

# ANALYSIS OF INDIA'S TRADE PATTERNS AND TRADE POSSIBILITIES WITH THE EUROPEAN UNION

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## ABSTRACT

Trade has played a crucial role in the emergence of developing economies. The global emergence of India is also linked to its role in global trade. In this context, the European Union and India initiated talks for a free trade agreement known as the Bilateral Trade and Investment Agreement (BTIA). However, this agreement has failed to materialise due to various challenges and disputes. Against this backdrop, the present study attempts to trace the existing pattern of trade relations between India and the EU and provide a preliminary analysis of the nature of trade in this proposed region. A modified gravity equation and indicators of regional trade interdependence have been estimated. The results indicate that trade within this region is in line with certain predictions of the gravity model. Additionally, it also indicates that such an agreement has little potential for expanding trade and might even result in 'unnatural trade'. Thus, it provides evidence for the argument that India can benefit from developing ties with similar emerging economies in the Asia-Pacific neighbourhood.

## KEY WORDS

Pattern of trade, India-EU Trade, Bilateral Trade and Investment Agreement, Gravity Model, Free Trade Agreements, Regional Trade Interdependence Indicators.

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## Introduction

The role of trade in the Indian economy began with a focus on major trade partners from the West. Countries such as the United States, the Soviet Union and the United Kingdom were some of India's closest trade partners in the early post-independence years. As European integration got underway, India was one of the first Asian economies to establish ties with the newly integrating European Community and was one of the first nations to recognise the European Union (EU). Indian liberalisa-

tion of trade coincided with the formation of the EU during the early 1990s. These changes enabled them to spark meaningful dialogue in the latter part of that decade. A major change in Indo-EU trade relations came in 2007 when negotiations for a regional trading agreement were initiated. The Bilateral Trade and Investment Agreement was seen as a means by which to utilise the untapped trade potential within this region.

The negotiations for the BTIA failed despite 16 rounds of negotiations and were

suspended in 2013 (European Commission, 2020). However, renewed interest in integration has resurfaced in recent years following changes in the policy approach of the Indian government. The EU views India's trade policy to be restrictive, affecting trade across a variety of sectors (European Commission, 2020). Tariff lines for specific products have remained an area of contention for both nations. Additionally, Indian policies with regard to intellectual property rights and legal regulations pertaining to investments have continued to be a concern in trade negotiations. India's demands to allow the movement of individuals to the EU and data security to expand its information technology sector have also raised some concerns. At present, the negotiations are in an undecided state as the parties have reached an impasse. Nowadays, there is growing enthusiasm for a Bilateral Investment Protection Agreement (BIPA) on the part of the EU.

The stalled negotiations and underlying trade issues can be placed in the context of the declining significance of the EU as a trade partner. For India, the share of the EU as an export destination and import market has declined based on trade data from the World Integrated Trade Services (WITS). Thus, this study begins with a question of understanding the nature of trade between India and the European Union. It has also created the need to examine whether such policy decisions are based on current trends in trade or due to popular perception of the role of conventional trade partners. Therefore, this study has the following objectives:

- I. To assess the factors that affect merchandise trade between India and the EU-28 by using the gravity model.
- II. To estimate indicators of Regional Trade Interdependence between India and the EU-27 to determine the potential benefits of a trade agreement.

In order to attain the above objectives, the paper applies the basic generalised form of the Gravity Equation and the Theory of Customs Union developed by Jacob Viner (1950) to examine the nature of merchandise trade flows and understand the potential of the BTIA in a preliminary form. The estimated gravity model shows that factors such as GDP and openness to trade positively impacted merchandise trade flows, while distance negatively impacted merchandise trade. The Indicators of Regional Trade Interdependence given by Plummer et al. (2010) showed that the potential for trade remains limited and that it could result in 'unnatural trade' which could in turn result in welfare losses for the countries involved. The results also suggest that India can benefit by exploring its trade potential and options preferably in its own Asian neighbourhood.

## 1. Literature review

Adam Smith viewed international trade to be a consequence of people's self-interest (Schumacher, 2012). For Smith, the possibility of getting a commodity for a cheaper price is the motivation for all forms of trade (Meoqui, 2019). However, trade between industrialised countries with superior productivity across all sectors and less technologically developed countries could not be examined using absolute advantage (Oldenski, 2010). This was overcome by comparative advantage, introduced by Ricardo, that reflected the ability of a country to produce a good or service at a lower opportunity cost than the other (Lee et al., 2013). Today, the theory of comparative advantage underlies modern mainstream theory of international trade (Costinot, 2009; Hao et al., 2020). In this context, the gravity model is a recent innovation in the existing literature on international trade (Brodzicki and Kwiatkowski, 2018). This model provides a fundamental

thesis that can be applied for the examination of any kind of economic flow (Startienė et al., 2018; Maciejewski, 2019; Khan et al., 2020).

In this section, a broad overview of the observed trends in Indian trade and the existing literature is presented.

### 1.1. Trends and patterns in Indian Trade

In this section, the patterns in India's trade with the EU-27 and its neighbours such as ASEAN, SAARC, Arab League and East Asia have been presented.

#### 1.1.1. India and the EU-27

The trade relations between India and Europe have been a long-term phenomenon. In terms of this connection, the latter half of the 20th century was an evolving ground that laid the foundation for the development of India-EU trade relations. The 1990s marked an important change in policy for both regions with the introduction of liberalisation measures in India and the formation of the EU. From the time of the EU's inception, both regions have made several attempts to expand their economic exchange through Action Plans and Joint Summits.

**Figure 1. Value of India's exports and imports with the EU-27**

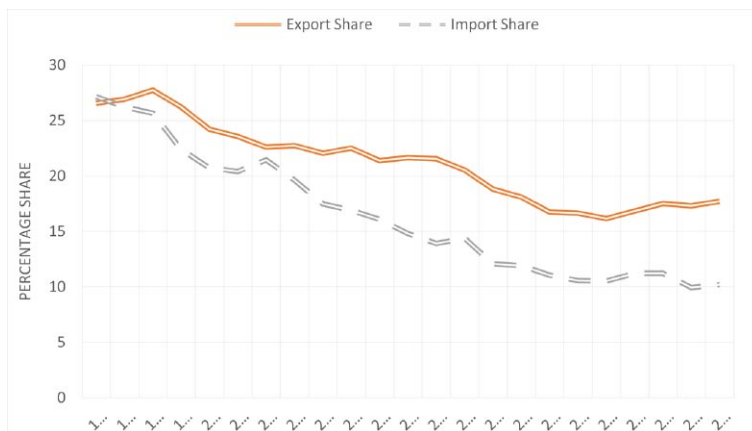


Source: Own elaboration based on data from World Integrated Trade Solutions.

Figures 1 and 2 show that the value of merchandise exports and imports have increased each year. The value of merchandise trade, which was limited prior to 2004, subsequently expanded after both countries became "strategic partners" (Commission of the European Communities, 2004). However, the share of the EU as a trade partner relative to India's total trade has declined significantly. From constitut-

ing a quarter of India's merchandise exports and imports, the share has declined to 17.74% of total exports and 10.22% of total imports of goods. This trend has also been strongly influenced by world economic trends, with their growth rates reflecting global macroeconomic trends.

**Figure 2. Share of India's trade with the EU-27 relative to total exports and imports of India**



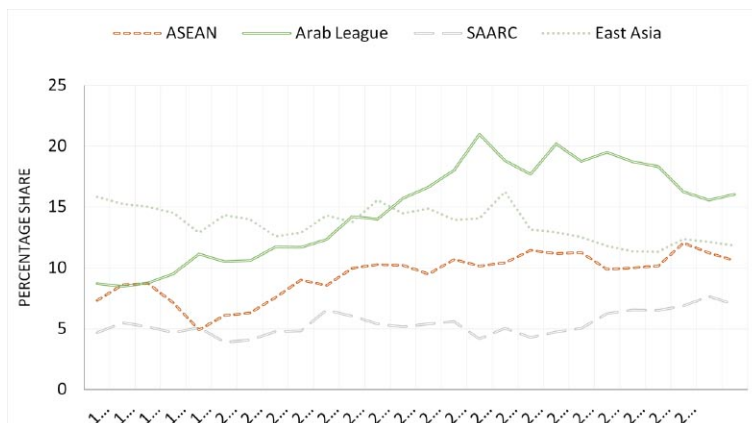
Source: Own elaboration based on data from World Integrated Trade Solutions.

The declining significance of the EU as an export market and source of imports, as measured by its share thereof, is possibly a consequence of the higher growth rates in the expansion of trade with other partners. This raises the question of the continuing relevance of traditional trade partners of the developed world for emerging economies such as India.

### 1.1.2. India and its neighbours

The share of prominent regional players – the South Asian Association for Regional Cooperation (SAARC), the Association of South East Asian Nations (ASEAN), the Arab League (Middle Eastern and North African Nations) and East Asia (China, Japan and the Koreans) - in the total merchandise exports and imports of India has been analysed here.

**Figure 3. Share of exports to neighbouring regions relative to total exports of India**



Source: Own elaboration based on data from World Integrated Trade Solutions.

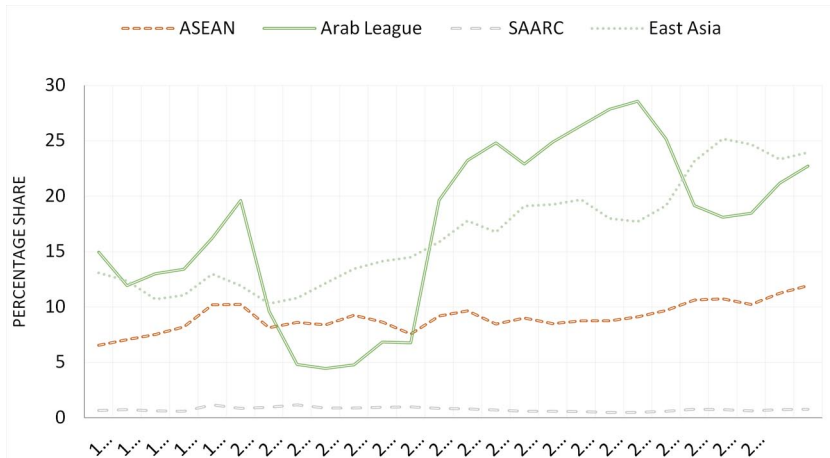
The above graph shows that the shares of SAARC, ASEAN, Arab League and East Asia have continued to be significant for In-

dia. Specifically, the countries of East Asia and the Arab League have had a greater than 10% share of India's total merchan-

dise exports for the past 23 years. The shares of SAARC and ASEAN have also trended upward. The upward trajectory in

the merchandise export shares of these regions indicates the growing importance of trade relations with these regions.

**Figure 4. Share of imports with neighbouring regions relative to total imports of India**



Source: Own elaboration based on data from World Integrated Trade Solutions.

The share of these four regions in India's merchandise imports has continued to rise with some of them manifesting significant fluctuations. Among them, the Arab League's share has fluctuated heavily but has been showing an overall upward trend. A similar increasing but relatively stable pattern has been observed for East Asia and ASEAN. In the case of SAARC, India imports a very small volume from the member nations. These aspects can be explained by several elements including geopolitical factors and the similarity of products. On the whole, the significance of various markets for India in the neighbourhood has been on the increase over this period.

## 1.2. Gravity Model

The gravity model was first introduced by Jan Tinbergen (1962) based on the Newtonian notion of 'gravity'. This model suggests that factors such as market size positively affect trade while distance negatively affects bilateral trade between any

two partners (De Benedictis and Taglioni, 2011). In the initial years, the model did not receive much empirical support, although at present it has received wide acceptance and is being used extensively for the analysis of trade patterns, trade potential and the effects of free trade agreements (Martínez-Zarzoso and Nowak-Lehmann, 2003). The inherent bias in the conventional model was first identified by Anderson (1979), who introduced the idea of 'economic distance' to reflect the 'institutional and infrastructural rigidities' in both partners. The gravity model, in its later applications, has been taken in a generalised form as the "volume of exports between pairs of countries [which] is a function of their incomes (GDPs), their populations, their geographical distance and a set of dummies" (Martínez-Zarzoso and Nowak-Lehmann, 2003). In an exploratory analysis of Australian trade potential, the gravity equation was estimated for log of export flows between two countries that were taken as a function of a set of determinants of trade potential

(Miankhel et al., 2014). It has also been found to be an effective model in explaining the international trade of South Korea (Sohn, 2005), Vietnam (Binh et al., 2011) and Kyrgyzstan (Allayarov et al., 2018). A review of 55 studies conducted with regard to the gravity model showed the efficiency of the model in explaining international trade flows (Kepaptsoglou et al., 2010).

The model is found to be particularly useful in understanding the effects of free trade agreements (Kepaptsoglou et al., 2010). One of the major studies conducted in the context of India, by Batra (2006), showed that the model provided elasticities for income and distance that were reflective of the economic and cultural features of India's trade. It also indicated that India's trade potential is highest with Pakistan (SAARC), Philippines and Cambodia (ASEAN), China, and European nations such as the UK, France and Italy. There are several studies producing contradictory results as well. For instance, Christie (2003) examined the gravity model with respect to trade between the countries of South Eastern Europe, finding wide variations between the trade explained by the model and the actual trade. This anomaly has in fact provided crucial information regarding the trade potential of the region. The conclusion drawn was that this was possibly an indication of either 'unnaturally' low or high trade within this region (Christie, 2003). The nature of geopolitics in the region indicated that it could be an economic manifestation of the internal conflicts of the region. It also brought out the trade potential of the region with other nations. This stands to reflect on some of the ignored aspects of the gravity model and does not entirely challenge the foundations thereof.

### 1.3 Free Trade Agreements

Neoclassical theory broadly argued in favour of free trade between nations. This implied that the removal of all trade barriers was beneficial to all parties involved in the case of a free trade agreement. A challenge to this understanding was brought about by the Theory of Customs Union proposed by Jacob Viner (1950). The formation of an FTA results in internal liberalisation but external protectionism (Raihan, 2009). Therefore, Viner argued that the removal of trade barriers within a proposed region can result in simultaneous trade creation and trade diversion. Trade creation involves the creation of new, efficient trade with participating countries to replace inefficient domestic production. Trade diversion involves redirecting trade away from efficient sources in non-participating countries towards inefficient sources in participating nations. The overall effect would be dependent upon the extent of the effects of trade creation and trade diversion, indicating the likelihood of unnatural and economically inefficient trade due to preferential trade between nations. These concepts have been further operationalised through various measures devised for the purpose of assessment (Plummer et al., 2010).

The existing works on the welfare effects of BTIA have been restricted to simulation analyses that have produced conflicting evidence owing to differences in the assumptions and statistical methods (Gasiorek et al., 2007). India and the EU have different production structures and imports from India face a very low tariff. Therefore, with India's share being a small portion of the total EU imports, the potential for trade creation is limited (Action Aid, 2008). Acherbosch et al. (2008) have stated that the potential gains for India are limited – indeed, the country might in fact

experience losses. Similarly, Polaski et al. (2008) estimated that India would experience welfare losses of an estimated US\$ 250 million and showed that the EU would have modest gains. In addition to macro variables, Meincke (2008) argued that the human development impact would be negative for India due to the impact on vulnerable groups. On the contrary, simulations of partial equilibrium analysis indicated the possibility of growth in the services trade (CEPII CIREM, 2008). Additionally, diversity in export structures was found to be a limiting factor that reduced the negative effects (Winters et al., 2009).

Brexit is predicted to have a negative impact on the agreement as the welfare benefits for India are expected to decline further (Roy and Mathur, 2016). This has given rise to questions regarding the future of the BTIA following Brexit, as the UK is one of India's largest European trade partners. Since 2000, India has had a trade surplus with the UK but a deficit with the other countries of the EU (Banga, 2017). India's trade relations with the EU and UK would depend largely upon the economic rivalry between these two players (Sastry, 2020). It is unlikely that trade negotiations for the BTIA with the EU-27 would go ahead without major issues as the UK has now exited the EU. The problem might continue as the nature of issues raised by the UK were similar to those raised by other members of the EU. It also raises questions regarding the possibility of an India-UK free trading agreement and the impact it could have on the India-EU trade deal.

## 2. Methodology

### 2.1 Estimation of the Modified Gravity Model

The study uses the gravity equation in order to understand the nature of pre-existing trade. For this purpose, the mer-

chandise trade flows between India and its 15 largest trading partners in the EU-28 (including the United Kingdom) have been selected for the analysis. These economies include Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Poland, Portugal, Spain, Sweden and the United Kingdom. The UK is also included in this analysis to reflect on the nature of past trade as this time period came prior to Brexit. These nations together represented close to 90 percent of India's total trade with the EU. As these are converted into export flows, there are 30 trade flows in total that have been analysed for a time period of 23 years from 1996 to 2018. The time period was selected on the basis of the formation of the EU in November 1993. A similar study by Martínez-Zarzoso and Nowak-Lehmann (2003) applied an Augmented Gravity Model to analyse the nature of trade between European and Latin American nations.

#### 2.1.1. Model specification

The gravity model states that bilateral trade flows depend upon the economic size of trade partners and the distance between them (Martínez-Zarzoso, 2003). The gravity equation as given by Tinbergen (1962) can be represented as follows:

$$E_{ij} = \alpha_0 Y_i^{\alpha_1} Y_j^{\alpha_2} D_{ij}^{\alpha_3} \quad (1)$$

In this equation, the exports from economy  $i$  to  $j$  ( $E_{ij}$ ) is represented as a function of the GNP of economy  $i$  ( $Y_i$ ) and  $j$  ( $Y_j$ ) and the distance between them ( $D_{ij}$ ).

One of the essential criticisms of the above form of the gravity model is that it is incomplete and fails to account for some of the trade-enabling or resisting factors (Anderson and Van Wincoop, 2003). Owing to such emergent criticisms, the following general form has been adopted as a basis for this study:

$$PX_{ij} = \beta_0 (Y_i)^{\beta_1} (Y_j)^{\beta_2} (D_{ij})^{\beta_3} (A_{ij})^{\beta_4} u_{ij} \quad (2)$$

The above equation (Bergstrand, 1985) is the value of trade flows between countries  $i$  and  $j$  ( $PX_{ij}$ ) as determined by the value of the nominal GDPs ( $Y_i$ ) and ( $Y_j$ ), the distance between them ( $D_{ij}$ ) and other factors ( $A_{ij}$ ) that assist or restrict trade.  $u_{ij}$  represents a log-normally distributed error term with  $E(\ln u_{ij}) = 0$ . The same specification has been used extensively in studies of international trade since Tinbergen and Poyhonen.

This study takes the trade openness of nations as a variable by means of which to capture the extent of globalisation in the economies, a factor assisting trade. This variable has been used in the evaluation of the trade flows of South Korea with 189 partner nations using the gravity model (Irshad et al., 2018). Trade openness is a measure that is estimated as a ratio of the total trade of the nation to its GDP. This measure is often used as a proxy for measuring the extent of globalisation. Upon taking a log of the variables considered, the modified gravity model with globalisation taken for this study is as follows. This specification is similar to the one adopted by Martínez-Zarzoso and Nowak-Lehmann (2003) in the study of EU-Mercosur trade.

$$\begin{aligned} \text{Log (Exports)} = & C + \beta_1 \text{Log (Exporter GDP)} \\ & + \beta_2 \text{Log (Importer GDP)} + \beta_3 \text{Log (Exporter} \\ & \text{Population)} + \beta_4 \text{Log (Importer Population)} \\ & + \beta_5 \text{Log (Distance)} + \beta_6 \text{(Exporter Trade} \\ & \text{Openness)} + \beta_7 \text{(Importer Trade Openness)} \\ & + \mu_i \quad (3) \end{aligned}$$

### 2.1.2. Variables

For the purpose of the analysis, all imports to India from the partner countries have been taken as exports by those countries to India, measured in thousands US\$. The income measure is taken on the basis of GDP at Purchasing Power Parity (PPP)

at current prices. This measure converts the GDP of an economy into PPP on the basis of current prices. The exchange rate fluctuations fail to capture the differences in price levels across the countries. Thus, in order to provide a comparable measure of GDP, they are converted to international dollars and taken at current prices to capture the purchasing power of economies. Distance is taken as the geographical distance between two countries to capture the extent of trading costs involved. This has been measured in terms of kilometres.

Population has been defined as an estimate of all residents of a country unaccounted for legal status and citizenship taken mid-year. The extent of globalisation is measured using the Trade Openness Index which measures trade as a percentage of GDP. The World Bank defines trade openness as the total value of a nation's international trade expressed as a percentage share of their GDP. It reflects the importance given to international transactions over domestic wealth creation. Also referred to as the trade openness index, this does not mean openness to international competitiveness, but rather the relative importance given to trade. This is a suitable measure in the study as it examines trade flows, and this measure presents the importance of the same. The variables such as GDP PPP at constant US\$ 2011, Population and Trade Openness are collected from the World Bank Database. Export and Import values have been taken from the World Integrated Trade Solutions Database of the World Bank. Geographical distance data has been obtained from Google Maps.

### 2.1.3. Fixed Effects Model

The fixed effects model works on the premise that there are individual specific effects that have an impact on the dependent variable (Allison, 2009). The following



is the specification of the fixed effects model:

$$Y_{it} = \mu_i + \beta X_{it} + \alpha_i + \varepsilon_{it} \quad (3)$$

In the above model,  $\alpha_i$  and  $\varepsilon_{it}$  are of specific importance in the fixed effects model.  $\varepsilon_{it}$  represents the random variation for all individual observations.  $\alpha_i$  is the relevant variable here, representing the individual specific effects, which are the time-invariant case specific impact on Y unobserved by the other variables X and Z.

#### 2.1.4. Random Effects Model

The random effects model refers to a panel data regression model in which the individual specific effects are distributed randomly and are independent of the regressors. Therefore, the random effects model is specified as follows:

$$Y_{it} = \mu_i + \beta X_{it} + \gamma Z_i + (\alpha_i + \varepsilon_{it}) \quad (4)$$

$$Y_{it} = \mu_i + \beta X_{it} + \gamma Z_i + v_{it} \quad (5)$$

where:

$v_{it}$  represents a composite error term which is inclusive of the individual specific effects (Bai, 2009).

In the above model, we consider a dependent variable Y which varies across time and cases, an independent variable X which varies across time and cases, and a second independent variable Z which is time-invariant.  $\mu_i$  represents the constant that may vary with the time period.  $\beta$  and  $\gamma$  are coefficients of X and Z respectively. The fixed effects model would omit Z as it is time-invariant, but a random effects model considers regressors that are time-invariant. The fundamental difference with regard to the fixed effects model is that  $\alpha_i$  is considered to be independent of regressors and therefore part of the composite error term  $v_{it}$ . Thus, the choice of the fixed or random effects model is made using the Hausman test depending on the correlation of effects and estimators.

#### 2.1.5. Hausman Test

A fixed effects estimator is only efficient under a fixed effects model. However, both fixed and random effects estimators are efficient for the random effects model. Therefore, to decide on the efficiency of the estimators, the Hausman test indicates the model to be chosen for the given variables. The random effects estimators are preferred when it is observed that the individual specific effects are unrelated effects. Therefore, the Hausman test indicates whether there is a significant difference between both fixed and random effects estimators. If the regressors and the effects are not correlated, the fixed effects estimator and the random effects estimator are consistent. However, in such a case, the fixed effects estimator is inefficient. Therefore, we select the random effects model. However, when they are correlated, the random effects estimators are inconsistent and we use the fixed effect estimators.

The collected data was organised and processed using Microsoft Excel 2010 and the panel data estimators were computed using Stata IC 12.

## 2.2. Estimating indicators of regional trade interdependence

Indicators of regional trade interdependence quantify the extent to which the proposed regions already trade with each other (Plummer et al., 2010). These have been estimated for India and the EU-27 for a period of 23 years from 1996-2018 based on the values of merchandise trade. The choice of the EU-27 was motivated by Brexit. Since any future trade agreement with the EU would not involve the UK, the analysis of the potential benefits have been restricted to the EU-27. The aim here is to understand the extent to which the region trade with itself in order to understand the possibilities for the future. Thus, the study is restricted to regional trade interdepend-

ence and does not look into the production, consumption and welfare effects.

For the purpose of the analysis, an FTA between India and the EU-27 has been looked into. The EU-27 represents a common market and is taken as a single entity. The following indicators of Regional Trade Interdependence have been taken from the *Methodology of Impact Assessment of Free Trade Agreements* (2010) of the Asian Development Bank.

### 2.2.1. Intra-Regional Trade Share

The Intra-Regional Trade Share is a ratio of the trade within the region proposed under the Free Trade Agreement to the total trade volume of the region (Plummer et al., 2010).

$$\text{Intra-Regional Trade Share} = \frac{T_{ii}}{T_i} \quad (6)$$

where:

$T_{ii}$  is the sum of the exports of  $i$  to  $i$  and imports from  $i$  to  $i$

$T_i$  is the sum of exports of  $i$  and  $i$  and imports of  $i$  and  $i$  from the world

The challenge with this measure, however, is that when there are more partners included in the FTA, their share will tend to increase as more volume of trade becomes part of the  $T_{ii}$ . This study does not face the limitation of a large number of partners increasing the value of the index, as we are considering only two economies.

### 2.2.2. Intra-Regional Trade Intensity

The Intra-Regional Trade Intensity is a ratio of the intra-regional trade share to the share of that region in the world's total trade (Plummer et al., 2010).

$$\text{Intra-Regional Trade Intensity} = \frac{\frac{T_{ii}}{T_i}}{\frac{T_i}{T_w}} \quad (7)$$

where:

$T_{ii}$  is the sum of the exports of  $i$  to  $i$  and imports from  $i$  to  $i$

$T_i$  is the sum of exports of  $i$  and  $i$  and imports of  $i$  and  $i$  from the world

$T_w$  is the sum of total world exports and total world imports

The value of this index basically indicates a bias in trade direction where values exceeding 1 are associated with an internal bias, and less than 1 with an external bias. It is also possible that the indicator may not be comparable with the extra-regional intensity indicator. The challenges with regard to comparability are not relevant as a comparison is not attempted.

### 2.2.3. Regional Trade Introversion Index

The Regional Trade Introversion Index is a measure of the relative intensity of regional trade in relation to trade with outsiders (Plummer et al., 2010).

$$\text{Regional Trade Introversion Index} = \frac{(H_{ii} - H_{Ei})}{(H_{ii} + H_{Ei})} \quad (8)$$

where:

$$H_{ii} = (T_{ii}/T_i) / (T_{oi}/T_o)$$

$$H_{Ei} = [1 - (T_{ii}/T_i)] / [1 - (T_{oi}/T_o)]$$

$T_{ii}$  is the sum of the exports of  $i$  to  $i$  and imports from  $i$  to  $i$

$T_i$  is the sum of exports of  $i$  and  $i$  and imports of  $i$  and  $i$  from the world

$T_{oi}$  is the sum of exports of the region to outsiders and imports from outsiders

$T_o$  is the sum of exports and imports of outsiders

This measure is an attempt to overcome the problems associated with the other measures of regional trade interdependence. It estimates the intra-regional trade intensity  $H_{ii}$  and extra-regional trade intensity  $H_{Ei}$ , which are estimated against the regional share of total trade of outsiders as opposed to world trade in the other measures. This measure ranges from -1 to +1 and is not influenced by the number of countries included in the region, with neg-

ative values associated with extra-regional trade bias and positive value with an intra-regional trade bias.

### 3. Results

#### 3.1. Modified Gravity Model: The Results

A fixed effects model works on the premise that there are individual specific

effects that have an impact on the dependent variable. The random effects model is a panel data regression model in which the individual specific effects are distributed randomly and are independent of the regressors. The results with regard to both models have been presented in the following table.

**Table 1. Modified gravity model for merchandise trade between India and 15 EU countries**

	Fixed Effects Model	Random Effects Model
Constant	-29.242* (0.007)	-42.051* (0.002)
Exporter's GDP	0.965* (0.000)	0.652* (0.000)
Importer's GDP	0.805* (0.000)	0.906* (0.000)
Exporter's Population	-1.251* (0.033)	0.385* (0.041)
Importer's Population	0.770 (0.190)	0.307 (0.104)
Distance	-	-0.362 (0.812)
Exporter's Trade Openness	0.013* (0.000)	0.012* (0.000)
Importer's Trade Openness	0.016* (0.000)	0.015* (0.000)
Number of Observations	690	690
R2 Within	0.8628	0.8608
R2 Between	0.0064	0.5979
R2 Overall	0.0248	0.6676
Sigma u ( $\alpha$ )	4.305	0.782
F-Statistic/ $\chi^2$	685.43* (0.000)	4050.30* (0.000)
Hausman Test ( $\chi^2$ )		18.68* (0.0047)

Source: Own elaboration.

Note: All variables except trade openness have been taken in log form

\* Significant at 5 per cent

The above table summarises the effects of factors such as GDP, population, distance and trade openness on merchandise exports between India and 15 nations of the EU-28. For the above results, the fixed effects model is applicable as indicated by the Hausman test ( $\chi^2 = 18.68$ ,  $p=0.0047$ ). The fixed effects estimators of this model are time-invariant country pair effects. Distance, which was a time invariant variable,

was dropped from the analysis during the estimation of the coefficients for the fixed effects model.

The above model can be written as:  

$$\text{Log (Exports)} = -29.242* + 0.965 \text{ Log (Exporter's GDP)*} + 0.805 \text{ Log (Importer's GDP)*} - 1.251 \text{ Log (Exporter's Population)*} + 0.77 \text{ Log (Importer's Population)} + 0.013 \text{ (Exporter's Trade Openness)*} + 0.016 \text{ (Importer's Trade Openness)*} \quad (7)$$

The above model indicates that a 1 percent rise in the GDP of an exporting country increases its merchandise exports by 0.96 percent. A 1 percent increase in the GDP of the importing country will increase the merchandise exports of the given country by 0.80 percent. It can be observed that the effect is positive, meaning that an increase in income leads to an increase in exports. Additionally, we note that income elasticity is greater for exporter GDP than for importer GDP by 0.16 percent. There is some empirical evidence from the works of Martínez-Zarzoso and Nowak-Lehmann (2003) which suggests that producer GDP income elasticity should be greater than that of the consumer. The population of exporters was found to have a negative impact, in that a 1 percent increase in population led to a 1.25 percent reduction in exports. This could indicate that the growing population in the domestic market reduced the output available for export. The population of importers, however, was found to be insignificant.

Trade openness is a measure of globalisation and has a positive impact on exports and imports. A 1 percent increase in the trade openness of an exporter increases its merchandise exports by 0.013 percent, while a similar increase in an importer's trade openness increases the merchandise exports of its partner by 0.016 percent. Despite being small in value, the impact can be significant given the nature of the variable itself. A 1 percent increase in trade openness reflects an increase in total trade relative to the nation's GDP. The trade openness of an importer has a greater impact than the trade openness of an exporter. This might indicate that the impact of the willingness of an importer to import will be more crucial than the willingness of an exporting country to export. Restrictions with regard to the importing country could

restrict the domestic nation's exports more severely than a restriction on exports in that country.

Although the fixed effects model did not include distance as it is a time-invariant variable, an increasing amount of econometric evidence is available supporting the use of the random effects model as the default model (Bell and Jones, 2015). The coefficient for distance is negative as per the random effects model, indicating that a 1 percent increase in distance resulted in a 0.36 percent reduction in merchandise exports. This negative relationship is in line with the theoretical gravity model and the findings of existing studies. However, the coefficient was found to be insignificant. We observe that the income elasticities have changed, with the coefficient of exporter GDP declining to 0.652 and importer GDP increasing to 0.906. The population of the exporter had a positive coefficient of 0.385, while importer population was insignificant. This indicates the ambiguity in existing literature that suggests that the role of population can be either positive or negative in reducing output for export or increasing labour for production.

### 3.2. Estimating indicators of regional trade interdependence

Data pertaining to India's exports and imports with trade partners, India's global trade, the trade partner's trade on a global scale and total global trade are collected from the World Integrated Trade Solutions database of the World Bank. The technical notes regarding the estimation of the index values have been attached in the appendix. Microsoft Excel was used for the organisation of data and estimation of the indicators. The results are summarised as follows.

**Table 2. Indicators of regional trade interdependence for India and the European Union (EU-27)**

Year	Intra-Regional Trade Share	Intra-Regional Trade Intensity	Regional Trade Introversion Index
1996	0.0091	0.0181	-1.0000
1997	0.0093	0.0211	-0.9949
1998	0.0088	0.0188	-0.9973
1999	0.0091	0.0205	-0.9950
2000	0.0086	0.0213	-0.9915
2001	0.0084	0.0201	-0.9930
2002	0.0090	0.0217	-0.9925
2003	0.0089	0.0207	-0.9937
2004	0.0090	0.0212	-0.9934
2005	0.0112	0.0273	-0.9899
2006	0.0115	0.0283	-0.9889
2007	0.0116	0.0279	-0.9899
2008	0.0134	0.0333	-0.9863
2009	0.0156	0.0392	-0.9833
2010	0.0154	0.0418	-0.9772
2011	0.0171	0.0471	-0.9732
2012	0.0169	0.0489	-0.9688
2013	0.0168	0.0483	-0.9696
2014	0.0158	0.0449	-0.9723
2015	0.0162	0.0463	-0.9711
2016	0.0157	0.0439	-0.9740
2017	0.0158	0.0450	-0.9722
2018	0.0180	0.0494	-0.9719

Source: Own elaboration based on data from World Integrated Trade Services.

Table 2 presents three essential inferences regarding the nature of merchandise trade in this region. Firstly, the share of merchandise trade in this region relative to world trade has increased but still remains substantially small at less than two percent. Secondly, Intra-Regional Trade Intensity indicates that the countries of the region are biased towards trading with nations outside this region. Finally, the Regional Trade Introversion Index value has changed from -1 in 1996 to -0.9719, indicating a continuation of extra-regional bias in trade between EU and India. This increase is an indication of a higher growth rate of trade within this region compared to trade outside the region. Extra-regional trade bias indicates that the nations of this region may be trading with nations outside the proposed region more intensely than

with nations within the region (Plummer et al., 2010). Thus, an FTA between India and the EU is less likely to be beneficial and can potentially induce the 'unnatural' trade of goods. 'Unnatural trade' implies that the free trading agreement can result in a loss of welfare for the countries involved as they have an extra-regional trade bias (Frankel et al., 1995).

#### 4. Discussion

The fundamental objective of the study is to assess the factors that affect India-EU trade and present a preliminary analysis into the potential for benefit for India associated with a Free Trade Agreement with the EU. The gravity equation based on fixed effects showed that the GDP of nations had a positive impact on merchandise exports, while exporter population

had a negative impact. Trade openness, a trade-enhancing factor, positively impacted merchandise exports between nations. The elasticity of importer trade openness is greater, indicating that willingness to import is more crucial in determining trade flows. Distance, which was not included in the fixed effects model due to its time-invariant nature, had a negative insignificant coefficient by the random effects model. In contrast to the findings of the fixed effects model, the random effects model found that exporter population positively influenced merchandise exports. The results of this analysis have not strictly adhered to previous studies based on the gravity model. This could potentially indicate the existence of underlying structural factors associated with the complementary nature of trade between developed and developing economies that are not captured by the basic gravity model.

In contradiction to general expectations, measures of regional trade interdependence have showed that free trade agreements may potentially lead to the 'unnatural trade' of goods. The low ratios for the trade indicators from the above analysis point to higher trade costs and economic distance within the proposed region. Therefore, an FTA would be harmful and could possibly induce "unnatural" trade (Plummer et al., 2010). 'Unnatural trade' implies that the free trading agreement can result in a loss of welfare for the countries involved as they have an extra-regional trade bias towards trading more with countries outside the region than within the region (Frankel et al., 1995). Additionally, the chance of 'unnatural trade' is even higher when countries are located on different continents and significant transportation costs are involved (Baier and Bergstrand, 1997). This essentially means that it could result in the diversion of trade which could negatively impact the economy in terms of production,

consumption and welfare. There are many factors which operate in this region to reduce the positive effects associated with trade creation: complementarity of economies, geographical distance and lower pre-agreement tariffs (Salvatore, 2014). This has also coincided with the findings of Action Aid (2008) which show that the share of India in the EU's total exports was too low and that it faced lower tariffs, and thus there was very limited scope for trade creation. With Brexit finalised, the benefits that India could have potentially derived from a trading agreement with EU have been further diminished (Roy and Mathur, 2016). These findings thus emphasise the need for the regional integration of similar economies as a future strategy for emerging economies.

The conclusions derived from the study raise questions regarding the future of India's trade policy. With the importance of conventional choices and traditional partners receding, the selection of trade partners and regions has become crucial if the country is to establish closer trading ties with other potential partners. It is important to estimate the benefits accrued by the comparative cost advantage which originates from the variations in factor endowments while devising strategies for developing future trade policies. The study highlights that a well-informed selection of trade partners and regions will have a long-lasting and positive impact on the trade scenario, which will ensure sustained growth in trade flows with a long-term effect. Batra (2006) also provided evidence to show that India's trade potential was highest with the Asia Pacific region. Static Applied General Equilibrium Analysis has found that the partial removal of tariffs with Australia could result in a significant welfare gain of 0.4 percent for different trade elasticities (Cho and Yoon, 2014).

India has an important role to play with regard to Asian integration. With its wide trade potential in this region, India – as one of the largest economies in this region – can pave the way for further integration. In a world with increasing integration among developed nations, the emergence of Asian economies is critical for their path towards global economic leadership (Vidya et al., 2020). India's potential lies with Pakistan in SAARC and with Philippines and Cambodia in ASEAN (Batra, 2006). These countries, along with major partners such as China, can be the first step for India to initiate its trade policy with a broader objective of integrating the Asian region. Some of the critical factors that can enable integration are cultural diversity, economic similarity and strategic location (Salvatore, 2014; Gani and Scrimgeour, 2019). However, there are several challenges that are facing this region, predominantly owing to underlying diplomatic tensions. India faces a great deal of tension with regard to China and Pakistan. The military dominance of China in the South China Sea remains yet another irritant in the context of economic relations in this region. Wignaraja et al. (2019) point to the need for regional policy coordination in order to extract benefits from the strategic location in the Indian Ocean. Anbumozhi and Kalirajan (2020) point to restrictions in the services trade and insufficient trade infrastructure which limit the integration of this region. Thus, there is a need for coordinated economic policy, and India can benefit by leading the change in this region.

The future of regional integration during the present times largely depends on the effects and after-effects of the global pandemic. The onset of the pandemic has resulted in a reduction of the density of global trade during the initial months (Vidya and Prabeesh, 2020). During the onset of the global pandemic, international trade

and regional integrations faced a challenge due to differences in national level policies (Erasmus 2020). Several countries also invoked specific clauses of trade agreements to impose restrictions and divert trade to protect their national interests (Holden, 2020). However, with the intensification of the crisis, there is growing recognition of the role of regional integrations in the post-COVID economic recovery at the global level (CEPAL 2020). Another important issue that may influence the trade relations of India with the EU is Brexit and its consequences (e.g. Czech and Krakowiak-Drzewiecka, 2019). In relation to India's trade with EU, India can benefit by integrating itself into the value chains of European companies as the economy is now being seen as an alternative to China (Bhandari and Gambhir, 2020). However, these aspects continue to be contentious and require policy level changes in both the EU and India. The lack of regional cooperation gives India an opportunity to lead and also to explore new markets to revitalise existing global value chains and also to forge new ones (Shingal, 2020). This becomes even more relevant in the case of growing sentiments against China and their trade policy, making India an alternative partner and investment destination. Thus, the outbreak of the pandemic has highlighted the increasing need to bring together major Asian powers such as India, Japan, Singapore and other economies of ASEAN together in forging an alliance for recovery and growth, making a strong case for Asian integration.

## Conclusions

This study has raised the question of examining the factors that influence trade between India and the EU and has examined the potential for benefits from an FTA. In order to answer the central research questions, the study estimated a gravity equa-

tion for India's trade with 15 major economies of the EU-28 and also estimated indices of regional trade interdependence for India and the EU-27. The gravity model estimates showed that income, population, distance and trade openness were factors that had a significant impact on the trade flows between India and 15 economies of the EU-28. The estimates of the fixed effects model show that the GDP of partners and trade openness have had a significant positive impact on export flows between India and the EU. Additionally, the estimates of the random effects model show that distance has had a negative significant impact on trade while population has had a positive significant impact on exports. The nature of results could potentially indicate that conventional models such as the basic gravity equation might not be able to account for some of the underlying structural factors that affect trade between developed and developing economies, for example the EU and India.

The assessment of the potential for benefits from an FTA was evaluated by estimating three indicators of regional trade interdependence, Intraregional Trade Share, Intraregional Trade Intensity and Regional Trade Introversion Index. The estimates showed that trade within this region has increased over the years relative to world trade but continues to remain substantially small. These indicators have also revealed that India's trade with the EU is characterised by extroversion or external bias where they are more likely to trade outside the proposed region than within the region. Thus, the results indicated that it could potentially result in 'unnatural trade' between India and the EU, resulting in a loss of welfare. These findings go to show that it is unlikely that India will receive benefits from such an agreement with regard to merchandise trade.

It is observed that the significance to India of conventional partners such as the EU are declining. Further, changes like Brexit have reduced the benefits for both parties involved. Thus, the future of India's trade can benefit by focusing on its strengths and endowments. As pointed out by several studies, India can benefit from an Asian-oriented trade policy. The geographical, cultural and administrative distance faced in trade with the EU can be overcome by such a policy. The Look East Policy adopted by the Indian government is one such measure, and further extension of such policy measures to bring about meaningful dialogue can play an important role in expanding the growth potential for all nations involved. However, there are several underlying issues that are preventing the full integration of this region, such as the lack of policy coordination and insufficient infrastructure. Thus, this potential can be exploited by bringing the nations together. In this context, India – as one of the largest economies – can play a pivotal role by adopting an inclusive trade policy.

The results of this study highlight the fact that emerging economies can benefit by leveraging the advantages offered by partners in their neighbourhood. Economic and cultural similarity, along with reduced geographical and other forms of distance, can provide the means for meaningful engagement. As pointed out by Salvatore (2014), geographical distance, economic similarity and pre-integration tariffs have a critical role to play in international trade. Therefore, countries that are seeking to develop new trade relationships and form regional integrations have to focus on these key aspects, as these have the potential to enhance benefits for their economies and also contribute to the growth of the global economy. Particularly in the post-pandemic world, regional integrations will be significant in bringing together economies



and communities in a process of recovery and development (CEPAL 2020). Thus, a neighbourhood first policy can go a long way to benefiting nations worldwide.

This study evaluates only trade with 15 major EU nations that constitute 90 per cent of trade using the gravity model. It is also restricted to only merchandise trade. A future expansion of this study can focus on the inclusion of all nations and the trade in services in the estimation of the model. It is restricted to the indicators of Regional Trade Interdependence to arrive at preliminary results regarding whether the agreement can potentially lead to benefits. The original gravity equation as proposed by Tinbergen is based on an intuitive logic that lacked theoretical justifications and had econometric specification issues, as pointed out by Anderson (1979). The results obtained can be enhanced by applying some of the emergent specifications that address some of the underlying theoretical and econometric concerns. The estimation of trade creation and trade diversion effects is also an area of further research with respect to India- EU trade liberalisation. The Structural Gravity Model could be used by incorporating all 27 nations of the EU to study the extent of trade creation and trade diversion. Also, further exploration can be carried out by employing advanced models such as SMART and GTAP to understand the production and consumption welfare effects. Finally, this study does not consider the implications of Brexit for this agreement. Although this study takes the fact that Brexit can reduce the potential benefits into consideration, it does not incorporate it into the methodology for analysis. Incorporating these aspects can further add to the findings with regard to the BTIA and its benefits.

## References

- Achterbosch, T., Kuiper, M., Roza, P. (2008), EU-India Free Trade Agreement: A Quantitative Assessment, The Hague: LEI Wageningen.
- Action Aid (2008), An assessment of the likely impact of the India – EU Free Trade Agreement: Action Aid briefing for UK MPs, United Kingdom.
- Allayarov, P., Mehmed, B., Arefin, S., Nurmatov, N. (2018), The factors affecting Kyrgyzstan's bilateral trade: A Gravity Model Approach, *Journal of Asian Finance, Economics and Business* 5(4), 95-100. <https://doi.org/10.13106/jafeb.2018.vol5.no4.95>
- Allison, P.D. (2009), *Fixed Effects Regression Models*, Thousand Oaks: Sage Publications.
- Anbumozhi, V., Kalirajan, K. (2020), South Asia's Economic Integration with East Asia: An Exploratory Analysis with a Focus on India, *Journal of Economic Integration*, 35(1), 91-110. <https://doi.org/10.11130/jei.2020.35.1.91>
- Anderson, J. (1979), A Theoretical Foundation for the Gravity Equation, *The American Economic Review*, 69(1), 106-116.
- Anderson, J., Van Wincoop, E. (2003), Gravity with Gravitas: A Solution to the Border Puzzle, *The American Economic Review*, 93(1), 170-192. <https://doi.org/10.1257/000282803321455214>
- Bai, J. (2009), Panel Data Models with Interactive Fixed Effects, *Econometrica*, 77(4), 1229-1279. <https://doi.org/10.3982/ECTA6135>
- Baier, S.L., Bergstrand, J.H. (1997) International trade, regional free trade agreements, and Economic Development, *Review of Development Economics*, 1(2), 153-170. <https://doi.org/10.1111/1467-9361.00011>
- Banga, R. (2016), Brexit: Opportunities for India, *Trade Competitiveness Briefing Paper*, The Common Wealth. <https://doi.org/10.14217/ca804af9-en>
- Batra, A. (2006), India's Global Trade Potential: The Gravity Model Approach, *Global*

- Economic Review, 3, 327-361. <https://doi.org/10.1080/12265080600888090>
- Bell, A., Jones, K. (2015), Explaining fixed effects: Random effects modelling of time-series cross-sectional and panel data, *Political Science Research and Methods*, 3(1), 133-153. <https://doi.org/10.1017/psrm.2014.7>
- Bergstrand, J.H. (1985), The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence, *The Review of Economics and Statistics*, 67(3), 474-481.
- Bhandari, J., Gambhir, J. (2020), The Pandemic and the Future of India-EU Trade Relationship, Retrieved from: <https://diplomatist.com/2020/04/25/the-pandemic-and-the-future-of-india-eu-trade-relationship/> (accessed 9 November 2020).
- Binh, D.T.T., Duong, N.V., Cuong, H.M. (2011), Applying the Gravity Model to Analyse Trade Activities of Vietnam, retrieved from: <https://www.freit.org/WorkingPapers/Papers/TradePatterns/FRE-IT639.pdf> (accessed 9 November 2020)
- Brodzicki, T., Kwiatkowski, J. (2018), An empirical investigation into the role of technology gap in the trade relations of the EU Member states, *Entrepreneurial Business and Economics Review*, 6(2), 111-135. <https://doi.org/10.15678/EBER.2018.060206>
- CEPAL (2020), The effects of the coronavirus disease (COVID-19) pandemic on international trade and logistics, Economic Commission for Latin America and the Caribbean.
- CEPII CIREM. (2008), Economic Impact of a potential FTA between the European Union and India, Brussels: Directorate General for Trade.
- Cho, S.W., Yoon, G. (2014), Sectoral-Analysis of Australia-India Free Trade Agreement, *Journal of Asia Pacific Economy*, 19(2), 205-229. <https://doi.org/10.1080/13547860.2013.820469>
- Christie, E. (2003), Potential Trade in South-East Europe: A Gravity Model Approach, *Journal for Labour and Social Affairs in Eastern Europe*, 5(4), 81-101.
- Commission of European Communities (2004), An EU-India Strategic Partnership, Brussels: Commission of European Communities.
- Costinot, A. (2009), An elementary theory of comparative advantage, *Econometrica*, 77(4), 1165-1192. <https://doi.org/10.3982/ECTA7636>
- Czech, S., Krakowiak-Drzewiecka, M. (2019), The rationale of Brexit and the theories of European integration, *Oeconomia Copernicana*, 10(4), 589-602. DOI: 10.24136/oc.2019.028
- De Benedictis, L., Taglioni, D. (2011), The gravity model in international trade, in: L. De Benedictis, L. Salvatici (Eds.), *The Trade Impact of European Union preferential policies* (pp. 55-89), Berlin-Heidelberg: Springer.
- Erasmus, G. (2020), The Implications of COVID-19 for Regional Trade, retrieved from: <https://www.tralac.org/blog/article/14630-the-implications-of-covid-19-for-regional-trade.html> (accessed 9 November 2020)
- European Commission. (2020), Countries and Regions: India, retrieved from: <https://ec.europa.eu/trade/policy/countries-and-regions/countries/india/> (accessed 30 October 2020).
- Frankel, J. A., Stein, E., Wei, S. (1991), Trading blocs: The natural, the unnatural, and the super-natural, *Journal of Development Economics*, 47, 61-95. [https://doi.org/10.1016/0304-3878\(95\)00005-4](https://doi.org/10.1016/0304-3878(95)00005-4)
- Gani, A., Scrimgeour, F. (2019), Can trading partner cultural diversity explain trade?, *Journal of Asia Pacific Economy*, 24(2), 313-327. <https://doi.org/10.1080/13547860.2019.1602905>
- Gasiorek, M., Holmes, P., Robinson, S., Rollo, J., Shingal, A., Mukherjee, C., Nanda N., Pahariya, N.C., Simi, T.B. (2007), Qualitative Analysis of a potential Free Trade Agreement between the European Union and India, Sussex: Centre for the Analysis of Regional Integration at Sussex.
- Hao, J., Li, C., Yuan, R., Ahmed, M., Khan, M.A., Oláh, J. (2020), The influence of the knowledge-based network structure hole

- on enterprise innovation performance: The threshold effect of R&D investment intensity, *Sustainability*, 12(15), 6155. <https://doi.org/10.3390/su12156155>
- Holden, P. (2020), *Regional Integration and Trade in the Era of COVID-19: A First Look*, Bruges: UNU Institute on Comparative Regional Integration Studies.
- Irshad, M.S., Xin, Q., Shahriar, S., Ali, F. (2018), South Korea's potential export flow: A panel gravity approach, *Asian Journal of Empirical Research*, 8(4), 124-139.
- Kepaptsoglou, K., Karlaftis M.G., Tsamboulas, D. (2010), The Gravity Model Specification for Modelling International Trade Flows and the Free Trade Agreement Effects: A 10 Year Review of Empirical Studies, *The Open Economics Journal*, 3, 1-13. <https://doi.org/10.2174/1874919401003010001>
- Khan, M.A., Khan, M.A., Ali, K., Popp, J., Oláh, J. (2020), Natural resource rent and finance: The moderation role of institutions, *Sustainability*, 12(9), 3897. <https://doi.org/10.3390/su12093897>
- Lee, E., Rhee, Y., Lee, S.U. (2013), Beyond Ricardian Model: An Optimal Commodity Distribution Based on Absolute Advantage for Multi-country Multi-commodity, *International Journal of Business and Management*, 8(14), 110-118. <https://doi.org/10.5539/ijbm.v8n14p110>
- Maciejewski, M. (2019), The similarity of the demand structure as a determinant of the commodity structure of bilateral trade in the European Union countries, *Entrepreneurial Business and Economics Review*, 7(2), 249-262. <https://doi.org/10.15678/EBER.2019.070214>
- Martínez-Zarzoso, I. (2003), Gravity Model: An Application to Trade Between Regional Blocs, *Journal of Applied Economics*, 31(2), 174-187. <https://doi.org/10.1007/BF02319869>
- Martínez-Zarzoso, I., Nowak-Lehmann, F. (2003), Augmented Gravity Model: An Empirical Application to Mercusor-European Union Trade Flows, *Journal of Applied Economics*, 6(2), 291-316. <https://doi.org/10.1080/15140326.2003.12040596>
- Meincke, B. (2008), *The EU-India FTA: Development and Growth for each and everybody?* Berlin: Heinrich Boll Foundation.
- Meoqui, J.M. (2019), Overcoming absolute and comparative advantage: A reappraisal of the relative cheapness of foreign commodities as the basis of international trade, *History of Economics – eJournal*. <https://doi.org/10.21390/ssrn.3095473>
- Miankhel, A.K., Kalirajan, K., Thangavelu, S.M. (2014), Australia's export potential: An Exploratory analysis, *Journal of Asia Pacific Economy*, 19(2), 230-246. <https://doi.org/10.1080/13547860.2013.820472>
- Oldenski, L. (2010), International Trade, Comparative and Absolute Advantage and Trade Restrictions, in: *21st Century Economics: A Reference Handbook*, Thousand Oaks: Sage Publications.
- Plummer, M., Cheong, D., Hamanaka, S. (2010), *Methodology for Impact Assessment of Free Trade Agreements*, Asian Development Bank.
- Polaski, S.A., Ganesh Kumar., McDonald, S., Panda, M., Robinson, S. (2008), *India's Trade Policy Choices: Managing Diverse Challenges*, United States: Carnegie Endowment for International Peace.
- Raihan, S. (2009), *European Union- India bilateral free trade agreement: Potential Implications for the excluded low-income economies of Asia and African Studies in Trade and Investment*, 67, 66-92.
- Roy, A., Mathur, S.K. (2016), Brexit and India-EU Free Trade Agreement, *Journal of Economic Integration*, 31(4), 740-773. <https://doi.org/10.11130/jei.2016.31.4.740>
- Salvatore, D. (2014), *International Economics: Trade and Finance*, Wiley & Sons.
- Sastry, V.V.L.N. (2020), *BREXIT-and Its Impact on India's Export Business*. India: Idea Publishing.
- Schumacher, R. (2012), Adam Smith's theory of absolute advantage and the use of doxography in the history of economics, *Erasmus Journal of Philosophy and Economics*, 5(12), 54-80. <https://doi.org/10.23941/ejpe.v5i2.105>

- Singhal, A. (2020), Responding to the COVID-19 Crisis: Policy Priorities for India, in: AIC-EEPC (Eds.) COVID-19 Challenges for the Indian Economy: Trade and Foreign Policy Effects (pp. 101-104), New Delhi: ASEAN-India Centre (AIC) – Engineering Export Promotion Council of India (EEPC).
- Sohn, C.H. (2005), Does the Gravity Model explain South Korea's trade flows?, *The Japanese Economic Review*, 56(4). <https://doi.org/10.1111/j.1468-5876.2005.00338.x>
- Startienė, G., Dumčiuvienė, D., Stundtienė, A., Januškevičius, A. (2018), An impact of the euro adoption on the international trade of new EMU members: The Lithuanian case, *Entrepreneurial Business and Economics Review*, 7(1), 201-215. <https://doi.org/10.15678/EBER.2019.070111>
- Tinbergen, J. (1962), *Shaping the World Economy*, New York: Twentieth Century Fund.
- Vidya, C.T., Prabeesh, K.P. (2020), Implications of COVID-19 pandemic on the global trade networks, *Emerging Markets Finance and Trade*, 56, 2408-2421. <https://doi.org/10.1080/1540496X.2020.1785426>
- Vidya, C.T., Prabeesh, K.P., Sirowa, S. (2020) Is Trade Integration Leading to Regionalization? Evidence from Cross-Country Network Analysis, *Journal of Economic Integration*, 35 (1), 10-38. <https://doi.org/10.11130/jei.2020.35.1.10>
- Viner, J. (2014), *The Customs Union Issue*, Oxford University Press.
- Wignaraja, G., Collins, A., Kannangara, P. (2019), Opportunities and challenges for regional economic integration in the Indian Ocean, *Journal of Asian Economic Integration*, 1(1), 129-151. <https://doi.org/10.1177/2631684619829958>
- Winters, A.L., Gasiorek, M., González, J.L., Holmes, K., Parra, M.M., Rollo, J., Singhal, A. (2009), *Innocent Bystanders: Implications of an EU-India Free Trade Agreement for Excluded Countries*, London: Commonwealth Secretariat.

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## Appendix A

*Technical notes for the calculation of measures of regional trade interdependence*

The following steps were followed in the estimation of the regional trade interdependence indicators:

### *Intra-Regional Trade Share*

The estimation of the Intra-Regional Trade Share requires two parameters  $T_{ii}$  and  $T_i$ . These have been calculated as follows on the basis of their above definition:

$$T_{ii} = 2 (\text{India's exports to partner} + \text{India's imports from partner}) \quad (1)$$

This value is multiplied by 2 to include the total exports and imports in the region. India's exports would be the imports of the region and vice-versa.

$T_i$  = India's Total Trade with World + Partner's Total Trade with World

India's Total Trade with World = India's Export to World + India's Import from World

Partner's Total Trade with World = Partner's Export to World + Partner's Import from World

The intra-regional trade share was thus computed by the formula

$$\text{Intra-Regional Trade Share} = \frac{T_{ii}}{T_i} \quad (2)$$

#### *Intra-Regional Trade Intensity*

The estimation of the Intra-Regional Trade Share requires three parameters  $T_{ii}$ ,  $T_i$  and  $T_w$ . The estimation of  $T_i$  and  $T_w$  are discussed in the above section.  $T_w$  is the total global trade and is estimated by adding total world exports to total world imports. Since world exports are equal to world imports, this parameter can be calculated by multiplying world trade by two. The following formula was applied for the computation of Intra-Regional Trade Intensity:

$$\text{Intra-Regional Trade Intensity} = \frac{T_{ii}}{T_i} \bigg/ \frac{T_i}{T_w} \quad (3)$$

#### *Regional Trade Introversion Index*

The estimation of this index requires four parameters  $T_{ii}$ ,  $T_i$ ,  $T_{oi}$  and  $T_o$ .  $T_{ii}$  and  $T_i$  have been estimated in the calculation of the preceding indicators. The measurement of  $T_{oi}$  and  $T_o$  is based on the trade of outsiders and is explained as follows:

$T_{oi}$  = India's Trade with Outsiders + Partner's Trade with Outsiders (4)

India's Trade with Outsiders = (India's Total Exports – Exports to Partner) + (India's Total Imports – Imports from Partner) (5)

Partner's Trade with Outsiders = (Partner's Total Exports – Exports to India) + (Partner's Total Imports – Imports from India) (6)

$T_o$  = Export of Outsiders + Import of Outsiders (7)

Export to Outsiders = Total World Exports – (World Exports to India – World Exports to Partner) (8)

Import to Outsiders = Total World Imports – (World Imports from India – World Imports from Partner) (9)

The intra-regional and extra-regional intensity indexes are then constructed on the basis of the above mentioned parameters using the following formulae:

$$H_{ii} = (T_{ii}/T_i) / (T_{oi}/T_o) \quad (10)$$

$$HE_i = [1 - (T_{ii}/T_i)] / [1 - (T_{oi}/T_o)] \quad (11)$$

The following formula is then applied to calculate the regional trade introversion index:

$$\text{Regional Trade Introversion Index} = (12)$$