

# Trade Integration of India with South and Central Asia: Evidence from Gravity Model

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## Abstract

The present study investigates exports of India with selected South and Central Asian countries and their top trade partners. The panel data from 1996–2020 is used and PPML estimation technique which takes care of heterogeneity, zero trade and endogeneity is applied. In addition to basic variables, institutional setup in selected countries is included in the model to get better results. To check robustness of results, in addition to PPML, Heckman selection model is also estimated. The findings indicate that institutions play an important role in export promotion of India to these countries. Among various institutional factors, effectiveness of government in different aspects has considerable influence on exports from the country. The study concludes that institutional quality needs to be improved to enhance trade cooperation of India with these countries.

## Keywords

*International trade, gravity model, institutional factors, regional trade agreement, panel data*

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## JEL code

*F13, F14, F15*

## INTRODUCTION

From the beginning of 21<sup>st</sup> century, due to changing economic situation around the world, India took a keen interest in improving cooperation with Central Asian states. On the other hand, given the land-locked nature and lack of connectivity, these countries expressed keen interest to increase cooperation with India (Sharma, 2012). To enhance cooperation, Connect Central Asia policy was announced by India in addition to India-Central Asia dialogue at track II to be held annually in one of these republics. It is under the mantra of the four C's (commerce, connectivity, community and consular) that define the renewed interest of India in the region (Roy, 2013). In addition, the country took an active part in International “North-South Transport Corridor (INSTC)” and along with Pakistan joined the Shanghai Cooperation Organization (SCO) in 2016. The country wants to develop bilateral and multilateral

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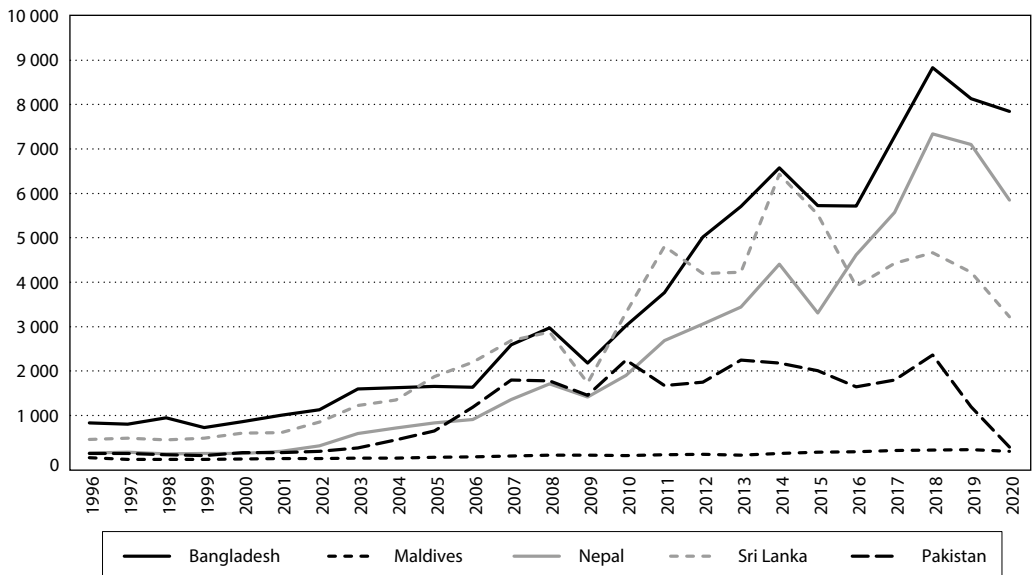
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partnership with the region (Chatterjee, 2018). Balooch (2009) suggests that Iran can act as gateway for trade enhancement between India and the region by providing access through Chabahar port. To avail this India acceded to “Customs Convention on International Transport of Goods” under cover of TIR Carnets in 2017 and joined “Ashgabat Agreement” in 2018.

In case of South Asia, in line with various trade agreements signed worldwide, SAARC member countries<sup>3</sup> also signed “South Asia Free Trade Agreement (SAFTA)” on January 6, 2006. In addition, various bilateral and multilateral trade agreements have been signed to enhance trade cooperation. However, despite 21 percent population of world and common culture and history, only 5 percent intra-regional trade takes place as compared to 35 percent in case of East Asia (Kathuria and Shahid, 2017). According to the World Bank Report (2014), South Asian countries have recorded average growth rate of 6 percent during the last 20 years. However, the contribution of trade among SAARC member countries continues to be insignificant as compared to trade with the outside world. Similarly, Iqbal and Nawaz (2017) concluded that SAFTA has been unable to create regional trade, which raises the question of what makes SAFTA ineffective. However, despite many measures, trade relations of India with South and Central Asian countries have not increased up to the expected magnitude, as is clear from Figures 1 and 2.

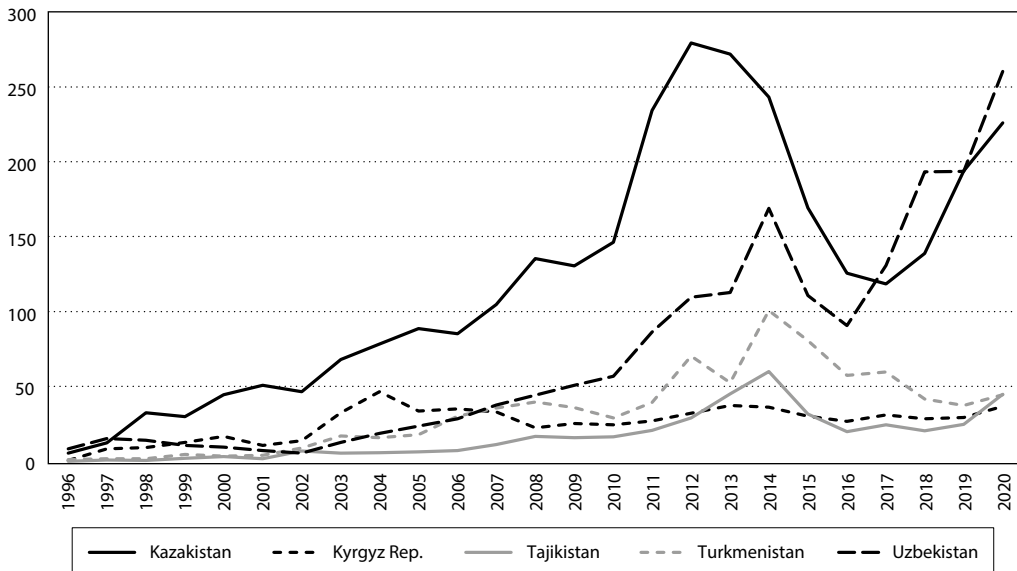
There are various obstacles to international trade ranging from geographical distance to formal trade barriers (Trefler, 1995; Anderson and Van Wincoop, 2004) which add to trade costs and reduce trade volume between countries. Anderson and Van Wincoop (2004) concluded that they account for ad valorem tax equivalent of around 170 percent for a representative developed country. However, Dardoff (1998) is of the view that in addition to observed costs, trade also includes unobserved trade costs, particularly difference in institutional quality between nations. It is due to these differences that firms have to bear

**Figure 1** Exports from India to South Asia (million USD)



Source: Author’s calculation based on data from DOTS, IMF

<sup>3</sup> Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, India, Pakistan, Sri Lanka.

**Figure 2** Exports from India to Central Asia (million USD)

Source: Author's calculation based on data from DOTS, IMF

additional costs related to foreign markets which leads to increase in trade costs (Berthelton and Freund, 2004; Hofstede, 2001). Institutional factors affect international trade in different ways. First, it is the quality of institutions mainly related to political and legal system that implements policies ensuring security of trade between countries. The effectiveness of formal regulations in a particular country impacts the way of doing business and interpersonal trust. Zhang et al. (2003) concluded that it is the implementation of property rights and adherence to trade contracts that vary significantly between countries.

Similarly, Achrol et al. (1983), Skarmeas et al. (2002) argue that environmental uncertainty leads to conflicts between partner countries. In addition, Rodrik (2000) has highlighted difficulties to enforce international contracts as compared to domestic ones. At the same time, Wei (2000) has concluded that low quality of institutions led to negative externality for private transactions, which raises costs and reduce bilateral trade. Highlighting the positive role of institutions, Anderson and Marcouiller (2002), or Jansen and Kyvik Nordas (2004) are of the view that business supported by effective rule of law and government regulations leads to enhanced trade cooperation between countries.

Various studies (Bown, 2017; Handley and Limao, 2017) conclude that well-functioning institutions diminish uncertainty related to trade and facilitate transaction between countries. However, threats to trade agreements which arise from delay could be determinantal to economic growth of a nation. Kamal and Zaki (2018) argue that countries sign trade agreements to reduce uncertainty related to bilateral trade. However, it is the structure of institutions in these countries that regulates implementation of these agreement. Thus bilateral trade is directly related to the quality of institutions. Improvement in institutional quality enhances bilateral trade, whereas low institutional quality impedes bilateral trade cooperation. Various factors like corruption, inadequate information and inadequate enforcement of contracts leads to increase in costs related to trade which adversely impacts export competitiveness of a country (Bakhsh et al., 2022).

The present study contributes to the current literature in many significant ways. First, to our knowledge, this is the first attempt to investigate regional integration of India with South and Central Asia. Second,

although plethora of studies (Kumar and Ahmed, 2015; Jan and Shah, 2019; Sharma and Kumar, 2021; Wani and Mir, 2023) highlight many factors which deter the progression of regional integration in South Asia, role of institutions has been neglected in available literature. The present study tests the hypothesis that institutional quality of partner countries matters for bilateral trade. To check the influence of institutional factors on exports, average of institutional factors is included in the model. Then, in line with objectives of the study, individual institutional factors are incorporated. Third, previous studies were criticized for failing to consider econometric issues related to trade costs. To address various econometric issues related to trade data, PPML is applied, which considers both time and country-pair fixed effects. In addition to PPML, Heckman selection model is estimated to check the coherence of results.

## 1 REVIEW OF LITERATURE

In available literature, quite a few studies have focused on the relationship between trade and institutional quality of different countries. Various studies (Anderson and Marcouiller, 2002; Francois and Manchin, 2013; De Mendonca, 2014) concluded that well-defined institutional setup is positively related to trade cooperation between countries. Whereas Iqbal and Nawaz (2017), and Nawaz (2020) argue that institutional arrangements support regional integration and impact cooperation between countries both directly and indirectly. Kea et al. (2019) is of the view that Cambodia needs to reform its institutions and monetary system to reduce the negative impact of external shocks and economic recession on rice exports. Aluko et al. (2021) concluded that FDI can boost economic growth in countries that enjoy certain degree of economic freedom. However, in case of those countries which enjoy less economic freedom, FDI can hardly improve their economic performance.

Chi and Kilduff (2010) argue that regional trade agreements, language and infrastructure have played a crucial role in increasing apparel imports of the USA from partner countries. Dincer (2014) has highlighted the role of R&D (research and development) in imports of Turkey from BRICS countries. The study concludes that R&D in Turkey negatively impacts imports from BRICS countries. However, increase in R&D in BRICS has enhanced imports of Turkey from these countries. Given the significance of agri-food exports in case of Nigeria, Abdullahi et al. (2021) argue that the national income of partner countries, membership of trade agreements and common borders enhance agri-food exports. On the other hand, geographical distance, exchange rate and landlocked geography negatively impact agri-food exports. The country enjoys agri-food export potential with major countries of the world which include Brazil, China, EU, Russia, USA and border countries. Guan et al. (2021) argue that growth rate of national income, exchange rate and FDI significantly affect trade between Mauritius and China. The study concludes that the two countries need to formulate policies to remove remaining restrictions to attract more mutual investment, which can further enhance bilateral trade. In case of Bangladesh, Shahriar et al. (2021) examined trade performance of leather products from 1989 to 2015. The study highlights the problem of high trade and transport costs associated with trade performance of the country.

In case of Central Asia, Suvankulov and Guc (2012) argue that though many countries, including China, India, Iran, Russia and Turkey have attempted to enhance trade cooperation with this region, China and Turkey have been most successful. Similarly, Agrawal and Sangita (2013), and Malik and Mir (2014) suggest that there is vast trade potential between India and Central Asia. According to Roy (2013), India still struggles to boost collaboration with Central Asia on trade and economic front.

In case of South Asian, various studies (Shaikh and Rahpoto, 2009; Shaikh et al., 2012; Regmi, 2017) argue that SAFTA has been instrumental in enhancing regional trade. Besides, Derosa and Govindan (1996), and Pigato et al. (1997) suggest that regional cooperation can benefit participating nations. Similarly, Hassan (2001), and Rahman, Shadat and Das (2006) concluded that opportunities for trade enhancement existed among South Asian nations. However, many other studies argue that, for various reasons, SAFTA has been ineffective in enhancing regional integration. Baysan et al. (2006) argue that due to small market

size and high non-tariff restrictions among member countries, SAFTA has been ineffective. According to Akhter and Ghani (2010), in short run SAFTA has not been able to benefit the member countries, though in long run it may be beneficial. Similarly, Sultana and Asrat (2014) argue that a high level of protection and infrastructural and institutional factors have been the main reason for less economic integration in South Asian. In addition, Kathuria and Shahid (2017) also concluded that political differences and weak regulating framework negatively impact trade in the region. Finally, Abbas and Waheed (2019) argue that member countries must revisit the regional trade agreement as SAFTA has been ineffective to create opportunities for trade among them. Thus from the above discussed literature, it can be concluded that institutional quality plays a vital role in trade cooperation between countries.

## 2 METHODOLOGY

### 2.1 Gravity model

The gravity model of trade propounded by Tinbergen (1962) and Poyhonen (1963) specifies that trade flow from one country to another country can be explained by economic forces in these countries and those economic and other forces resisting or aiding this flow. The model explains the flow of trade between the set of countries as being proportional to their national income (GDP) and inversely proportional to the geographical distance between them. The linear form of classical gravity model can be expressed as:

$$\ln(T_{ij}) = \alpha_0 + \alpha_1 \ln(GDP_i) + \alpha_2 \ln(GDP_j) + \alpha_3 \ln(Dis_{ij}), \quad (1)$$

where  $T_{ij}$  represents bilateral trade between countries  $i$  and  $j$ ,  $\alpha_0$  is a constant,  $GDP_i$  and  $GDP_j$  denote the national income of two countries,  $Dis_{ij}$  shows geographical distance, and  $\alpha_1, \alpha_2, \alpha_3$  are parameters. From Formula (1), it is clear that countries with high income tend to have high volume of bilateral trade than countries with low levels of income. Head (2003) argues that the economic size of partner countries specifies demand and supply forces. Similarly, geographically close countries tend to trade more as compared to geographically distant countries. Thus, distance reflects trade costs as it represents economic and non-economic factors.

In addition to national income and distance, various other explanatory factors like common border, common language, regional trade agreements, difference in per capita gross domestic product (PCGDPD) and institutional factors<sup>4</sup> and average of institutional factors are included in the model. After adding these variables, augmented gravity model is given as follows:

$$\begin{aligned} \ln(T_{ijt}) = & \alpha_0 + \alpha_1 \ln(GDP_{it}) + \alpha_2 \ln(GDP_{jt}) + \alpha_3 \ln(PCGDPD_{ijt}) + \alpha_4 \ln(Dis_{ij}) + \alpha_5 (\text{Contig}_{ij}) + \\ & \alpha_6 (\text{Comlang}_{ij}) + \beta_1 \ln(\text{Inst}_{jt-1}) + \beta_2 (\text{LGEP}_{jt}) + \beta_3 (\text{LPSP}_{jt}) + \beta_4 (\text{LRQP}_{jt}) + \beta_5 (\text{LRolP}_{jt}) + \\ & \beta_6 (\text{LVAP}_{jt}) + \beta_7 (\text{LCCP}_{jt}) + \varepsilon_{ijt}, \end{aligned} \quad (2)$$

where basic variables are the same as in equation (1),  $PCGDPD_{ijt}$  measures the difference in per capita gross domestic product of partner countries to test the presence of intra-industry or inter-industry trade. The gravity model forecasts that nations with different per capita GDP, trade less than those with similar level of per capita GDP. Similarly,  $\text{Contig}_{ij}$  and  $\text{Comlang}_{ij}$  represent common border and common language between partner countries. In addition,  $\text{Inst}_{jt-1}$  measures partner countries institutional quality index at the level. Besides individual institutional factors at level have been incorporated to get a better idea

<sup>4</sup> Which include control of corruption (CC), government effectiveness (GE), political stability and absence of violence/terrorism (PA), rule of law (ROL), regulatory quality (RQ), voice and accountability (VA).

of their role in trade cooperation. Given the objectives of study, institutional factors of partner countries are included. In the available literature, gravity model has been used to answer various questions ranging from role of border, effect of various trade agreements (Soloaga and Wintersb, 2011; Baier et al., 2019) to role of various cultural and institutional factors in trade cooperation.

## 2.2 Econometric approach and data source

In traditional gravity model, use of linear logarithmic form was widespread. However, the recent literature argues that linear approach leads to biased results, which are inconsistent in presence of heteroscedasticity (Silva and Teneyro, 2006). Besides, logarithm operator applied to trade flow leads to the problem of zero trade flow<sup>5</sup> as log of zero is undetermined. In the present study, estimation is performed using Poisson Pseudo Maximum Likelihood (PPML) proposed by Silva and Teneyro (2006, 2010, 2015), taking into account the fact that present sample includes large number of zeros. This estimator has been widely used in recent studies due to its consistent results (Egger and Nigai 2015). Silva and Teneyro (2006) strongly recommends use of PPML rather than OLS because the former includes difference in size of coefficients which are smaller and more suitable. Head and Mayer (2014) argue that in presence of dummies, PPML gives several advantages as compared to other estimators. One obvious challenge in gravity model estimation is that the multilateral resistance terms highlighted by Anderson and van Wincoop (2003) are not directly observable. Following Olivero and Yotov (2012), exporter-time and importer-time fixed effect are used to account for multilateral resistance terms. Another challenge in gravity model estimation is issue of endogeneity related to trade policy variable. Following Baier and Bergstrand (2007) country-pair fixed effect are used to control for potential endogeneity concerns. In addition, year-fixed effect is used to control for macroeconomic shocks. It is important to note here that set of country-pair fixed effect absorbs all bilateral time invariant variables that are used in gravity regression. Taking into account all the above mentioned issues and following (Westerlund and Wilhelmsson 2006; Alvarez et al. 2018; Nawaz, 2020), gravity model is estimated as:

$$T_{ij} = \alpha_0 + \alpha_1 \ln(GDP_i) + \alpha_2 \ln(GDP_j) + \alpha_3 \ln(PCGDP_{ij}) + \alpha_4 \ln(Dis_{ij}) + \alpha_5 (Contig_{ij}) + \alpha_6 (Comlang_{ij}) + \beta_1 (SAFTA_{ij}) + \beta_2 (ECO_{ij}) + \beta_3 (Inst_{jt-1}) + \beta_4 (LGEP_{jt}) + \beta_5 (LPSP_{jt}) + \beta_6 (LRQP_{jt}) + \beta_7 (LRolP_{jt}) + \beta_8 (LVAP_{jt}) + \beta_9 (LCCP_{jt}) + E_{ij} + I_{ij} + C_{ij} + \varepsilon_{ijt} \quad (3)$$

In addition to the variables discussed above, Formula (3) includes SAFTA and ECO,<sup>6</sup> two regional trade agreements of South Asian and Central Asian states. Moreover, along the lines of suggestions of Matyas (1997, 1998), exporter ( $E_{ij}$ ), importer ( $I_{ij}$ ), and country dummies ( $C_{ij}$ ) are added to take care of unobserved factors.

The dataset used is a balanced panel that includes 11 countries of South and Central Asia and top 10 trade partners<sup>7</sup> of these two regions from 1996 to 2020.

Finally, to check the robustness of results, Heckman Sample Selection model is applied, consisting of sample selection (Formulas 4 and 5) and an outcome model (Formula 6) to confirm the results of previous models. It is important to mention here that different econometric techniques supplement each other

$$E_{ijt} = nZ_{ijt} + \mu_{ijt}, \quad (4)$$

<sup>5</sup> For further detail – Golovko and Sahin (2021).

<sup>6</sup> Afghanistan, Azerbaijan, Iran, Kazakhstan, Kyrgyz Republic, Pakistan, Tajikistan, Turkey, Turkmenistan, Uzbekistan.

<sup>7</sup> Bangladesh, Bhutan, Maldives, Nepal, Pakistan, Sri Lanka, Kazakhstan, Kyrgyz, Tajikistan, Turkmenistan, Uzbekistan, China, Myanmar, Russia, Iran, Singapore, Switzerland, USA, Saudi Arabia, UAE, Hong Kong.

**Table 1** Sources of data

Variable	Source of data
Bilateral exports	Direction of trade statistics, IMF
GDP	WDI, World Bank
Per capita GDP	WDI, World Bank
Distance	CEPII
Language	CEPII
Common border	CEPII
Regional trade agreement	World Trade Organization
Institutional factors	WGI, World Bank

Source: Author's calculation

where  $E_{ijt}$  is the latent variable and is not observed; however, in the present study, it is observed whether countries have trade, such as  $E_{ijt} = 1$  if  $E_{ijt} > 0$  and  $E_{ijt} = 1$  if  $E_{ijt} = 0$  and is a vector of variables that effect  $E_{ijt}$ . Selection model (institutions at level):

$$T_{ij} = \alpha_0 + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln Dis_{ij} + \beta_4 \ln PCGDP_{ij} + \beta_5 \text{contig}_{ij} + \beta_6 \text{comlang}_{ij} + \beta_7 \text{SAFTA}_{ij} + \beta_8 \text{ECO}_{ij} + \beta_9 \text{INS}_{jt-1} + \beta_{10} (\text{LGEP}_{jt}) + \beta_{11} (\text{LPSP}_{jt}) + \beta_{12} (\text{LRQP}_{jt}) + \beta_{13} (\text{LRolP}_{jt}) + \beta_{14} (\text{LVAP}_{jt}) + \beta_{15} (\text{LCCP}_{jt}) + \varepsilon_{ij} \quad (5)$$

Outcome model:

$$T_{ij} = \alpha_0 + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln Dis_{ij} + \beta_4 \ln PCGDP_{ij} + \beta_5 \text{contig}_{ij} + \beta_6 \text{comlang}_{ij} + \beta_7 \text{SAFTA}_{ij} + \beta_8 \text{ECO}_{ij} + \beta_9 \text{INS}_{jt-1} + \beta_{10} (\text{LGEP}_{jt}) + \beta_{11} (\text{LPSP}_{jt}) + \beta_{12} (\text{LRQP}_{jt}) + \beta_{13} (\text{LRolP}_{jt}) + \beta_{14} (\text{LVAP}_{jt}) + \beta_{15} (\text{LCCP}_{jt}) + \varepsilon_{ij} \quad (6)$$

### 3 RESULTS AND DISCUSSION

The gravity model estimation requires substantial preparation for data collection and organization, given that a large data set is needed for analysis. The advantage of this data set is that the estimations made are more precise and stable. However, collection of data from different sources requires much time and effort.

The extended gravity model expressed in Formula (4) is estimated in six different specifications to examine the impact of different variables on the bilateral export cooperation of India with South Asian and the Central Asian states, as presented in Table 2.

The results show that the sign and size of coefficients align with available literature. Model (1) included the average quality of institutional factors in partner countries. In the rest of the model, the impact of quality of individual institutional factors is examined. It is important to mention here that institutional factors at the level are included, given that changes in any of these factors impact trade after a time gap.

From the available literature, it is clear that the GDP of reporting country indicates supply capacity, and GDP of partner country shows demand capacity. The coefficient of GDP in both reporting and partner country is statistically significant and have a positive sign. The results indicate that 1 percent increase in GDP of reporting country increases trade by 0.81 percent. Similarly, 1 percent increase in the GDP of partner country enhances trade by 0.83 percent. The higher coefficient of reporting country compared

to the partner country confirms the findings of Feenstra et al. (2001). The coefficient of distance is significant and has expected negative sign along the lines of available literature. The distance variable confirms classical gravity model (Anderson and Van Wincoop, 2003). These findings contradict the thesis that “distance is dead” due to increased integration worldwide. Thus it can be concluded that despite the rapid pace of globalization, distance has maintained its significance as an explanatory variable of the gravity model.

**Table 2** PPML with time-fixed effect

Variable	-1	-2	-3	-4	-5	-6	-7
LnGDPI	0.818*** (0.03)	0.757*** (0.03)	0.784*** (0.03)	0.752*** (0.02)	0.760*** (0.02)	0.806*** (0.03)	0.759*** (0.03)
LnGDPj	0.833*** (0.03)	0.810*** (0.03)	0.875*** (0.03)	0.845*** (0.03)	0.806*** (0.03)	0.818*** (0.03)	0.848*** (0.03)
PCGDPD	-0.020 (0.02)	0.210*** (0.02)	0.167*** (0.02)	0.234*** (0.02)	0.159*** (0.02)	0.004 (0.02)	0.207*** (0.02)
LnDISij	-1.042*** (0.06)	-1.070*** (0.06)	-1.033*** (0.06)	-1.122*** (0.05)	-1.066*** (0.06)	-1.096*** (0.06)	-1.053*** (0.06)
SAFTAij	-2.456*** (0.20)	-1.852*** (0.20)	-1.492*** (0.21)	-1.918*** (0.19)	-2.216*** (0.20)	-2.674*** (0.21)	-1.967*** (0.19)
ECOij	-1.111*** (0.13)	-0.529*** (0.13)	-0.719*** (0.14)	-0.583*** (0.14)	-0.761*** (0.13)	-1.148*** (0.13)	-0.576*** (0.13)
Contig	0.289*** (0.08)	0.675*** (0.08)	0.552*** (0.08)	0.616*** (0.08)	0.665*** (0.08)	0.379*** (0.08)	0.722*** (0.08)
Comlang	1.292*** (0.07)	0.873*** (0.06)	1.055*** (0.06)	0.810*** (0.06)	0.946*** (0.07)	1.227*** (0.07)	0.903*** (0.06)
INSTjt-1	0.647* (0.35)						
LGEP		0.836*** (0.04)					
LPSP			0.743*** (0.04)				
LRQP				0.788*** (0.04)			
LRoIP					0.628*** (0.04)		
LVAP						0.169*** (0.03)	
LCCP							0.687*** (0.03)
Constant	-28.98*** (1.13)	-25.99*** (1.14)	-28.36*** (1.11)	-26.25*** (1.05)	-25.79*** (1.04)	-26.78*** (1.03)	-27.06*** (1.09)
Observations	10 499	10 079	10 079	10 079	10 079	10 079	10 079
R-squared	0.574	0.685	0.665	0.702	0.672	0.593	0.683

Note: Standard errors in parentheses \* p<.10, \*\* p<.05, \*\*\* p<.01.  
Source: Author's calculation



The “GDP per capita income difference” (PCGDPD) is used to study the comparative existence of Heckscher-Ohlin (H-O) theory with reference to Linder hypothesis. According to H-O theory, countries trade with each other is based on factor endowment, which leads to comparative advantage in respective countries. The difference in factor endowment in different countries leads to more intensive inter-industry trade. However, at present, even countries with same factor endowment trade with each other, which leads to intra-industry trade. The estimated coefficient of PCGDPD is significant and has a positive sign which indicates higher volume of bilateral trade between partner countries. Thus based on the sign of coefficient, H-O hypothesis predominates the Linder hypothesis, which suggests that countries with different factor endowments have a higher inter-industry trade flow than intra-industry trade (Krugman, 1981).

Following Silva and Tenreyro (2006), effect of change in variable X on variable Y is calculated by  $\{(e^{\alpha} - 1) \times 100\}$ , where  $\alpha$  is the coefficient of dummy variable. The common border enhances trade by  $(e^{0.289} - 1) \times 100 = 0.49$  percent compared to countries without a direct link. Similarly, the common language between countries enhances trade by  $(e^{1.292} - 1) \times 100 = 133.91$  percent compared to countries which face language barriers in bilateral trade cooperation. In addition to these variables, trade policy liberalization is expected to enhance trade between countries. For this reason, regional trade agreements are incorporated, which play a significant role in trade cooperation. The coefficient of SAFTA and ECO have negative sign and are statistically significant. This results indicates that South and Central Asian states have failed to enhance intra-regional trade cooperation.

The primary variable of interest in present study is the role of institutional setup in selected countries. Institutions play significant role in the international trade cooperation between countries. There are several dimensions that capture institutional quality. In the present study, in addition to the institutional quality index, six dimensions are included separately that capture institutional quality to avoid overlapping impacts. It is the lag of institutional variables which are included because bilateral trade slowly adjusts to institutional changes. Improvement in institutional quality is expected to impact bilateral trade cooperation positively. Regarding bilateral exports of India to these countries, the results in column (2–7) and Table (2) show that institutions play an important role. The positive sign of institutional factors indicates that improvement in quality of institutions is expected to enhance bilateral trade cooperation. Improvement in government effectiveness by 1 percent enhances exports by 0.83 percent. Similarly, the coefficient of regulatory quality indicates that 1 percent improvement in government ability to implement policies leads to enhancement of exports by 0.78 percent to partner countries. Among other variables, PS, VA, RoL and CC indicates an enhancement of bilateral exports between these countries with improvement in quality of these indicators. These variables are related to the participation of general public in government formation, freedom of expression, control of corruption, policy formulation and government credibility regarding policy implementation.

The results reveal that the impact of these variables on bilateral exports of these countries is outstanding. The results in the present study align with the findings of Bakhsh et al. (2022), who examined exports from China to Belt and Road initiative countries. Moreover, the findings indicate that trade agreements in South and Central Asia have not generated enough trade opportunities for member countries. The signs of coefficients in the Heckman model (Table 3) align with the results presented in Table 2. This model (Table 3) was run to check the robustness of the results as different econometric techniques complement each other. The signs of the variables are same both in PPML and Heckman models. Thus there is no need to discuss the results again.

**Table 3** Heckman selection model results

Variable	-1	-2	-3	-4	-5	-6	-7
LnGDPi	0.947*** (0.02)	0.938*** (0.02)	0.943*** (0.02)	0.930*** (0.02)	0.952*** (0.02)	0.949*** (0.02)	0.978*** (0.02)
LnGDPj	0.739*** (0.01)	0.685*** (0.01)	0.716*** (0.01)	0.815*** (0.01)	0.736*** (0.01)	0.696*** (0.01)	0.723*** (0.01)
PCGDPD	0.064*** (0.01)	0.309*** (0.02)	0.298*** (0.02)	0.274*** (0.02)	0.274*** (0.01)	0.261*** (0.01)	0.117*** (0.01)
Contig	1.217*** (0.08)	1.444*** (0.08)	1.468*** (0.08)	1.252*** (0.08)	1.382*** (0.08)	1.452*** (0.09)	1.291*** (0.09)
Comlang	2.065*** (0.09)	1.515*** (0.09)	1.580*** (0.09)	1.838*** (0.09)	1.470*** (0.09)	1.620*** (0.09)	1.847*** (0.09)
LnDIS	-0.862*** (0.05)	-1.262*** (0.05)	-1.240*** (0.05)	-1.177*** (0.05)	-1.268*** (0.05)	-1.218*** (0.05)	-1.076*** (0.05)
ECOij	-0.612*** (0.12)	-0.454*** (0.12)	-0.364*** (0.12)	-0.519*** (0.12)	-0.515*** (0.12)	-0.411*** (0.12)	-0.552*** (0.12)
SAFTAij	-0.787*** (0.13)	-0.658*** (0.12)	-0.669*** (0.12)	-0.421*** (0.13)	-0.801*** (0.12)	-0.846*** (0.12)	-1.088*** (0.12)
INSTjt-1	0.471*** (0.14)						
LGEP		0.939*** (0.04)					
LCCP			0.811*** (0.03)				
LPSP				0.703*** (0.04)			
LRQP					0.744*** (0.03)		
LRolP						0.809*** (0.04)	
LVAP							0.460*** (0.05)
Constant	-32.54*** (0.54)	-27.49*** (0.57)	-28.44*** (0.56)	-31.04*** (0.54)	-28.96*** (0.55)	-28.26*** (0.57)	-30.68*** (0.56)
<b>Select</b>							
LnGDPi	0.376*** (0.01)	0.383*** (0.01)	0.384*** (0.01)	0.384*** (0.01)	0.384*** (0.01)	0.384*** (0.01)	0.384*** (0.01)
LnGDPj	0.299*** (0.01)	0.308*** (0.01)	0.309*** (0.01)	0.308*** (0.01)	0.308*** (0.01)	0.308*** (0.01)	0.309*** (0.01)
PCGDPD	-0.028*** (0.01)	-0.027*** (0.01)	-0.027*** (0.01)	-0.027*** (0.01)	-0.027*** (0.01)	-0.027*** (0.01)	-0.027*** (0.01)
Contig	0.486*** (0.09)	0.486*** (0.09)	0.482*** (0.09)	0.482*** (0.09)	0.483*** (0.09)	0.482*** (0.09)	0.477*** (0.09)
Comlang	7.305 (333 109.48)	6.925 (66 549.81)	7.264 (253 675.07)	7.097 (123 947.02)	6.991 (84 124.11)	7.074 (118 679.46)	7.261 (237 557.10)
LnDIS	-0.330*** (0.03)	-0.338*** (0.04)	-0.335*** (0.04)	-0.336*** (0.04)	-0.337*** (0.04)	-0.336*** (0.04)	-0.335*** (0.04)
Constant	-12.98*** (0.40)	-13.33*** (0.41)	-13.39*** (0.41)	-13.36*** (0.41)	-13.34*** (0.41)	-13.36*** (0.41)	-13.39*** (0.41)
Observations	10 499	10 163	10 163	10 163	10 163	10 163	10 163

Notes: Standard errors in parentheses \* p<.10, \*\* p<.05, \*\*\* p<.01.

Source: Author's calculation

## CONCLUSION

The present study examined bilateral export determinants of India with selected South and Central Asian countries and top trade partners to determine the impact of quality of institutions on trade cooperation between these countries. The gravity model with advanced estimation techniques was applied following the available literature. In addition to basic variables, role of institutional factors at level, regional trade agreements, cultural factors and related trade costs were also incorporated. The result confirms that institutions play positive and significant role in trade integration between countries, in line with the findings of Gani and Prasad (2008).

The results discussed above indicate that various factors of institutional quality play an important role in export promotion from India to these countries. Among various factors, GE, RQ and PS have the most substantial impact, followed by CC, RoL and VA. This highlights the need to improve the quality of public and civil services and their independence from political pressure. Similarly, the ability of the government to formulate and implement policies to promote private sector development needs to be paid adequate attention to promote exports. Further, the focus should be diverted towards control of corruption, misuse of public offices for private gains, and increased participation of common masses in government formation, which is conducive to economic development and international trade. Besides, the results indicate that regional trade agreements have been ineffective to enhance trade cooperation among member countries, which points out the ineffective implementation of these agreements.

The findings of the present study highlight various areas which needs attention from the competent authority of these countries. First, an effective government role in formulation and implementation of policies is important to promote trade cooperation between India and these countries. Similarly, the participation of people in government formation and freedom of expression, association and free media needs to be promoted in these countries. Similarly, there is a need to check corruption and abuse of public office for private gains needs to be curbed in addition to the improvement in law and order situation and control of terrorist activities.

In general, the results indicate that institutional quality promotes trade between countries. The present study confirms the hypothesis regarding the role of institutions in trade cooperation between countries. Thus institution of democracy need to be strengthened to enhance economic development and trade cooperation among these countries.

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