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Is South Asian Free Trade Area Desirable? Evidence from Dynamic Gravity Models

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ABSTRACT

This study investigates the desirability of the South Asian Free Trade Area (SAFTA), considering its potential in generating trade creation and trade diversion effects by controlling the trade persistence, which is often ignored by the previous studies. In this regard, dynamic gravity models on South Asian imports, exports, and total trade are used over the period from 2003 to 2013. Results of the two-step system GMM estimator confirmed the desirability of SAFTA with the presence of significant intra-bloc and extra-bloc trade expansions. Further, SAFTA depicted a significant anticipation effect as trade expansions were significant even one year prior to its implementation, and they continued to be significant until 2009. Further, this study empirically confirms the potential of SAFTA in mitigating the region's political tension, especially when implementing the trade strategy. Thus, it is recommended to bring SAFTA to its full potential by further reducing tariffs and removing sensitive lists.

Keywords: Dynamic Gravity Models, Political Factors, SAFTA, Trade Creation, Trade Diversion

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INTRODUCTION

The formation of the South Asian Free Trade Area (SAFTA) can be considered as one of the significant outcomes of recent trade policy reforms of South Asian countries. When assessing its desirability, most of the previous studies used a gravity model, which is considered as one of the most successful empirical methods with good fit (Anderson, 2011), high level of explanatory power (Ivus & Strong, 2007; Bergstrand & Egger, 2011) and also "have produced some of the clearest and most robust empirical findings" (Leamer & Levinsohn, 1995).

However, Gravity models employed in almost all the previous studies are static models and often ignore the dynamic aspects. Ignorance of dynamic relations may lead to bias results, as these countries used to trade even before the formation of SAFTA. When countries depict historical trade relations, on the one hand, the sunk cost that firms incurred in setting distribution and service networks in partner countries and, on the other hand, consumers "habit formation" on partner country's products would lead to higher trade than other country pairs (Eichengreen & Irwin, 1997). Ignorance of this trade persistency would result in providing incorrect inferences on its desirability.

Moreover, previous studies that concentrated on the political tension, when assessing the desirability of SAFTA, often provide evidence to reject the hypothesis of Regional Trade Agreements (RTA) promoting peace among politically disintegrated countries. As the ignorance of trade persistence leads to biased estimates, the rejection of the above hypothesis may not be valid. With the laps of almost 14 years after implementing SAFTA, the influence of bilateral political disputes on South Asian trade might have diluted because of their opportunity cost (Oneal & Russett, 1997, 1999; Barbieri, 2002; Martin et al., 2008). Further, implementation of supranational institutions following RTAs also lead to settlements over these inter-state disputes (Bearce, 2003; Bearce & Omori, 2005; Haftel, 2007). This fact was further confirmed by Pakistan's decision to grant India the most favoured nation status by the end of 2012 and to reduce items from Pakistan's sensitive list. Therefore, this study continues to hypothesise the potential of SAFTA in mitigating the region's political tension.

Thus, this study seeks to cultivate the literature in two ways. First, by investigating the desirability of SAFTA using a dynamic gravity model, the role of trade persistence in shaping the effects of RTAs would be emphasised. Second, by devoting significant attention to political factors when measuring the desirability of SAFTA, this would indicate to what degree have political factors given weight over economic factors by the region, especially when implementing the trade strategy. The rest of the sections of this study are structured as follows. A comprehensive analysis of previous studies that concentrated on South Asian trade agreements are provided. It is followed by an outline of dynamic gravity model specifications and their estimation techniques. Then it presents the data analysis and discussion. Finally, the conclusion of the study is provided.

LITERATURE REVIEW

Several studies examined the effects of South Asian trade agreements by using gravity models. Hirantha (2004) using a basic gravity model examined trade creation and trade diversion effects of South Asian Preferential Trade Agreement (SAPTA). He confirmed a significant trade creation effect for the period from 1996 to 2002. Also, with the absence of trade diversion effects, he concluded the potential of SAFTA in succeeding as a viable trade integration arrangement. Tumbarello (2006) investigated the effects of SAPTA from 1984 to 2003. He also confirmed the existence of trade creation effects and the absence of trade diversion effects for SAPTA. Rahman et al. (2006) reported the existence of both export creation and export diversion effects for the period from 1991 to 2003. The deleterious influence of region's political factors in expanding trade turned out to be a common conclusion among most of these previous studies, but none of them empirically tested the effects of those factors.

However, Moktan (2008) introduced a political variable to capture bilateral political disputes when assessing the desirability of SAPTA. Results of the study confirmed a significant negative effect of the region's political factors on exports. Meanwhile, SAPTA showed a significant positive impact on exports during Post-SAARC (1985-2005) and Post-SAPTA (1995-2005) periods. Almost all these studies indicated the potential of SAFTA in expanding intra-regional trade depending on results obtained for a period even before the implementation of SAFTA that is by considering trade patterns in the SAPTA period.

Nonetheless, several studies recently attempted to explore the effects of SAFTA within the gravity framework. Bhattacharya and Das (2009) examined the potential influence of SAFTA on member countries by devoting special attention to "behind the border" and "beyond the border" constraints from 1995 to 2008. They defined "behind the border" constraints as "the unfavourable policy environments in the home country" while those in the partner country as "beyond the border" constraints. In this regard, the error term, ε, of the gravity model is decomposed into "single-sided error term" (u) and "double-sided error term" (v), which capture the effects of "behind the border" and "beyond the border" constraints, respectively. Four hypothetical tariff reductions (25%, 50%, 75%, and 100%) have been evaluated in arriving at the results. Findings of the study indicated that "behind the border" constraints significantly influence the exports, and relatively smaller member countries would achieve the maximum gain when SAFTA is fully operational. Moinuddin (2013), using a recent data set (1992-2011), investigated the determinants of trade flows and the effects of SAFTA. Their results indicated that all the standard gravity variables are significant and confirmed the existence of trade creation effects following SAFTA. Peiris et al. (2017) investigated the trade creation and trade diversion effects of SAFTA, especially after controlling the political factors. The results of the study confirmed significant intra-bloc and extra-bloc trade expansions following the agreement. Further, they emphasised the deleteriousness of the region's political factors in expanding trade.

Gravity models were employed in almost all the previous studies often ignored the persistence of trade. Ignorance of trade persistency may lead to bias results, as these countries used to trade even before the formation of trade agreements. When countries depict historical trade relations, the sunk cost that firms incurred in setting distribution and service networks in partner countries and, on the other hand, consumers "habit formation" on partner country's products would lead to higher trade than other country pairs (Eichengreen & Irwin, 1997). This would lead to persistence in trade, indicating that, for instance, exports in a given year tend to continue in the coming years as well. Ignorance of this lagged effect of trade would result in providing incorrect inferences. According to Martinez-Zarsozo et al. (2009), the gravity model has been augmented with lagged effect on trade in very few occasions, and none of the authors have employed it in estimating the effects of trade agreements until then. Recently, Tripathi and Leitao (2013) augmented a

gravity model to introduce trade persistence when examining India's trade flows. Their results showed a significant trade persistence. However, they have not examined the effects of RTAs on trade, but only the bilateral trade flows of India. Therefore, dynamic gravity models are yet to apply in assessing the static efficiency of South Asian trade agreements.

METHODOLOGY

Since the central objective of this study is to evaluate the desirability of SAFTA, following Viner (1950), trade creation and trade diversion effects are estimated. In this regard, the standard gravity model is augmented to capture these effects and to control several other factors that may affect the region's trade. Equation 1 illustrates the standard gravity model.

$$\ln(T_{ij}) = \alpha + \beta_1 \ln(GDP_i) + \beta_2 \ln(GDP_j) + \beta_3 \ln(DIS_{ij}) + \varepsilon_{ij} \quad (1)$$

Where, $\ln(GDP_i)$ and $\ln(GDP_j)$ denote natural logarithms of gross domestic production (GDP) values in country$_i$ and country$_j$. According to Tinbergen (1962) GDPs are included to represent demand and supply forces of importing and exporting countries. $\ln(DIS_{ij})$ indicates natural logarithms of physical distance between economic centres of country i and j. The distance variable is included in order to capture the trade frictions or trade costs, such as transport cost. ε_{ij} is the error term. Beta values are representing the respective elasticities.

Augmenting the Standard Gravity Model

As gravity models provide normal levels of bilateral trade, dummy variables can be used to evaluate deviation of trade from normal levels as a result of an RTA (Martinez-Zarsozo et al., 2009). Therefore, in order to estimate trade creation and trade diversion effects, two dummy variables are introduced accordingly. Following Peiris et al. (2017), Magee (2008), Martinez-Zarsozo et al. (2009), and Moinuddin (2013), several other commonly used sets of dyad variables are introduced to the standard gravity model. Country pair per capita GDP values are used to represent the income levels of respective countries. Other dyad variables may represent whether countries are landlocked, speak the same language, and colonial ties. Moreover, international trade in South Asia is discouraged due to prevailing

political factors that disturb their inter-country relationships. Therefore, political factors are also used to augment the Equation 1 above.

The decision to form an RTA is not exogenous. According to Baier and Bergstrand (2007), this endogeneity shown in RTA dummy variables can be eliminated by using panel data models with country-specific fixed effects. Further, other country-specific factors, which are not controlled by the present model specifications, may lead to bias inferences. A common way to overcome this issue is to include exporter fixed effects and importer fixed effects (Magee, 2008; Martinez-Zarsozo et al., 2009). Thus, a typical gravity model specification that estimates the effects of SAFTA would be;

$$\ln T_{ijt} = \beta_0 + \alpha_t + \alpha_i + \alpha_j + \beta_1 \ln(GDP_{it}.GDP_{jt}) + \beta_2 \ln(PGDP_{it}.PGDP_{jt}) + \beta_3 \ln(DIS)_{ij}$$
$$+ \gamma_t (TC_{it}) + \delta_t (TD_{it}) + \sum_{l=1}^{3} \chi_l (X_{ij}) + \varphi_1 PPF_{it} + \theta_1 PPF_{jt} + \nu_{ijt} \quad (2)$$

Where, $PGDP_{it}$ and $PGDP_{jt}$ denotes the per capita GDPs of country i and country j. Following a substantial amount of literature, the interaction terms of country pair GDP ($GDP_{it}.GDP_{jt}$) and PGDP ($PGDP_{it}.PGDP_{jt}$) are used instead of regressing them independently. X_{ij} represents a vector of dummy variables that represent common language (l=1), colonial ties (l=2), and land lockedness (l=3). Governance indicators estimated by Kaufmann et al. (1999) are used as proxies for political factors. They are: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Voice and Accountability, and Rule of Law. According to Globerman and Shapiro (1999), these indicators are considered superior to other indices that have been used elsewhere because they are estimated using 31 different qualitative indicators from 13 different reliable sources. Thus, these meta-indices would encompass most of the other measures. However, these indices highly correlate with each other. Therefore, following Globerman and Shapiro (1999), an aggregate measure is obtained by estimating their first principal component for both country i and country j. These principal components of governance indicators in country i (PPF_i) and country j (PPF_j) are used to represent political factors.

TC_{ijt} represent dummies for the trade creation effect, and TD_{ijt} are dummies for the trade diversion effect of SAFTA. TC_{ijt} = 1 when both country i and j are SAFTA members and 0, otherwise. TD_{ijt} = 1 when only one country is a SAFTA member and 0, otherwise. αt is supposed to represent omitted

variables that capture any common shocks that affect trade in a particular year and the time trends in trade. α_i denotes importer country-specific fixed effects. Exporter country-specific fixed effects are denoted by α_j. v_{ij} is the error term. The other variables are the same as in Equation1.

The model is further augmented by considering the dynamic aspects of the gravity equation. Following Martinez-Zarsozo et al. (2009), a lagged endogenous variable is introduced to account for the persistence in trade. In addition, following Magee (2008), the dynamic path of SAFTA is also separately measured. Frankel (1997) indicates that the anticipation effect of firms may lead to affect trade flows even before the implementation of trade agreements. Further, as SAFTA is following a gradual tariff reduction procedure, effects may materialise gradually over time. Freund and McLaren (1999) state that the effect of trade agreements may materialise over three to four years prior to implementation and continue for seven to eight years. However, with this study, due to data restriction, the period is restricted to one year prior to the agreement (2005) and seven years after (2006 to 2013). The lagged effect of trade is included in the equation (3), and the specification is further augmented in equation (4) by introducing the dynamic path of SAFTA. Thus, following augmented gravity models for South Asia would combine the arguments of Martinez-Zarsozo et al. (2009) and Magee (2008).

$$\ln T_{ijt} = \beta_0 + \alpha_t + \alpha_i + \alpha_j + \lambda \ln(T_{ijt-1}) + \beta_1 \ln(GDP_{it} * GDP_{jt}) + \beta_3 \ln(PGDP_{it} * PGDP_{jt}) + \beta_3 \ln(DIS_{ij}) + \gamma_t(TC_{it}) + \delta_t(TD_{it}) + \sum_{l=1}^{3} \chi_l(X_{ij}) + \varphi_1 PPF_{it} + \theta_1 PPF_{jt} + v_{ijt} \quad (3)$$

$$\ln T_{ijt} = \beta_0 + \alpha_t + \alpha_i + \alpha_j + \lambda \ln(T_{ijt-1}) + \beta_1 \ln(GDP_{it} * GDP_{jt}) + \beta_3 \ln(PGDP_{it} * PGDP_{jt}) + \beta_3 \ln(DIS_{ij}) + \sum_{s=-1}^{7} [\gamma_{1t-s}(TC_{1it-s}) + \delta_{t-s}(TD_{1it-s})] + \sum_{l=1}^{3} \chi_l(X_{ij}) + \varphi_1 PPF_{it} + \theta_1 PPF_{jt} + v_{ijt} \quad (4)$$

Where λ is the coefficient of the lagged effect of trade. $D_{i(j)t-s}$ are dummy variables that represent one for each year starting from (2005) one year before the implementation of SAFTA and goes up to 2013. The other variables are the same as in equation 1 and 2 above.

Equations 3 and 4 are estimated in obtaining the trade creation and trade diversion effects of SAFTA. Although there may be a correlation between the levels of the right-hand side variables and the country-specific effects in the above equations, there would be no correlation between the differences of these variables and the country-specific effects. Therefore, a two-step System GMM estimator is used in estimating the above equation as it combines the moment conditions for the differenced model with those for the levels model. Because it combines, in a system, the regression in differences and the regression in levels of instruments are considered from both the regressions. The Saragan test is used to check whether the instruments are correlated with the error term. The data set covers 87 commonly traded partner countries, which includes only seven (07) South Asian countries. Bhutan is not considered with this study due to lack of data. The sample size is limited to 87 countries considering the commonness of trading partners and availability of data. Therefore, a maximum of 82,302 (87x86x11) observations are used in estimating the dynamic panel models. Appendix 1 provides the list of countries used in this study. The estimation of gravity equations is repeated for the three proxies used to represent trade that is natural logarithms of imports, exports, and total trade (imports plus exports). Appendix 2 provides a detailed explanation of the data used to represent each of the gravity variables.

RESULTS AND DISCUSSION

Table 1 reports correlations between three dependent variables that are used to proxy trade and other basic gravity variables. In addition, the correlations between trade and common components of political factors (PPF) are also reported.

The correlations between trade variables and GDP are strongly positive; thus, supports the gravity intuition that larger countries trade more compared to smaller countries. The intuition that, higher the income level, the better would be the trade, also strongly supported as correlations between trade variables and per capita GDP are positively significant. By contrast, correlations between distance and trade variables are negatively significant, which suggests that as country pairs are further apart tend to trade less. Further, this study assumes that considered political factors are deleterious to trade, which is strongly supported by the presence of significant negative correlations.

Table 1: Correlation Matrix for Basic Gravity Variables

	lnIM	lnEX	lnTotTrade	$lnGDP_{ij}$	$lnPGDP_{ij}$	lnDist	PPF_j
lnIM	1.0000						
lnEX	0.7640*	1.0000					
lnTotTrade	0.9140*	0.8970*	1.0000				
$lnGDP_{ij}$	0.7110*	0.7100*	0.7270*	1.0000			
$lnPGDP_{ij}$	0.4210*	0.4210*	0.4320*	0.4790*	1.0000		
lnDist	-0.2750*	-0.2840*	-0.2910*	-0.0400*	-0.1870*	1.0000	
PPF_j	-0.2900*	-0.2300*	-0.2580*	-0.2800*	-0.5700*	0.0980*	1.0000
PPF_i	-0.2470*	-0.3100*	-0.2740*	-0.2800*	-0.5700*	0.0950*	-0.0110*

Note: * Indicates P-Values less than 0.01

Trade Creation and Trade Diversion

The gravity model estimates for trade creation and trade diversion effects of SAFTA with reference to bilateral imports, exports and total trade are reported in Table 2. All these models show the existence of significant lagged effects of trade, meaning that international trade flows are persisted over time irrespective of trade agreements. Thus, it confirms the possible "sunk cost" effect of firms and consumers "habit formation" effect on bilateral trade. Among others, Martinez-Zarsozo et al. (2009) also confirm the persistency in bilateral trade flows. The results for all the imports, exports, and total trade models provide better estimates as the Sargan test confirms the validity of instruments at 95% confidence level. Also, Arellano and Bond serial correlations test confirms the non-existence of second-order autocorrelations, except for the imports model. Therefore, the estimated coefficients are more precise, and misspecification is reduced considerably.

Trade creation effects of SAFTA measured through TC_{ij} dummies are statistically significant for all the models. These dynamic gravity models depict trade creation effects with magnitudes of 0.346, 0.452, and 0.809 for imports, exports, and total trade, respectively. This indicates that intra-regional imports in South Asian countries increase by 41% ($e^{0.346}$ -1 = 41), intra-regional exports by 57% ($e^{0.452}$ -1 = 57), and intra-regional trade in general by 125% ($e^{0.806}$ -1 = 125) as a result of SAFTA. However, several previous studies that used static gravity models, gravity models without lagged dependent variable, reported relatively higher trade creation magnitudes. For instance: Peiris et al. (2017) indicates that intra-regional imports increase by 212%, intra-regional exports by 159%, and total trade by 267% as a result of SAFTA; Hirantha (2004) report a 377% of trade creation effect for SAPTA; Moktan

(2008) shows a 141% improvement in exports in the post SAPTA periods; Akhter and Ghani (2010) indicate that a hypothetical block among Pakistan, India, and Sri Lanka would improve trade by 30 times following SAFTA. Therefore, the results indicate that static gravity models tend to overestimate trade creation effects and thus intensify the requirement of including lagged effects of trade, especially when estimating the desirability of SAFTA.

Table 2: Gravity Model Estimates for Imports, Exports, and Total Trade

Gravity Variables	Two-step system GMM		
	Imports[ab]	Exports[ab]	Total Trade[ab]
lnIM (-1)	0.041*	0.036*	0.025**
$lnGDP_{ij}$	0.368*	0.549*	0.549*
$lnPGDP_{ij}$	-0.213**	0.042	-0.051
$lnDist_{ij}$	- 2.911*	-1.731*	-2.454*
TC_{ij}	0. 346*	0.452***	0.809*
TD_{ij}	0.322*	0.690*	0.465*
$CLang_{ij}$	10.121	14.243	7.471
Col_{ij}	-1.932	-4.762	-2.059
PPF_i	-0.045***	0.091*	-0.017
PPF_j	0.089*	-0.04	0.021
# observations	82302	82302	82302
Time FE	Yes	Yes	yes
Importer FE	Yes	Yes	yes
Exporter FE	Yes	Yes	yes
SarganTest[p]	0.051	0.057	0.055
AR (1)[p]	0	0	0
AR (2)[p]	0.001	0.026	0.085

Note: *, **, & *** Indicates P-Values less than 0.01, 0.05, and 0.1 respectively. a - standard errors are robust to arbitrary patterns of heteroskedasticity in the data. b – Time and country-specific dummies are not reported. [p] - Indicates P-Values for several post estimation tests. Post estimation tests are estimated before obtaining robust standard errors.

TD_{im} variable, which is used to measure the trade diversion effect, depicts positively significant coefficients, though negative coefficients are expected. This indicates that SAFTA would not lead to decrease trade with non-member countries; instead, it expands extra-bloc trade as well. Freund (2000) indicates that even with the absence of significant trade creation effects, extra-bloc trade expansions can exist following a trade agreement as it allows external exporters to overcome fixed trade costs (cited from Eicher et al.,

2012). Eicher et al. (2012) report positive trade diversion effects for AFTA, EFTA, EU, and NAFTA trading blocs by referring to previous studies. Moreover, they confirm the existence of these positive trade diversion effects for APEC, EFTA, EU, and MERCOSUR. Hirantha (2004), Akhter and Ghani (2010), and Peiris et al. (2017) also indicated the existence of extra-bloc trade expansions following South Asian trade agreements. The magnitude of this positive trade diversion effect also decreases as and when the model specifications are adjusted for trade persistence. According to Peiris et al. (2017), extra-bloc imports increase by 1061%, exports by 586%, and total trade by 662%. However, this study depicts significant reductions in extra-bloc trade expansions following SAFTA. Results depict 38% extra-bloc import expansion, 99% extra-bloc export expansion, and 59% expansion in total external trade.

The results for political factors depict an interesting shape. Imports model indicates that political factors in $country_i$s are negatively significant, and in $country_j$s they are positively significant. Meanwhile, in the exports model, political factors in $country_i$s are positively significant, and in $country_j$s they are negative. However, in the total trade model, both effects are insignificant with a negative coefficient for $country_i$s and a positive one for $country_j$s. This pattern indicates that the political environment in importing countries tends to hinder trade, while in exporting countries it encourages trade. This may be probably due to the tendency of overlooking import substitution with exports promotion strategy by countries in the contemporary world.

Dynamic Time Path of Trade Creation and Trade Diversion

Appendix 3 reports the estimated coefficients for equation 4 using Two-Step System GMM estimators. Two-step system GMM estimator provides better estimates as the Sargan test confirms the validity of instruments and Arellano and Bond serial correlations test confirms the non-existence of second-order autocorrelations. However, the imports model yet again depicts the presence of second-order autocorrelations.

When estimating the dynamic path of trade expansion effects only one year prior to the implementation of SAFTA is considered due to possible collinearity. Therefore, it measures an anticipation effect one year prior to SAFTA and effects over seven years after implementation. $TC_{ijt=0}$ and $TD_{ijt=0}$

represents the trade creation and trade diversion effects for the year (2006) SAFTA is implemented. Reported results in appendix 3 indicate the presence of trade expansion effects even before the implementation of SAFTA since both TC_{ijt-1} and TD_{ijt-1} are positively significant. Exports model depicts an intra-bloc trade expansion of 73% and extra-bloc trade expansion of 87%. Total trade model depicts expansion effects of 48% and 47% for the intra-bloc and extra-bloc trade, respectively. Meanwhile, imports model shows an extra-bloc trade expansion of 38%. However, intra-bloc trade anticipation effect is positive but not significant for the imports model. Magee (2008) also reports insignificant but positive anticipation effects of imports for FTAs. All in all, these results provide further evidence for the Frankel's (1997) argument that anticipation effect of firms would lead to affect trade flows even before the implementation of trade agreements.

Dynamic time path results for the later years also provide some notable insights towards the effects of SAFTA. Statistically significant trade creation effects are found up to three years after the introduction of SAFTA for both exports and total trade models. Highest trade creation effects are reported in the third year (2009) that is intra-bloc exports expand by 68% and total trade expand by 59%. Gradual tariff reduction approach of SAFTA may have encouraged these significant trade creation effects even in later years. Surprisingly, imports model does not depict any significant trade creation effect for individual years in the post-implementation period of SAFTA. Similar result that is insignificant intra-bloc trade expansion effect, is presented by Magee (2008) for imports in FTAs. Further, all the models depict negative trade creation coefficients from the year 2011 onwards, but they are not statistically significant. This indicates that intra-bloc trade expansion effects of SAFTA do materialise only over five years (2006 to 2010), including the year it is implemented. Thus, results show a close affiliation to the previous empirical findings, as Magee (2008) reports year six as the peak year for FTAs in providing trade effects. That is, from year seven onwards, they start to provide negative coefficients. Meanwhile, trade diversions are positively significant once again up to three years after the introduction of SAFTA. This indicates that extra-bloc trade expansion effects of SAFTA are significant over the period from 2006 to 2009. From 2010 onwards, these effects become insignificant, and even the magnitude of these coefficients gets very low. The global economic meltdown process due financial crisis that emerged during that period may have significantly caused this sudden drop, because according

to Kher (2012), most favoured export destinations (Japan, North America, and Western Europe) of the region increase their protectionist tendencies in the post-financial crisis era.

Effect of Political Factors

This section estimates the specific effect of South Asian political factors on their international trade. In this regard, earlier gravity models (equation 3 for imports, exports, and total trade) are estimated by narrowing $country_i$s only to South Asian countries considered with this study. Meanwhile, $country_j$s are increased up to 98 as more data on common trading partners are available when $country_i$s are limited to South Asian countries. Therefore, a maximum of 7469 ($7 \times 97 \times 11$) observations are used with a two-step system GMM estimator in obtaining the results. Each of the indices of Kaufmann et al. (1999) and their first principal component are individually included in the gravity models and estimated separately. All the estimated coefficients are precise and unbiased because post estimation tests confirm the validity of instruments and the non-existence of second-order autocorrelations either at 95% or at 90% confidence levels. The substantive impacts of these coefficients are interpreted based on a change of one standard deviation of political factors from their average. Same procedure was applied previously when interpreting the effect of institutional quality on trade by De Groot et al. (2004). Appendix 4 shows gravity model coefficients estimated to represent the effect of these political factors on South Asian trade.

According to the reported results in Appendix 4, the control of corruption (CC) variable depicts negative coefficients for both $country_i$s and $country_j$s in the imports model while they are positive in the exports model. This indicates that corruption leads to decrease South Asian imports and increase exports. Meanwhile, the total trade model indicates corruption in South Asian countries, encourages trade while trading partners discourages trade. These results support the argument that corruption acts as a barrier to trade because of unproductive activities (Bhagwati, 1971) or due to unnecessary trade costs (Anderson & Marcouiller, 2002). Meanwhile, depicted positive effects on trade would support Lavallee's (2005) argument that corruption acts "as a mean of greasing the wheels of commerce". However, the consequences of corruption on region's trade are not statistically significant at any of the confidence levels considered with this study.

Coefficients for government effectiveness (GE) show positive figures for all the trade models. Nonetheless, effects are statistically insignificant except for $country_i$s in the exports model. So, one standard deviation increase in South Asian government effectiveness would increase the region's export by 17% ($e^{0.355 \times 0.452} - 1 = 0.174$). This may provide a good indication regarding the quality of recent trade policy formulation, implementation, and the government's commitment to such policies. Political stability (PS) variable that accommodates politically-motivated violence and terrorism show statistically significant coefficients for the imports model. One standard deviation increase in this variable for South Asia would increase the region's imports by 12% ($e^{0.123 \times 0.882} - 1 = 0.115$) and it decreases by 14% ($e^{-0.164 \times 0.882} - 1 = -0.135$) with response to trading partners' political stability. Coefficients in export and total trade models are not significant. However, the exports model depicts a negative coefficient showing its resistance on exports. The unstable South Asian political environment may have led to this result. Political instability adversely effects on productivity due to uncertainty and inefficient allocation of resources. Further, it may affect negatively on investments (Mauro, 1995; Alesina & Perotti, 1996; Perotti, 1996), resulting in slower technological progress. Therefore, it harms local production resulting in higher imports and lower surpluses for exports.

Estimated results for regulatory quality (RQ) in $country_i$s depict positive values for all the trade models. One standard deviation increase in this variable would increase the region's exports by 22% ($e^{0.411 \times 0.486} - 1 = 0.221$) and total trade by 9% ($e^{0.177 \times 0.486} - 1 = 0.089$). But the increase in imports is not statistically significant. All in all, these results provide further evidence for the soundness of government policies and regulations that promote the private sector, especially that engaged in international trade. Meanwhile, voice and accountability (VA) variable depicts a negatively significant value for $country_j$s in the imports model, indicating a 21% ($e^{-0.242 \times 0.968} - 1 = -0.209$) decrease in South Asian imports. Apart from that, results indicate that the extent to which citizens' present political freedom, freedom of expression, freedom of association, and freedom of media do not significantly affect the region's trade. Results for the rule of law (RL) also show insignificant coefficients. However, all the trade models depict negative values for both $country_i$s and $country_j$s, indicating the lack of confidence in rules of society, and in particular, the quality of contract enforcement.

The overall effect of these political variables on South Asian trade is measured by using their first principal component. Principal component of political factors (PPF) in $country_i$s depict an inverse relationship with South Asian trade for all the bilateral trade models. However, statistical significance is present only in the bilateral exports model. It indicates that one standard deviation increase in political factors would decrease the region's exports by 23%. Peiris et al. (2017) reported statistically significant political effects for all imports, exports, and total trade models during the same period. Therefore, this study once again evidences that the adjustment of trade persistence in the gravity models leads to correct the biases in static gravity models. Further, results provide enough evidence to accept the hypothesis that RTAs promote peace among politically disintegrated countries. The negatively significant coefficient for the political factors in the exports model indicates the resistance that they generate on exports promotion. This would have resulted due to the import substitution policies of the region. Moinuddin (2013) indicates that prevailing political conflicts as one of the major reasons for the persisted import substitution policies in the region.

In addition, South Asian trading partners also depict negative coefficients for political factors except in the imports model. One standard deviation increase in political factors in trading partners would decrease region's exports by 12% ($e^{-0.057 \times 2.28} - 1 = 0.122$) and total trade by 11% ($e^{-0.049 \times 2.28} - 1 = 0.106$). These facts provide further evidence, on the one hand, for South Asian poor bilateral relations with their trading partners and, on the other hand, the resistance that they provide on trade, especially on exports. However, imports would increase by 48% ($e^{0.171 \times 2.28} - 1 = 0.477$) as a result of one standard deviation increase in trading partners' political factors. From the trading partners' perspective, these results indicate that political factors tend to encourage their exports while providing barriers for imports from South Asia.

CONCLUSION

The dynamic gravity models confirmed the presence of significant intra-bloc and extra-bloc trade expansions following SAFTA. However, when compared to the previous studies that used static gravity models, the magnitude of these trade expansions has significantly reduced. Peiris et al. (2017), by using a static gravity model, indicated that intra-regional imports increased by 212%, intra-regional exports by 159%, and total trade by 267% due to SAFTA.

However, when trade persistency is adjusted to the gravity models, results indicate that imports increase only by 41%, intra-regional exports by 57%, and total trade by 125%. Therefore, this study emphasises the importance of considering trade persistency when assessing the desirability of RTAs. The magnitude of extra-bloc trade expansions is also significant. Results depicted 38% extra-bloc import expansion, 99% extra-bloc export expansion, and 59% expansion in total external trade. This indicates that SAFTA would not lead to decrease trade with non-member countries; instead, it expands extra-bloc trade as well. All the standard gravity variables found strongly significant with the expected signs confirming the effectiveness of the gravity model. Results for the dynamic time path indicated the presence of significant anticipation effects for SAFTA. Moreover, intra-bloc trade creations and extra-bloc trade expansions became significant up to three years after the implementation of SAFTA. Among the political variables tested with this study, political stability in the region is found significantly import promoting, while government effectiveness and regulatory quality significantly exports promoting. The only political variable that significantly influences total trade is regulatory quality, which is positive in this instance. However, the aggregate effect of political factors is insignificant except in the export model. Therefore, this study confirms the desirability of SAFTA with the presence of significant intra-bloc and extra-bloc trade expansions. Further, this confirms the potentiality of SAFTA in mitigating the regions' political tension. Therefore, policymakers can achieve the goal of intra-regional trade expansion by further improving the terms and conditions of the agreement. Especially, they do not need to worry about trade diversion effects because, though contrary to theory, SAFTA depicts a positive trade diversion effect. Thus, it is recommended to bring SAFTA to its full potential by further reducing tariffs and removing sensitive lists. However, the prevailing political environment stands as one of the major barriers in expanding intra-regional trade. On this end, policymakers should note the negative impact of the region's political tension on trade and should not let political factors to weigh over economic factors, when implementing the trade strategy. If policymakers bring SAFTA to its full potential, its trade expansion potential would itself take care of the political tension. Because trade expanding FTAs lead to increase the opportunity cost of hanging on these political disputes.

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Appendix 1: Country List

Afghanistan	Chile	Greece	Maldives	Poland	Tanzania
Algeria	Hong Kong	Hungary	Malta	Portugal	Thailand
Argentina	China	Iceland	Mauritius	Qatar	Trinidad and Tobago
Australia	Colombia	India	Mexico	Romania	Tunisia
Austria	Costa Rica	Indonesia	Morocco	Russian Federation	Turkey
Azerbaijan	Cote d'Ivoire	Ireland	Myanmar	Saudi Arabia	Ukraine
Bahrain	Croatia	Jamaica	Nepal	Senegal	United Arab Emirates
Bangladesh	Cyprus	Japan	Netherlands	Singapore	United Kingdom
Barbados	Czech Republic	Jordan	New Zealand	Slovak Republic	United States
Belarus	Denmark	Korea	Norway	Slovenia	Uruguay
Belgium	Estonia	Kuwait	Oman	South Africa	Zambia
Brazil	Fiji	Lebanon	Pakistan	Spain	Zimbabwe
Bulgaria	Finland	Luxembourg	Paraguay	Sri Lanka	
Cameroon	France	Macedonia	Peru	Sweden	
Canada	Germany	Malaysia	Philippines	Switzerland	

Appendix 2: Data Sources and Descriptions

Bilateral trade: Reference Source: Among others, Soloaga and Winters (2000) and Martinez-Zarzoso and Suarez-Burguet (2005). Data Source: IMF DOTS database and World Bank Database. Description: imports, exports, and total trade (imports plus exports) between $country_i$ and $country_j$ at time t measured in US$ millions[1].

Size of the economy: Reference Source: Among others, Hirantha (2004), and Sharma and Chua (2000). Data Source: World Bank Database. Description: approximated by GDP at current price in US$.

Level of Development: Reference Source: Among others, Hirantha (2004), and Sharma and Chua (2000). Data Source: World Bank Database. Description: approximated by per capita GDP at current price in US$.

Control of Corruption: Data Source: World Bank Database of Worldwide governance indicators. Description: This indicator "captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests" (Kaufmann el al.,1999).

Government Effectiveness: Data Source: World Bank Database of Worldwide governance indicators. Description: This indicator "captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (Kaufmann et al.,1999).

Political Stability and Absence of Violence/Terrorism: Data Source: World Bank Database of Worldwide governance indicators. Description: this indicator "captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism" (Kaufmann et al.,1999).

[1] The selection among imports, exports, and total trade for a gravity model specification has been widely debated in the literature. Kandogan (2004) provides a detailed view on this regard.

Regulatory Quality: Data Source: World Bank Database of Worldwide governance indicators. Description: this indicator "captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development" (Kaufmann et al.,1999).

Voice and Accountability: Data Source: World Bank Database of Worldwide governance indicators. Description: this indicator "captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media" (Kaufmann et al.,1999).

Rule of Law: Data Source: World Bank Database of Worldwide governance indicators. Description: this indicator "captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence" (Kaufmann et al.,1999).

Appendix 3: Dynamic Time Path Estimates for Trade Creation and Trade Diversion

Gravity Variables	Two-Step System GMM[ab]		
	Imports	Exports	TotTrade
lnY(-1)	0.042*	0.037*	0.025**
$lnGDP_{ij}$	0.548*	0.279*	0.445*
$lnPGDP_{ij}$	-0.159***	0.079	-0.020
$lnDist_{ij}$	-2.310*	-1.272*	-1.895*
TC_{ijt-1}	0.219	0.551*	0.389**
$TC_{ijt=0}$	0.044	0.187	0.252
TC_{ijt+1}	0.184	0.417***	0.382**
TC_{ijt+2}	0.124	0.263	0.368**
TC_{ijt+3}	0.002	0.518*	0.465**
TC_{ijt+4}	0.066	0.051	0.106
TC_{ijt+5}	-0.160	-0.131	-0.058
TC_{ijt+6}	-0.067	-0.080	-0.076
TC_{ijt+7}	-0.091	-0.091	-0.099
TD_{ijt-1}	0.256*	0.625*	0.382*
$TD_{ijt=0}$	0.323*	0.478*	0.347*
TD_{ijt+1}	0.160*	0.238*	0.162*
TD_{ijt+2}	0.176*	0.178*	0.176*
TD_{ijt+3}	0.088***	0.138*	0.137*
TD_{ijt+4}	0.037	0.056	0.006
TD_{ijt+5}	0.052	0.050	0.045
TD_{ijt+6}	0.036	-0.005	0.000
TD_{ijt+7}	0.057	0.076**	0.046
$CLang_{ij}$	9.974	16.949	11.232
Col_{ij}	-6.129	-7.503	-4.826
PPF_i	-0.060**	0.074*	-0.034
PPF_j	0.075*	-0.049***	0.004
# observations	82302	82302	82302
Time FE	Yes	yes	Yes
Importer FE	Yes	yes	Yes
Exporter FE	Yes	yes	Yes
SarganTest[p]	0.058	0.068	0.071
AR(1)[p]	0.000	0.000	0.000
AR(2)[p]	0.001	0.069	0.142

Note: *, **, & *** Indicates P-Values less than 0.01, 0.05, and 0.1 respectively. a - Standard errors are robust to arbitrary patterns of heteroskedasticity in the data. b – Time and country specific dummies are not reported. [p] - Indicates P-Values for post estimation tests. Post estimation tests are estimated before obtaining robust standard errors.

Appendix 4: Estimates for South Asian Political Factors

		PPF[ab]	CC[ab]	GE[ab]	PS[ab]	RQ[ab]	VA[ab]	RL[ab]
lnY(-1)	-imp	0.024	0.024	0.023	0.024	0.024	0.024	0.025
	-exp	0.046***	0.046	0.043	0.042	0.042	0.042	0.047***
	-total	0.025	0.026	0.024	0.022	0.023	0.020	0.023
$lnGDP_{ij}$	–imp	0.251	0.286	0.272	0.235	0.235	0.207	0.245
	-exp	0.788*	0.759*	0.815*	0.747*	0.776*	0.738*	0.730*
	-total	0.507*	0.495*	0.498*	0.516*	0.507*	0.509*	0.507*
$lnPGDP_{ij}$	-imp	0.018	-0.042	-0.024	0.032	0.025	0.049	-0.001
	-exp	-0.582*	-0.562**	-0.620*	-0.572**	-0.549**	-0.556**	-0.546*
	-total	-0.178	-0.165	-0.176	-0.184	-0.160	-0.160	-0.184
$lnDist_{ij}$	-imp	-1.231	-1.309	-1.245	-1.128	-1.133	-1.025	-1.158
	-exp	-2.927*	-2.773*	-2.976*	-2.701*	-2.880*	-2.676*	-2.664*
	-total	-2.224*	-2.172*	-2.169*	-2.251*	-2.243*	-2.261*	-2.221*
TC_{ij}	-imp	0.097	0.098	0.092	0.082	0.095	0.103	0.118
	-exp	0.163	0.189	0.162	0.198	0.176	0.174	0.201
	-total	0.189**	0.202**	0.178**	0.203**	0.196**	0.198**	0.206**
TD_{ij}	-imp	0.071	0.072	0.081	0.083	0.078	0.058	0.095
	-exp	0.097	0.117	0.084	0.123	0.105	0.097	0.106
	-total	0.189***	0.197***	0.176***	0.192***	0.191***	0.194***	0.202***
$CLang_{ij}$	-imp	50.156**	49.274**	47.350**	46.576**	47.770**	49.398**	48.757**
	-exp	40.828***	42.558**	39.983***	42.380***	42.975**	47.058**	44.374**
	-total	49.593	49.759	50.245	51.871***	50.209	50.976	51.738***
Col_{ij}	-imp	3.092	3.043	2.879	3.071	2.963	2.955	3.226
	-exp	-2.085	-2.276	-2.310	-2.430	-2.727	-2.614	-2.065
	-total	2.907	3.090	2.751	3.159	3.077	3.091	3.256
Lanlock	-imp	-0.083	-0.197	-0.325	-0.302	-0.266	-0.240	-0.187
	-exp	-1.294	-1.553	-1.276	-1.464	-1.277	-1.502	-1.476
	-total	-1.170	-1.233	-1.277	-1.250	-1.224	-1.253	-1.173
$Country_i$	-imp	-0.019	-0.070	0.072	0.123***	0.037	0.005	-0.069
	-exp	-0.124**	0.168	0.355**	-0.081	0.411*	0.060	-0.020
	-total	-0.062	0.153	0.086	0.050	0.177***	-0.027	-0.050
$Country_j$	-imp	0.171***	-0.151	0.036	-0.164***	-0.142	-0.242***	-0.236
	-exp	-0.057	0.046	0.076	0.079	0.086	-0.069	-0.080
	-total	-0.049	-0.004	0.177	0.038	0.083	0.006	-0.082
# Observations		7469	7469	7469	7469	7469	7469	7469
S.D. of PF_i		2.155	0.437	0.452	0.882	0.486	0.532	0.633
S.D. of PF_j		2.280	1.068	0.961	0.943	0.926	0.968	1.007

SarganTest[p]-imp	0.175	0.181	0.171	0.165	0.174	0.162	0.180
-exp	0.087	0.082	0.075	0.05	0.057	0.082	0.084
-total	0.117	0.112	0.101	0.105	0.111	0.092	0.106
AR(1)[p] -imp	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-exp	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-total	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2)[p] -imp	0.015	0.014	0.014	0.014	0.014	0.015	0.016
-exp	0.094	0.099	0.078	0.086	0.086	0.088	0.090
-total	0.808	0.847	0.794	0.782	0.781	0.765	0.801

Note: *, **, & *** Indicates P-Values less than 0.01, 0.05, and 0.1 respectively. a - Standard errors are robust to arbitrary patterns of heteroskedasticity in the data. b – Time dummies are not reported. [p] - Indicates P-Values for post estimation tests. Post estimation tests are estimated before obtaining robust standard errors.