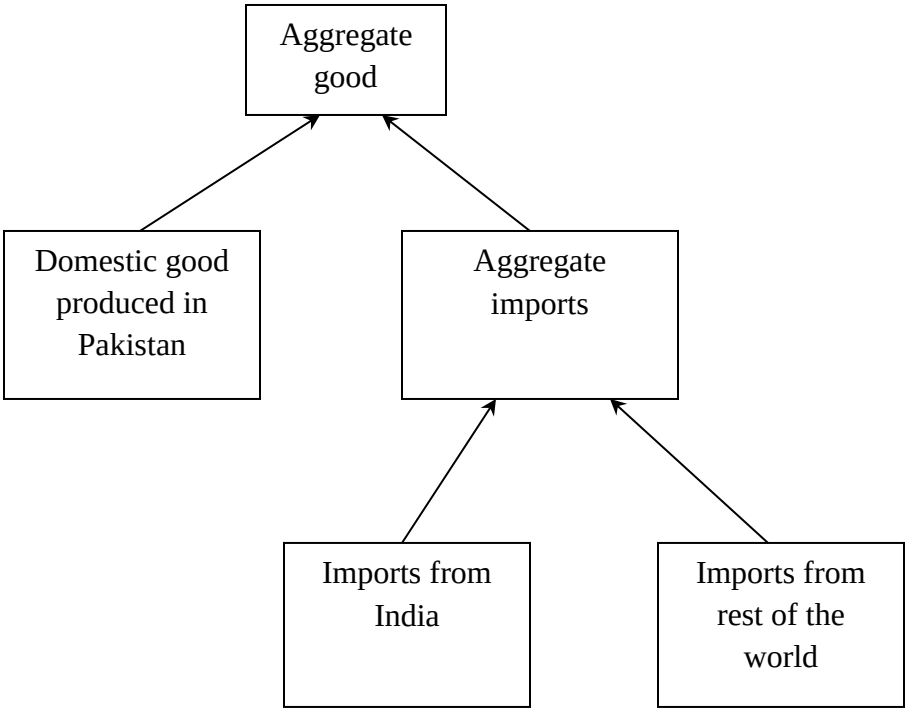


Figure 4: A Model of Pakistan's Import s

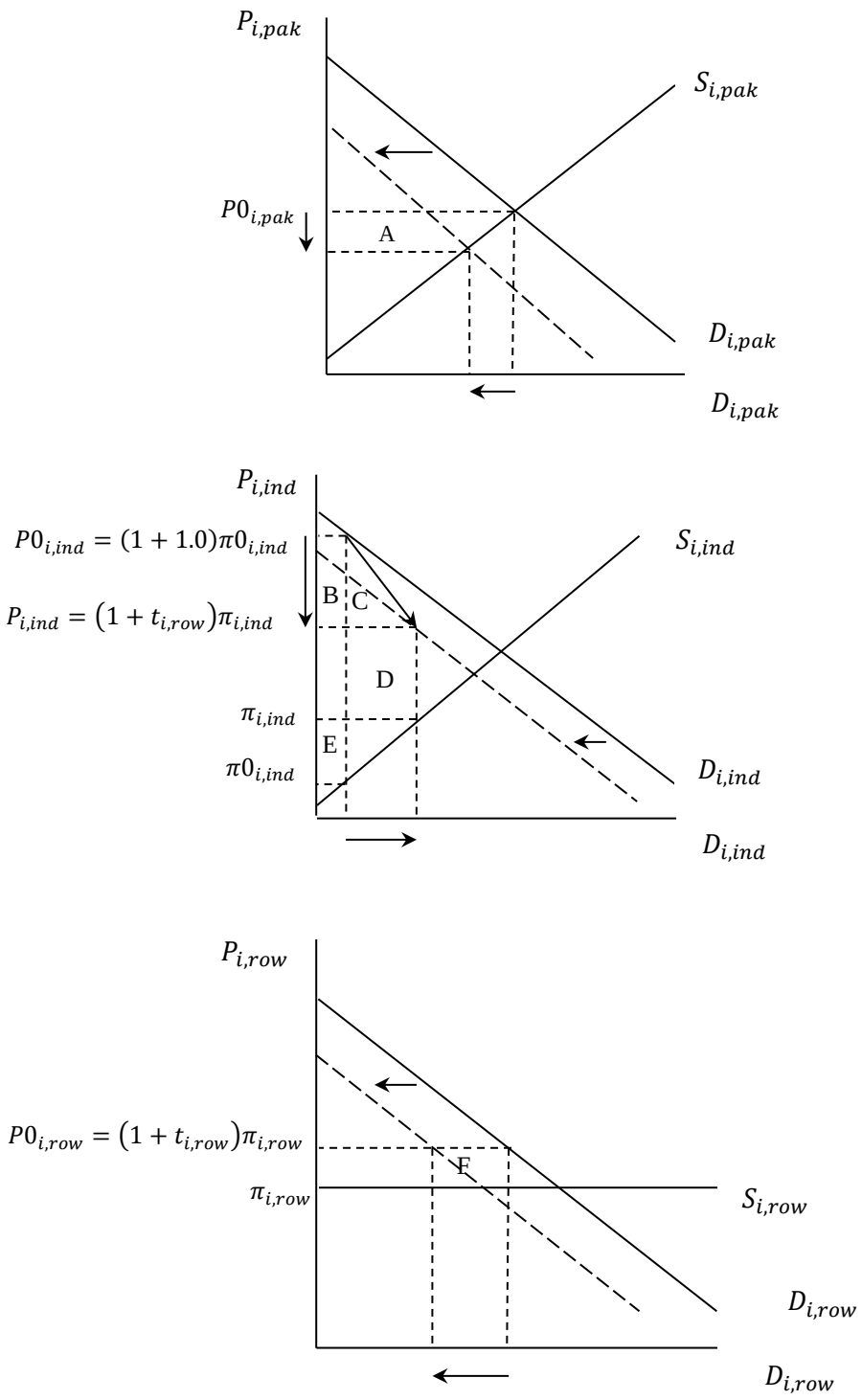


Table 1: Initial Values (millions of 2006 US$ except for MFN tariff).

Sector	**MFN Tariff (percent)**	**Pakistani Output**	**Imports from India**	**Imports from ROW**
Tobacco	25	871.3	10.0	20.0
Pharmaceuticals	17	1,406.5	15.9	350.8
Auto parts	34	323.7	10.0	250.5
Cloth	20	5,930.4	10.0	269.5
Leather	25	278.4	10.0	45.2
Sporting goods	18	144.3	10.0	31.6
Footwear	25	149.0	10.0	22.7
Paper	20	175.0	10.0	348.1

Note: As stated in the paper, we set an arbitrary, minimum level of imports from India at US$10 million.

Table 2: Results of Pakistan's Granting MFN Status to India in the Negative List (millions of 2006 US$ except for MFN tariff, with percent changes in *parentheses* for domestic output).

	MFN Tariff (percent)	**Imports from India**		**Imports from ROW**		**Pakistan's Output**		**Consumer Surplus**		**Tariff Revenue**		**Net Welfare**	
Sector		*MFN*	*SAFTA*	*MFN*	*SAFTA*	*MFN*	*SAFTA*	*MFN*	*SAFTA*	*MFN*	*SAFTA*	*MFN*	*SAFTA*
Tobacco	25	18.1	26.6	-1.9	-2.6	-13.0 *(-1.5)*	-18.5 *(-2.1)*	3.2	4.9	2.6	-0.5	5.9	4.3
Pharma-ceuticals	17	33.0	43.0	-13.7	-17.4	-13.9 *(-1.0)*	-17.7 *(-1.3)*	5.7	7.6	2.0	-2.5	7.6	5.0
Auto parts	34	16.1	27.0	-10.7	-17.2	-3.3 *(-1.0)*	-5.3 *(-1.6)*	2.8	4.8	0.8	-4.4	3.5	0.4
Cloth	20	20.0	27.3	-3.4	-4.6	-13.0 *(-0.2)*	-17.4 *(-0.3)*	3.4	4.7	2.2	-0.8	5.6	3.9
Leather	25	18.0	26.2	-6.1	-8.5	-8.9 *(-3.2)*	-12.7 *(-4.6)*	3.3	5.0	1.8	-1.7	5.0	3.3
Sporting goods	18	19.4	25.4	-7.1	-9.0	-8.8 *(-6.1)*	-11.4 *(-7.9)*	3.8	5.1	1.3	-1.4	5.1	3.8
Footwear	25	17.4	25.2	-5.5	-7.4	-8.9 *(-6.0)*	-12.7 *(-8.5)*	3.4	5.2	1.7	-1.5	5.2	3.7
Paper	20	19.8	27.0	-15.0	-19.9	-2.0 *(-1.2)*	-2.7 *(-1.5)*	3.4	4.8	0.2	-3.3	3.6	1.5