INTERNATIONAL TRADE THEORY AND PRACTICE: CONTEMPORARY ISSUES

RIS
Research and Information System
for Developing Countries
विकासशील देशों की अनुसंधान एवं सूचना प्रणाली

एक्ज़िम बैंक
EXIM BANK
भारतीय निर्यात-आयात बैंक
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PREFACE

Prof. Sachin Chaturvedi
Director General, RIS

The fast changing scenario of world trade has thrown up many challenges that need in-depth analysis of issues, such as rise of global supply chains; cross-sector and cross-country input linkages; complex trade statistics; vertically-integrated mode of production; growing share of trade in services; etc.

With the objective of enhancing capacity building of young scholars working in area of international trade, RIS jointly with the EXIM Bank of India and the Ministry of External Affairs, Govt. of India conducts "Summer School on International Trade Theory and Practice" annually.

The programme was launched in June 2016 and the first edition of Summer School was conducted with a few Ph.D and M. Phil scholars. In 2017, the Summer School was conducted in partnership with EXIM Bank of India. Another heartening fact was that candidates from BIMSTEC countries also joined in this programme in the Second Edition.

The current edition of the Summer School, conducted from 10 to 19 June 2019, had 49 Ph.D and M. Phil scholars, out of which two from BIMSTEC Secretariat and one each from three BIMSTEC countries, viz. Bangladesh, Nepal, and Thailand.

The course structure included recent developments in trade theory; databases and information on international trade, tools and techniques in trade analysis; understanding FTAs and regional trading blocs; issues of trade in technology; and trade and development issues.

As part of the agenda of the programme, participants were enageged in group assignments on the following themes: India's Trade Performance; Investment, Finance and Exchange Rate; Technology, GVC, Competitiveness; Multilateralism and Regionalism; and Trade and Employment. The present publication contains the short research articles prepared by the participants focusing on these themes.

I am sure this report may be found useful for all those who are working in the area of international trade.

I also take this opportunity to thank my senior colleague Professor S.K. Mohanty for leading the RIS team with Professor Naushad Ali Azad, Dr. Sabyasachi Saha, Dr. Priyadarshi Dash and Mr Kamlesh Goyal for successful organization of the fourth edition of the RIS-EXIM Bank Summer School on International Trade Theory and Practice.

Sachin Chaturvedi

I

Impacts of Foreign Direct Investment and Remittances Inflows on Exchange Rate in South Asia

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I

Impacts of Foreign Direct Investment and Remittances Inflows on Exchange Rate in South Asia

1. Introduction

Over the last few decades, the developing countries have witnessed a surge in foreign capital inflows, especially foreign direct investment (FDI) and migrant remittances. FDI is defined as an investment in a business by an investor from another country while migrant remittances refer to "the unrequited transfers" sent by migrant workers back to relatives in their country of origin. In some countries, these remittances have exceeded other sources of finance including FDI and bank credit. As against other capital flows, remittances are relatively stable and negatively correlated with the overall economic conditions of the recipient country (Ratha, 2003; Singer, 2010). Hence, they can serve as a key countercyclical measure in the times of recession.

The rise in foreign capital inflows has had significant impact on various macroeconomic parameters, both positive as well as negative. While higher inflows of remittances has been found to facilitate investments in the recipient country and thereby improve the country's economic performance (Adejumo and Ikhide, 2019), it has also resulted in perverse effects on the economy in the form of excessive appreciation of the exchange rate (Brahim et. al., 2017), thereby lending support to the "Dutch Disease" phenomenon. Similar results have been found with regard to the impact of FDI on exchange rate.

The available literature on the impact of FDI and migrant remittances on exchange rate is sparse and scattered. The objective of the current study is to add to the growing literature on the topic. For empirical examination, the study has used the data on the South Asian economies. These countries have witnessed a secular increase in migrant remittances since 1991. Meanwhile, the flow of FDI has also been on the rise, albeit with sporadic fluctuations.

The rest of this paper is organised as follows. Section 2 provides a brief literature review on the subject and identifies the research gaps and focuses on the specific objectives of the present study. Section 3 briefly describes the trends in FDI, remittances and exchange rate in Asia followed by a theoretical background of the study in Section 4. Sections 5 documents data sources and methodological issues followed by the discussion of empirical findings in Section 6. Finally, based on the findings, conclusions are drawn in Section 7.

2. Literature Review

2.1 Impact of migrant remittances on exchange rate

There is a plethora of studies that analyse the

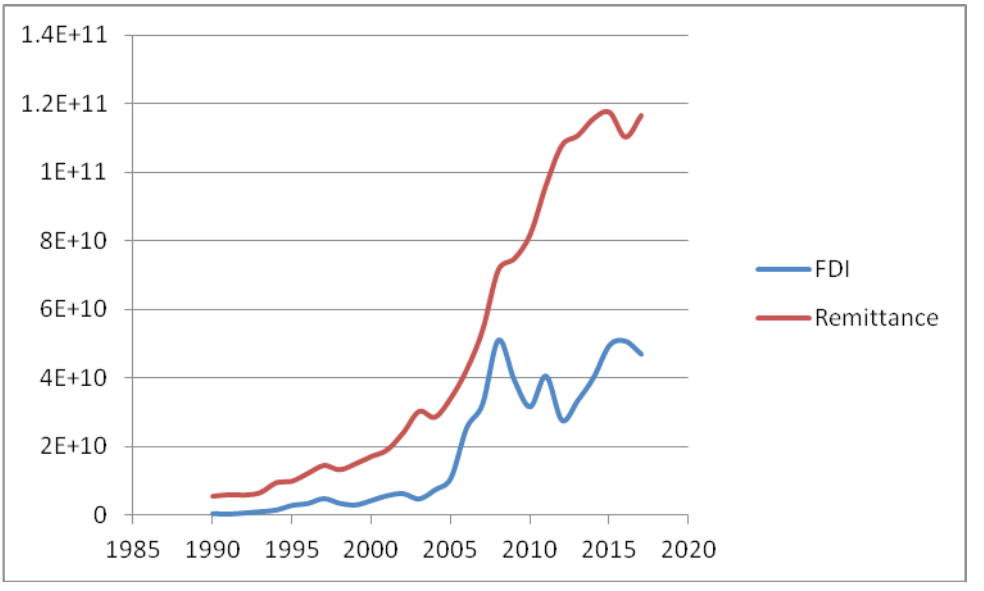
impact of migrant remittances on exchange rate. By analysing a sample of 114 developing countries for the period 1970 to 2013, Kim (2019) reports that under the fixed exchange rate regime, the inflow of remittances leads to appreciation of the nominal exchange rate. The author further finds that the degree of this appreciation decreases with the rise in trade openness. On the other hand, using the dynamic ordinary least squares (DOLS) method and data covering 1981 to 2014, Adjumo and Ikhide (2019) find that remittance inflows have been associated with a rise in the real exchange rate in Nigeria.

2.2 Impact of FDI on exchange rate

The dependent economy model first explained by Salter and Swan (1959) and subsequently extended by Corden (1960) and Dornbusch (1980) acts as the theoretical framework for explaining the impact of capital flows on the real effective exchange rate. According to this model, a surge in capital inflows to a sector of the economy increases the marginal product of labour in that sector, and hence the real wage. Consequently, aggregate demand rises as a result of rise in real income. These results in higher relative prices of non-tradable goods, assuming that the prices of tradable goods remain constant as their demand is dependent on non-domestic factors. A rise in the relative price of non-tradable goods therefore corresponds to a real exchange rate appreciation. Meanwhile, Dornbush (1973, 1974) argues that a change in FDI inflows affects the real exchange rate through the differences in the mode of FDI spending, i.e., domestic spending or capital accumulation. This model applies to the case of a small country, which is a price taker in the world market.

The empirical evidence on the relationship between FDI and exchange rate reveals a mixed picture. Giavazzi and Spaventa (1990) observe that the key reason behind the appreciation of the real exchange rate in the Southern European Countries in the late 1980s was the large inflows of foreign capital. Corden (1994) also found that an increase in capital flows leads to an appreciation of the REER and termed this result as "real exchange rate problem". Meanwhile, Baffes et al. (1999) found that the appreciation of

Figure 1: Remittance and FDI Flows in South Asia (in US$), 1990-2017



Source: World Bank, 2018

currency results only if FDI is used in financing domestic non-tradable goods.

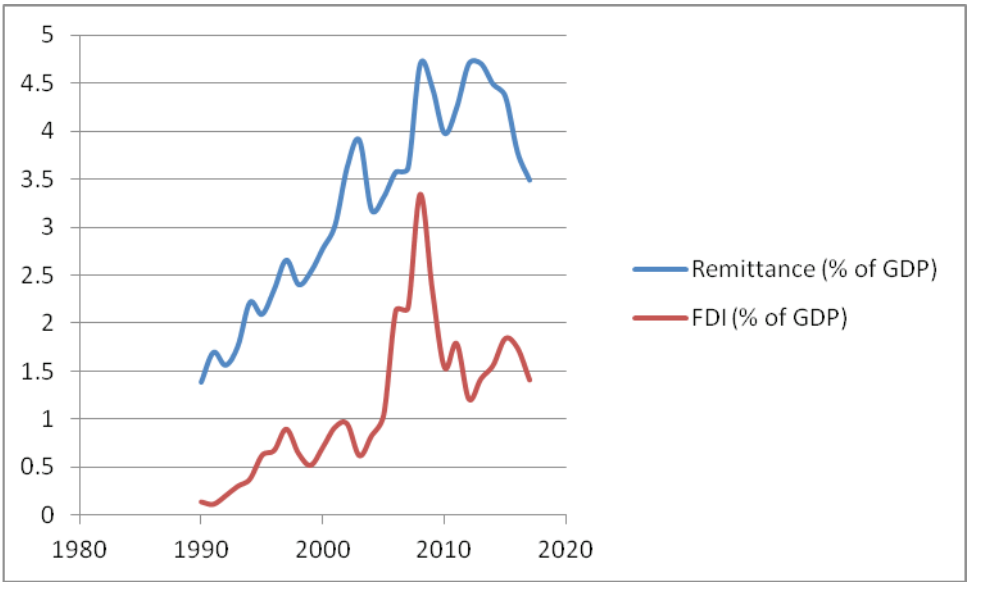
Kosteletou and Liargovas (2000) find that in case of large countries with freely floating currencies, causality runs from the real exchange rate to FDI while in small countries with fixed or "quasi'' fixed currencies, there is evidence of bi-directional causality. Meanwhile, Athukorala and Rajapatirana (2003) examined the impact of capital inflows on exchange rate by disaggregating the capital inflows between other capital inflows and FDI inflows. The authors observed that the increase in other capital inflows resulted in a much higher real exchange rate appreciation in the Latin American countries compared to the Asian economies because of weak macroeconomic fundamentals in the former during the period 1985-2000. Rehman et al. (2012) finds that both foreign direct investment inflows and workers' remittances have a significant and positive relationship with the real exchange rate of Pakistan.

In the Indian context, Biwas and Dasgupta (2012) find that increase in FDI inflows and workers' remittances lead to the appreciation of real exchange rate and FDI inflows have a greater impact on real exchange rate appreciation than remittances. According to the authors, productivity rise in the tradable goods sector, lesser trade-orientation of inward FDI and usage of remittances for non-tradable consumption are significantly responsible for such appreciation. Their study also prescribed policy measures to reduce the over-valuation of currencies caused by FDI inflows in non-tradable goods and increasing productivity in the tradable goods sector.

3. Trends of FDI and Remittances Inflows in South Asia

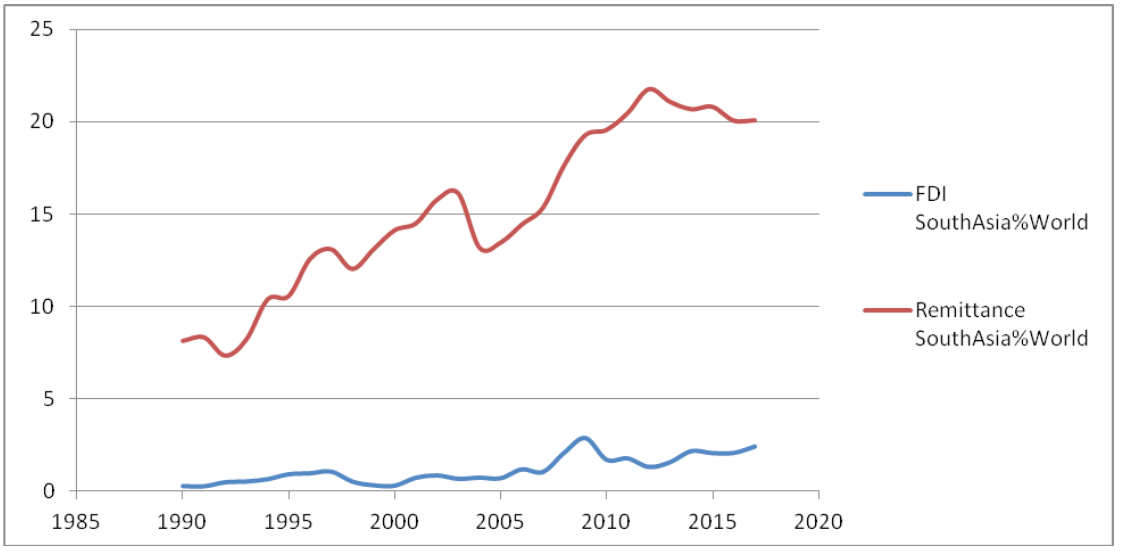
International remittances inflows and FDI have increased significantly in the South Asian countries over the past few decades. When it comes to remittances part, it has become the major source that attracting foreign exchange earnings for South Asian countries. Literature

Figure 2: FDI and Remittances as Proportion of GDP in South Asia



Source: World Bank, 2018

Figure 3: World Share of FDI and Remittances to South Asia



Source: World Bank, 2018

reveal that policy-makers in many countries has observed that remittances as unrestricted private financial flows help the country to increase their size and effectiveness of investment. In certain aspects, remittances plays a similar role like FDI. It is believed that remittances are having similar effect on economic growth like FDI.

An examination of FDI in South Asia indicates a similar trend to remittance inflows. Figure 1 describes the relationship between remittances and FDI in South Asia. The figure indicates similar movements of the two variables. From the 1990s, remittances and FDI flows were experiencing gradual increases, (remittances and FDI started increasing after the year 1992 mainly due to privatization and trade liberalization policies implemented by the South Asian countries) while the decade of the 2000s was characterised a high shift in remittances than the FDI flows in South Asia. The reason was that FDI inflows had reached its maximum in 2008 and then showed decline thereafter due to country-specific conditions such as political and macro-economic stability. This suggests that the South Asian country group experienced a high growth in both remittances and FDI flows over the period of but the correlation between these two variables was not that strong.

Moving to the remittance and FDI flows as a share of Gross Domestic Product (GDP) in South Asia, Figure 2 indicates that the share of remittances as a percentage of GDP is much more than the FDI inflows. In this case, it can be said that South Asia is the group that is getting more help form the home workers who are working in foreign nations or it could be attributed tohigher employability due to availability of cheap labour in the country. As regards global share, Figure 3 indicates that the remittances of South Asia is much more than its FDI inflows highlighting that South Asia benefits most from the remittance flows than other regions of the world.

4. Theoretical Framework

To examine the effects of remittance inflows on the equilibrium real exchange rate, we adopt a kind of Salton-Swan (1959) diagrammatic approach. Let us consider a small open economy with a fixed nominal exchange rate and flexible domestic wages and prices. The economy has a two-sector "dependent economy" production structure, with traded as well as non-traded goods production sectors. A fixed amount of labour force is mobile between the two sectors. In this setting, the supply of traded

goods depends directly, and that of non-traded goods inversely, on the real exchange rate "e", measured as the relative price of traded goods in terms of non-traded goods. Non-traded goods are purchased by the household sector and the government. Household's demand for non-traded goods increases with total real household consumption'd' (measured in units of traded goods) which makes non-traded goods relatively cheaper. We take the government's demand for non-traded goods to be fully exogenous. Since an increase in total household consumption expenditure increases the demand for non-traded goods, maintaining equilibrium in the market for non-traded goods, referred here as "internal balance," requires a real exchange rate appreciation, which simultaneously increases the supply of non-traded goods and reduces the demand for them. This relationship is depicted graphically by a negatively sloping locus YY (for internal balance).

The balance of payment is the sum of the trade balance, remittance inflows, and the interest payments/receipts associated with the country's international investment position. In this set-up, an increase in steady-state real household consumption requires a real exchange rate depreciation, which maintains external balance by shifting domestic production to traded goods. This implies that the BB (external balance) locus must have a positive slope. The equilibrium real exchange rate is defined by the intersection of the internal and external balance loci at point A and is labelled e*. With this analytical framework in hand, we can now examine how the equilibrium real exchange rate responds to a change in remittance inflows, which affects the positions of the YY and BB curves.

Remittance receipts represent an increment to household incomes equal to the amount remitted by workers from abroad. Accordingly, the external balance locus shifts to the right - an increase in remittance flows allows a higher level of household consumption to be consistent with external balance at an unchanged value of the real exchange rate. There are no direct effects on the internal balance locus, so the equilibrium is at B. As a result, there is an increase in private absorption and real exchange rate appreciation.

Figure 4: Internal and External Balances

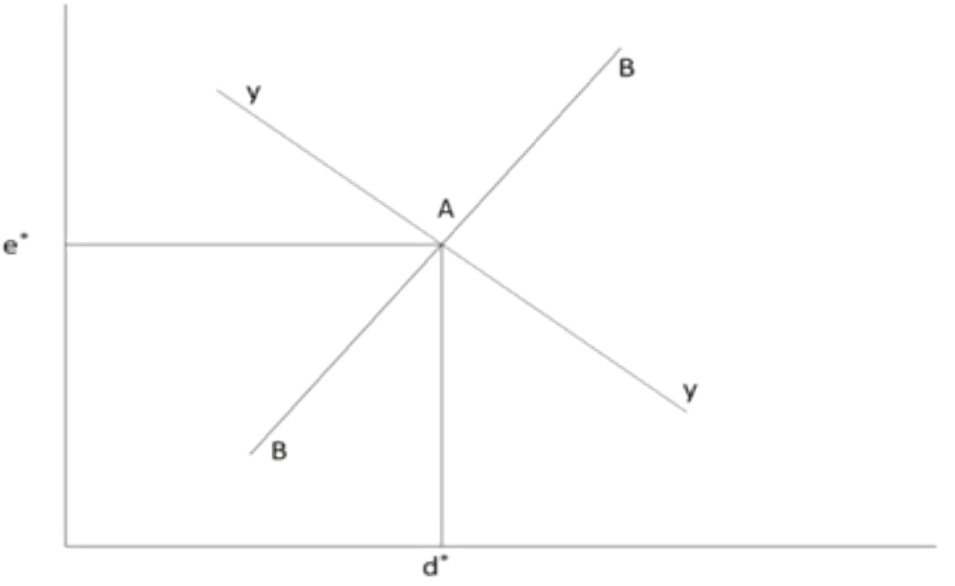
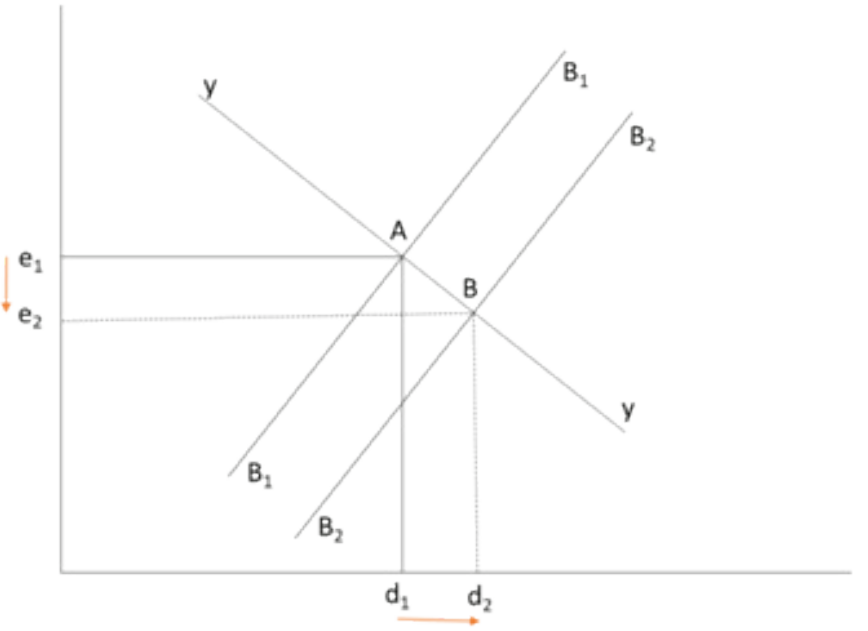


Figure 5: Internal and External Balances with Remittances Inflows



But how robust is this result? While the direction of the effect is unambiguous, its magnitude depends on two factors that are likely to be economy–specific:

a. The share of traded goods in domestic absorption: The larger is the share of traded goods in domestic absorption the greater is the increase in consumption of traded goods induced by remittances. This in turn reduces the impact of larger remittance receipts on the current account, since a deterioration of trade balance is partly offset by the larger remittance flows. Graphically, this implies a smaller shift in the BB curve.

b. The curvature of the domestic production possibilities frontier (PPF): The weaker are diminishing returns, the lesser will be the concavity of the PPF, and therefore smaller change in the real exchange rate would be required to restore steady-state equilibrium in response to a substantial change in remittance flows. Graphically, a less concave PPF generates flatter internal and external balance loci, and therefore a smaller equilibrium change in the real exchange rate.

This is being said, however with respect to these factors affecting only the quantitative response of the equilibrium real exchange rate. Qualitatively, our analysis up to this point is consistent with the conventional view that an increase in remittance flow volumes should be associated with an appreciation of the real exchange rate at the equilibrium.

5. Data and Methodology

To conduct the empirical exercises, the study collects the data on FDI inflows (FDI), remittances inflows (REMIT), real effective exchange rate (REER), export, import and gross domestic product (GDP) from the World Development Indicators (WDI) published by World Bank (2018) from 1991 to 2017 for nine South Asian countries namely Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan and Sri Lanka. We calculate the volume of trade which is nothing but the sum total of exports and imports, and then trade openness (TRO) is measured by the percentage ratio of volume of trade to GDP to use it as a control variable. Based on theoretical evidences the study incorporates

another variable, trade deficit (TRDF) in the regression model. All the variables except REER are converted into their real terms and purchasing power parity (PPP) adjusted as per standard norms; those are taken in logarithmic forms in order to make them normal.

The Arellano and Bond (1991) referred GMM technique is a commonly used estimate for the fixed effect dynamic panel models, where, the fixed effect can be eliminated by using first differences of the panel regression equation and then estimate the instrumental variables in the differenced equation. The validity of the instruments can be checked by Sargan (1958) and Hansen (1982) tests. The one period lag dynamic panel model is presented as follows in equation (1):

$$y_{it} = \alpha_i + \theta_t + \beta y_{i,t-1} + x_{it}^{'}\eta + \varepsilon_{it} \quad (1)$$

Where α_i = fixed effect, θ_t = time dummy, x_{it} represents (k-1)×1 exogenous variables' vector and $\varepsilon_{it} \sim N(0, \sigma^2)$ denotes random disturbances. In order to eliminate the unobservable state-specific effects, equation (1) is differenced, by transforming it as follows in equation (2):

$$\Delta y_{it} = \Delta\theta_t + \beta\Delta y_{i,t-1} + \Delta x_{it}^{'}\eta + \Delta\varepsilon_{it} \quad (2)$$

The lag-difference of the logarithm of the dependent variable is correlated with the difference of error term. To remove this kind of endogeneity in equation (2), instrumental-variables with lag as suggested by moment condition are to be used. The differenced components of endogenous explanatory variables in regression equation should also be treated carefully. In this particular empirical investigation to find the impacts of FDI and remittance inflows on exchange rate in south Asia, the equation (3) is proposed to be estimated using the panel data as follows:

$$\Delta lnREER_{it} = \beta_1\Delta lnREER_{it-1} + \beta_2\Delta x_{1it}^{'} + \beta_3\Delta x_{2it}^{'} + \Delta\varepsilon_{it} \quad (3)$$

In equation (3), $x_{1it}^{'}$ denotes a matrix of the components of FDI and REMIT; $x_{2it}^{'}$ is a component matrix of control variables including TRO and TRDF. All other symbols used in equation (3) follow their usual meanings. As the study mainly focuses on FDI and REMIT in order to examine the impacts on RRER, equations (3) is to be estimated first without considering $x_{2it}^{'}$ and then all respective control variables would be incorporated sequentially for testing the robustness of results.

Table 1: Descriptive Statistics

	lnREER	lnFDI	lnREMIT	lnTRO	lnTRDF
Mean	4.7692	20.0326	18.1603	-0.2799	20.8365
Median	4.7852	19.8641	20.0996	-0.6317	21.3175
Maximum	5.1903	22.3365	21.0445	0.6103	24.5759
Minimum	4.3966	16.2594	14.4161	-1.0531	15.5205
Std. Dev.	0.1916	1.9799	2.9904	0.6008	2.5846
Skewness	0.2635	0.4813	-0.2133	0.2606	0.4508
Kurtosis	2.9840	2.9935	3.0919	3.0781	3.0205
Jarque-Bera	0.5447	2.7356	4.6192	3.9107	1.8135
Probability	0.7616	0.2547	0.0993	0.1415	0.4038
Sum	138.3056	580.9467	526.6474	-8.1185	604.2578
Sum Sq. Dev.	1.0275	109.7627	250.3925	10.1080	187.0373
Observations	243	243	243	243	243

Source: Authors' estimation

Table 2: Estimated Results of Dynamic Panel GMM Estimation

Dependent Variable: $\Delta lnREER_{it}$				
Method: Panel GMM				
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**
$\Delta lnREE_{Rit-}1$	1.0000*** (0.00)	0.9677*** (0.00)	0.9381*** (0.00)	0.8192*** (0.00)
$\Delta lnFDI_{it}$	-0.0003 (0.49)	0.0008 (0.51)	-0.0011 (0.42)	-0.0081 (0.42)
$\Delta lnREMIT_{it}$	0.0362** (0.01)	0.0271*** (0.00)	0.0198** (0.01)	0.0179*** (0.00)
$\Delta lnTRO_{it}$		0.0006 (0.37)		-0.0099 (0.27)
$\Delta lnTRDF_{it}$			0.0061** (0.01)	0.0200** (0.00)
Observations	234	234	234	234
No of Instruments	5	4	5	6
Arellano-Bond Test for AR(2)	0.36	0.41	0.38	0.43
Sargan Test p-value	0.31	0.29	0.26	0.34
Hansen Test p-value	0.26	0.22	0.31	0.35

Source: Authors' estimation

6. Empirical Results

Table 1 shows the observed descriptive statistics of all the variables used in the study. The variables are averaged over the sample period (1998-2017). The mean (median) REER is around 4.77 (4.79) for the entire sample for the selected time period. Similarly, for FDI the values hover around 20.03 (19.86) and for REMIT, TRO, TRDF the values are 18.17 (20.09), -0.27 (-0.63) and 20.83 (21.32) respectively. However, the difference between the maximum and minimum values (range) of the variables seems to relatively wider for LFDI and LNREMIT unlike other variables considered in this study. Variables in the model seem to have a near normal distribution as they are relatively symmetric with Mesokurtic distribution. The Jarque-Bera statistic also indicates a tendency towards normal distribution. However strict normality cannot be inferred about the variables from the above table.

Table 2 presents the estimated outcomes of dynamic panel equations by following the two steps robust difference-GMM estimation process exploring the impacts of FDI and REMIT on REER including TRO and TRDF as control variables. Model 1 specifies the initial regression equation followed by the chronological inclusions of earlier mentioned control variables captured by Model 2 and Model 3 respectively. Finally, Model 4 captures this estimation procedure of robustness checking by including all explanatory variables together in a single regression equation. The Arellano-Bond second-order auto-correlation (AR(2)) test confirms the accurate specifications of models. The reported p-values of Sargan (1958) and Hansen (1982) tests validate that instruments are exogenous. The number of instruments is found to be lesser than the number of cross-section units (i.e. countries) in each model, which is also satisfactory.

Estimated results reveal that REER is directly and significantly influenced by its lag value and REMIT at first-differenced forms. But, FDI is not found to be a significant determinant of REER in South Asian countries and it is also observed that TRO does not also influence REER in those countries. However, the empirical results also imply that TRDF is a significant

factor to influence REER in positive direction, and these outcomes are robust as indicated by the specified models.

7. Concluding Remarks

This paper has empirically examined the impacts of inflows of foreign direct investment (FDI) and migrants' remittances on real effective exchange rate in South Asia. The South Asian region has been identified as the highest receiver of remittances inflows in the world. The dynamic panel GMM estimation indicates that remittances directly influence real effective exchange rate but FDI inflow is not significant in influencing foreign exchange rate. The study also reveals that trade openness does not also influence REER in those countries. However, the empirical results also imply that trade deficit is a significant factor that influences REER in the positive direction, and these outcomes are robust as presented by the econometric analysis.

References

Adejumo, A. O., & Ikhide, S. I. (2019). The Effects of Remittance Inflows on Exchange Rates in Nigeria. *The Journal of Developing Areas*, *53*(1), 1-15.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, *58*(2), 277-297.

Athukorala, P. C., & Rajapatirana, S. (2003). Capital inflows and the real exchange rate: a comparative study of Asia and Latin America. *World Economy*, *26*(4), 613-637.

Baffes, J., O'Connell, S. A., & Elbadawi, I. A. (1999). *Single-equation estimation of the equilibrium real exchange rate*. The World Bank.

Biswas, S. & Dasgupta, B (2012). Real exchange rate response to inward foreign direct investment in liberalized India. *International Journal of Economics and Management*, *6*(2), 321-345.

Brahim, M., Nefzi, N., & Sambo, H. (2017). Remittances and the real effective exchange rates in MENA countries: What is the long run impact?

Corden, W. M. (1960). The geometric representation of policies to attain internal and external balance. *The Review of Economic Studies*, *28*(1), 1-22.

Dornbusch, R. (1973). Money, devaluation, and non-traded goods. *American Economic Review*, *63(5)*, 871-880.

Dornbusch, R. (1974). Tariffs and nontraded goods. *Journal of international economics*, *4*(2), 177-185.

Dornbusch, R. (1980). Home goods and traded goods: the dependent economy model. *R. Dornbusch, Open Economy Macroeconomics, New York, Basic Books*.

Giavazzi, F., & Spaventa, L. (1990). *The 'New' EMS* (No. 86). Quaderni-Working Paper DSE.

Hansen, L.P. (1982). Large sample properties of generalized method of moments estimators. Econometrica 50(4), 1029-1054.

Kim, J. (2019). The Impact of Remittances on Exchange Rate and Money Supply: Does "Openness" Matter in Developing Countries? *Emerging Markets Finance and Trade*, 1-26.

Kosteletou, N., & Liargovas, P. (2000). Foreign direct investment and real exchange rate interlinkages. *Open economies review*, *11*(2), 135-148.

Ratha, D. (2003). Workers' Remittances: An Important and Stable Source of External Development Finance. *Global Development Finance*, Ch.7. World Bank.

Rehman H., Jaffri, A. A., & Ahmed, I. (2010). Impact of foreign direct investment (FDI) inflows on equilibrium real exchange rate of Pakistan. *South Asian Studies*, *25*(1), 125.

Salter, W. E. (1959). Internal and external balance: the role of price and expenditure effects. Economic Record, 35(71), 226-238.

Sargan, J.D. (1958). The estimation of economic relationships using instrumental variables. Econometrica 26(3), 393-415.

Singer, D. A. (2010). Migrant remittances and exchange rate regimes in the developing world. *American Political Science Review*, 104(2), 307-323.

World Bank (2017). World Development Indicators. World Bank.

II

Potential Export Gains from Better BIMSTEC Integration: Empirical Study Using Gravity Model

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II

Potential Export Gains from Better BIMSTEC Integration: Empirical Study Using Gravity Model

1. Introduction

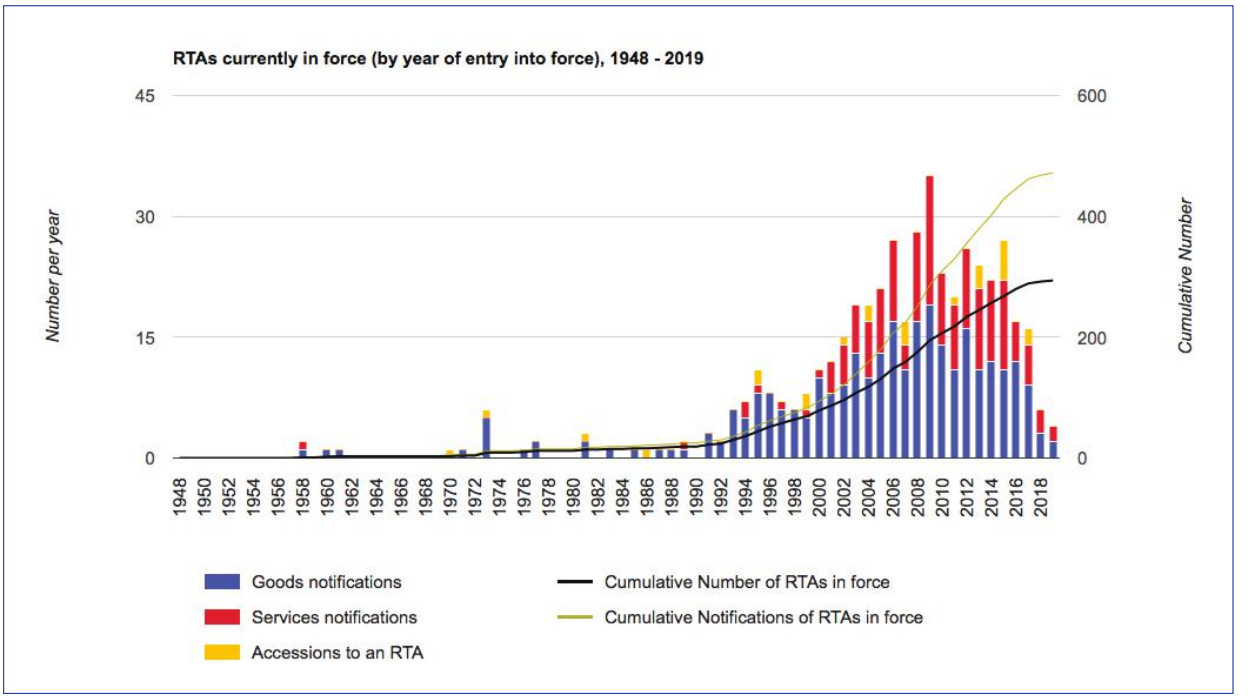
One of the primary features of the global trade landscape since the establishment of the WTO has been the concomitant rise in the number of regional trading agreements (RTAs) (Figure 1). Even though the General Agreements on Tariffs and Trade (GATT) came into effect in 1948, there were no RTAs until 1957. Although the first RTA came into effect in 1958, the rate of signing of new RTAs was very sluggish. It was only after the establishment of the World Trade Organization (WTO) in 1995, through Marrakesh declaration, that the RTAs really started to proliferate. In 2019, there were 472 cumulative notification of RTAs out of which 294 RTAs came in force (WTO 2019) and a few RTAs are currently under negotiations. The failure of Doha Round, which began in 2001, has often been cited as the reason for the rise of RTAs as the multilateral trading framework could not effectively address the needs of many WTO member states.

The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) was set up in June 1997 to foster socio-economic cooperation among Bangladesh, India, Sri Lanka, and Thailand and was known as BIST-EC, until Myanmar's inclusion later in that year, when it became Bangladesh, India, Myanmar, Sri Lanka and Thailand Economic Cooperation (BIMST-EC). Nepal and Bhutan joined in February 2004 and the name of the group was changed to Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC). It was initiated primarily as a combination of India's Look East Policy (now Act East Policy) and Thailand's Look West Policy. BIMSTEC is home to 1.5 billion people, amounting to 21 percent of the world population and a combined GDP of over $2.5 billion dollars.

Figure 2 shows that the BIMSTEC region is very poorly integrated. Although the intra-regional share of trade in the region has risen from 2.35 per cent in 1990 to 5.99 per cent in 2017, the level of integration is much lower than compared to other regional blocks like European Union (EU), Association of Southeast Asian Nations (ASEAN), and North American Free Trade Agreement (NAFTA).

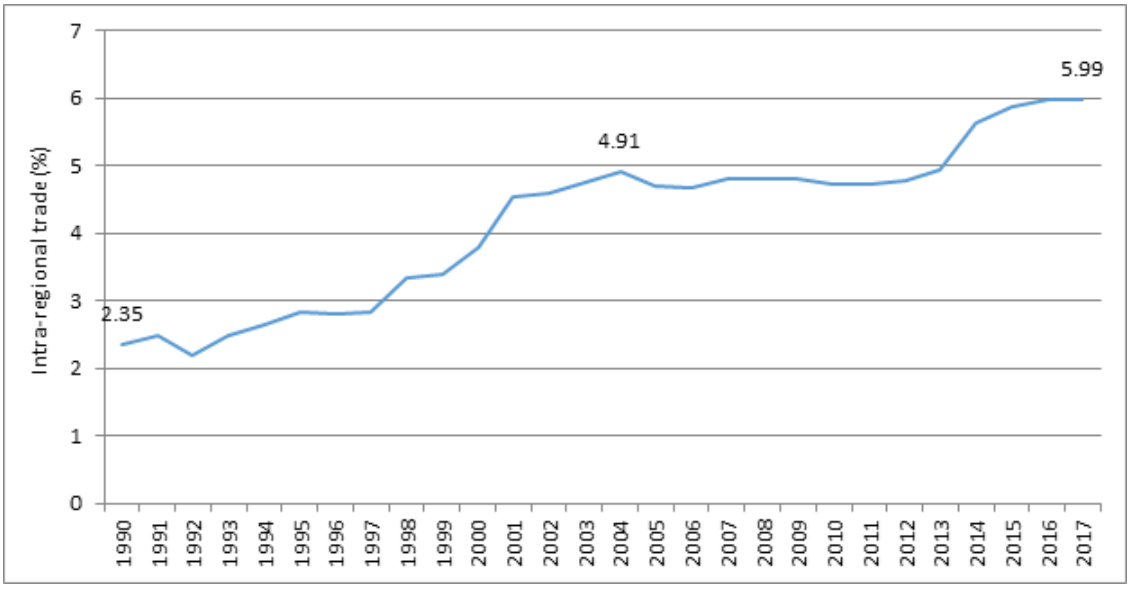
Although BIMSTEC has not signed a free trade agreement, BIMSTEC has identified 14 priority areas, where a member country takes the lead, viz. trade and investment; transport and communication; energy; tourism; technology; fisheries; agriculture; public health; poverty alleviation; counter-terrorism and transnational crime; environment and natural disaster management; culture; people to people contact and climate change.

Figure 1: RTAs Currently in Force



Source: World Trade Organization (WTO)

Figure 2: Intra-regional Trade Share in BIMSTEC Region



Apart from all these facts, the full potential of intra-regional trade remains untapped due to the existence of tariff & non-tariff barriers, lack of efficient communication and transportation & information gaps. Since a better regional integration, for example through an FTA, can help eliminate or reduce these tariff and non-tariff barriers, this study attempts to estimate the extent of exports that the region can achieve through efforts that increase the level of regional integration. We use a structural gravity model to estimate the potential gains in exports accruing from participation in BIMSTEC FTA.

2. Literature Review

Newton's Law of Gravity implies that particles are mutually attracted in proportion to their sizes and proximity. When this logic is applied to international trade, countries trade in proportion to their respective market sizes vis-s-vis gross domestic products and proximity. Prominent examples include Ravenstein (1885) and Tinbergen (1962), who used gravity to study immigration and trade flows, respectively. In a seminal paper, Anderson (1979) offered a theoretical economic foundation for the gravity equation under the assumption of product differentiation by place of origin and Constant Elasticity of Substitution (CES) expenditures. Another early contribution to gravity theory of trade is Bergstrand (1985).

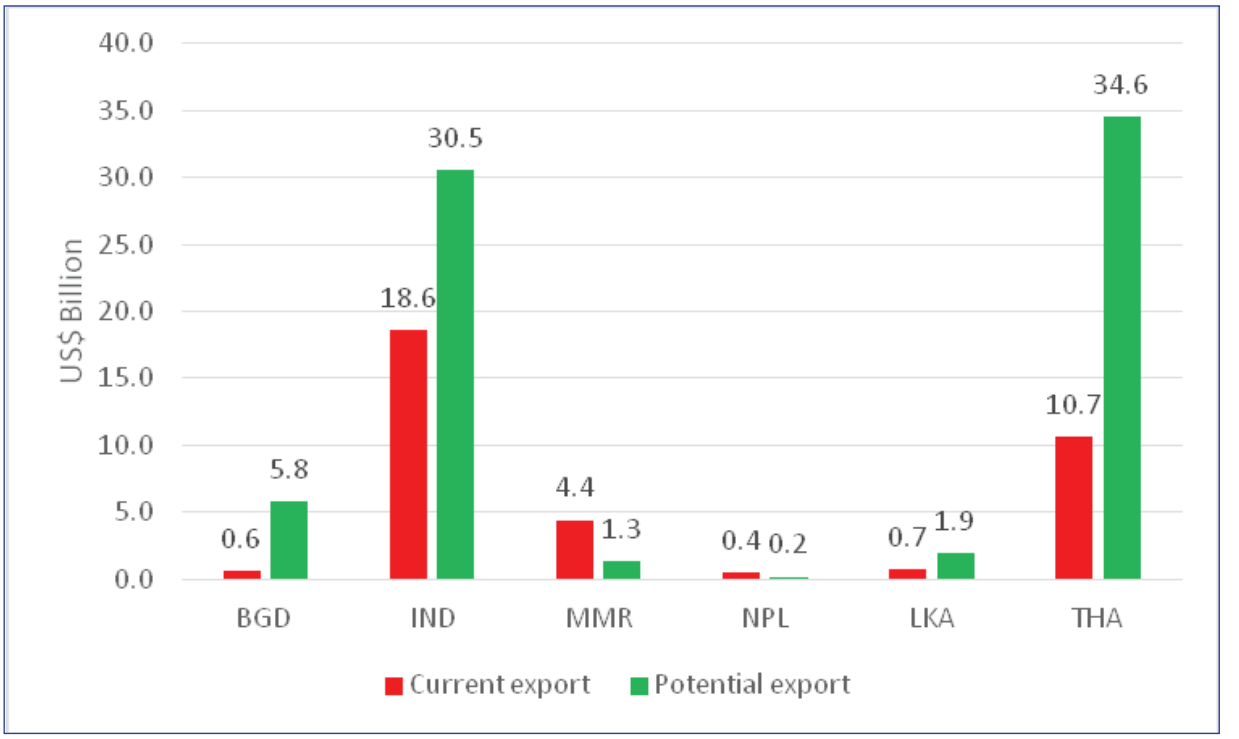
Despite these theoretical developments and its solid empirical performance, the gravity model of trade struggled to make much impact in the profession until the late 1990s and early 2000s. Arguably, the most influential structural gravity theories in economics are those of Eaton and Kortum (EK) (2002), who derived gravity on the supply side as a Ricardian structure with intermediate goods, and Anderson and van Wincoop (2003), who popularized the Armington-CES model of Anderson (1979) and emphasized the importance of the general equilibrium effects of trade costs.

The academic interest in the gravity model was recently stimulated by the influential work of Arkolakis et al. (2012), who demonstrated that a large class of models generates isomorphic gravity equations which preserve the gains from trade. The gains from trade are invariant to a series of alternative micro-foundations including a single economy model with monopolistic competition (Anderson, 1979; Anderson and van Wincoop, 2003); a Heckscher-Ohlin framework (Bergstrand, 1985; Deardoff, 1998); a Ricardian framework (Eaton and Kortum, 2002); entry of heterogeneous firms, selection into markets (Chaney, 2008; Helpman et al., 2008); a sectoral Armington-model (Anderson and Yotov, 2016); a sectoral Ricardian model (Costinot et al., 2012; Chor, 2010); a sectoral input-output linkages gravity model based on Eaton and Kortum (2002) (Caliendo and Parro, 2015)iew, and a dynamic framework with asset accumulation (Olivero and Yotov, 2012, Anderson et al. 2015C, and Eaton et al., 2016). Most recently, Allen et al. (2014) established the universal power of gravity by deriving sufficient conditions for the existence and uniqueness of trade equilibrium for a wide class of general equilibrium trade models.

Other studies on impact of proposed FTAs had been done using different methodology. Hosein and Khadan (2011) in their study investigated the potential benefits that can be derived from the proposed CARICOM-Canada FTA for CARICOM countries by using trade complementarity approach and a partial equilibrium model approach to identify the potential gains from FTA. The welfare effect is captured by the partial equilibrium model which is based on an imperfect substitution framework which shows that there will be a significant fall in tariff revenues and welfare for each of the listed CARICOM member states with the extent differing for all the members.

Strutt (2008) used GTAP model to analyse the potential impacts of a BIMSTEC-Japan Free Trade Agreement (FTA) using GEMPACK

Figure 3: Current and Potential Intra-Regional Exports in BIMSTEC (for the year 2015)



Note: The analysis doesn't include Bhutan because of lack of data.

Source: Authors' estimates.

software. The study suggest that if the FTA is extended to include Japan, significant gains are likely for both the BIMSTEC region as a whole and for Japan with substantial variation in the impacts on individual BIMSTEC member economies with Thailand gaining the most.

Chirathivat and Mallikamas (2002) focused on the benefits that can be reaped from the proposed ASEAN-China FTA. The paper used GTAP model with a sample of 45 countries/ regions and 50 production sectors. The result of the study is that proposed FTA would result in increased market access, competitiveness, reduction in prices, increased domestic demand as well, trade creation, economies of scale, increased efficiency and skill of labour.

Cheong (2004) focused on the implications of the proposed bilateral US-Korea FTA in the context of emerging regionalism in East-Asia. The paper also proposes that US-Korea should focus on economic interests as well as non-economic interests that could be reaped from US-Korea FTA. The study makes use of multi-region, multi-sector CGE modelling with increasing returns to scale. This paper concludes that US-Korea should enter into a FTA as both the countries would be benefitted from it.

Neogi and Chawdhury (2017) conducted a study to find whether India-BIMSTEC economic integration has helped in increasing India's trade in the region by using a panel data where base shifting index has been used to standardize GDP (at Constant US$) of BIMSTEC countries. The study has taken GDP of 2010-11 as base to study the impact of GDP, Exchange rate, distance between countries and average weighted tariff rates on India's trade with BIMSTEC countries. Regional Integration is evaluated where Hausman Specification Test is conducted to evaluate the appropriateness of using fixed effect model or random effect model

for which random effect model is found to be more appropriate. The study found that economic integration through Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation has positive and significant impact on India's exports to the entire region of BIMSTEC.

3. Empirical Model

The data on export flows between BIMSTEC countries and 210 importers for the years 2002-2017 are drawn from UN-COMTRADE obtained from the World Integrated Trade Solution (WITS). The MFN tariff data are sourced from the WITS as well. The data on GDP are obtained from World Development Indicators by the World Bank. The data on gravity variables (distance, contiguity, common colonial origin, common language, FTA) are sourced from CEPII database which builds upon the original works of Head, Mayer and Ries (2010).

General Model

The traditional gravity model that is estimated for the study is expressed as the following:

$$\ln X_{ijt} = \alpha_0 + \alpha_1 \ln GDP_{it} + \alpha_2 \ln GDP_{jt} + \alpha_3 lndist_{ij} + \alpha_4 \ln tariff_{jt} + \alpha_5 FTA_{ij} + \sum_z \alpha_z G_{ij} + \epsilon_{ijt} \quad (1)$$

where X_{ijt} is the total exports by country i to country j in year t, GDP_{it} is exporter's GDP in current prices in year t, GDP_{jt} is importer's GDP in current prices in year t, $tariff_{jt}$ is j's MFN average applied tariff rate in year t, FTA_{ij} is a dummy variable to indicate whether the country pairs have a preferential or free trade agreement in year t or not, G_{ij} is a vector of common bilateral gravity controls like contiguity, common language, etc. and ϵ_{ijt} is the error term.

However, the specification in equation (1) is not a theoretically consistent specification for a gravity model as it doesn't control for multilateral resistance terms (MRT), which would result in a serious omitted variable bias, producing bias results. Thus, following Feenstra (2004), we control for MRT using exporter fixed effects and importer fixed effects. Thus, our empirical strategy is as follows:

$$\ln X_{ijt} = \beta_0 + \beta_1 lndist_{ij} + \beta_2 \ln tariff_{jt} + \beta_3 FTA_{ij} + \sum_z \beta_z G_{ij} + \delta_i + \delta_j + \delta_t + \epsilon_{ijt} \quad (2)$$

where δ_i is the importer-fixed effect, δ_j is the exporter fixed effect, and δ_t is the time fixed effect.

Note that the specification in equation (2) doesn't have variables for GDP and tariff because the importer fixed effect and the exporter fixed effect would absorb these components.

4. Analysis

Table 1 provides the estimates of the traditional gravity model (column 1) as well as the structural gravity model (column 2). We see in column (1) that the exporter's GDP and importer's GDP have high elasticities, as found in literature. Similarly, distance is highly significant and so is the presence of an FTA. In other words, increase in distance between countries reduces exports and presence of an FTA strongly increases exports. Further, same common language between countries also boosts trade. The only unexpected result is that tariffs are insignificant. However, this could be because of the use of MFN rates at aggregate level rather than the effectively applied rates at the product level. Or, it could also mean that tariffs are no longer significant given the increasing

importance of non-tariff measures. However, we should not be overly concerned because our main model is given by the structural gravity in column (2) which controls for tariffs and other exporter and importer characteristic (for example, GDP) through importer and exporter fixed effects as in Feenstra (2004).

The structural gravity model in column (2) is theoretically consistent as it controls for multilateral resistance term (MRT)[1]. Alongside distance and FTA, contiguity and common language are also significant under the structural gravity model.

Table 1: Results of Estimated Gravity Equation

	(1) Pooled OLS	(2) Fixed Effects, LSDV
VARIABLES	**Log export**	**Log export**
Exporter GDP	1.664***	
	(0.047)	
Importer GDP	0.851***	
	(0.031)	
Log MFN tariff	0.117	
	(0.101)	
Log distance	-0.646***	-1.957***
	(0.123)	(0.271)
FTA	1.250***	0.648***
	(0.278)	(0.164)
Contiguity	0.718	1.077**
	(0.521)	(0.541)
Common language	-0.591**	0.302*
	(0.235)	(0.177)
Common colony	0.0635	-0.185
	(0.179)	(0.157)
Constant	-42.41***	28.24***
	(1.920)	(2.658)
Observations	7,805	13,646
R-squared	0.69	0.84

Notes: Robust standard errors clustered at importer exporter pair level. $^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$.

Potential BIMSTEC exports under Deeper integration the structural gravity model given in table 1 is used to estimate the potential export gains that could be obtained under deeper regional integration (for example, an FTA that is currently under discussion). However, we have to be mindful that having an FTA doesn't automatically eliminate all the non-tariff barriers and hence these estimates should be taken as an upper bound estimates rather than the impact of FTA. To measure the true impact of a potential FTA, we need to augment our specification to include other variables such as non-tariff measures.

1 For a detailed treatment of a theoretically-consistent (structural) estimation, please refer to Anderson and van Wincoop (2003), and refer to Feenstra(2004) for the use of fixed effects to account for MRT..

The potential export gains are computed using the formula:

Potential Exports = Predicted Exports-Actual Exports

where 'Predicted Exports' is the export level predicted by the structural gravity model and the 'Actual Exports' is the current level of exports. The estimates of export potential for the year 2015 are presented in Figure 3.[2] It is observed that Bangladesh, India, Sri Lanka and Thailand could have realized that greater exports to the region under deeper regional integration whereas Nepal and Myanmar are currently over exporting to the region and could see a loss in their intraregional exports. In the case of Nepal, the results could have been driven by Nepal's overwhelming exports to India. The results are also tabulated in Table A.1.

Table 2 and Table 3 presents some of the cases of over-exports and under-exports in the region. Over-exports refer to when the potential exports predicted by the gravity model is lower than the current level of exports and under-exports refer to the case of potential exports being higher than the actual exports.

Table 2: Cases of Over-Exports in the Region (US$ million)

Exporter	Importer	Year	Current Exports	Potential Exports	Difference	
India	Sri Lanka	2015	5501.02	2301.01	-3200.01	
Myanmar	Thailand	2015	3359.36	797.12	-2562.24	
Myanmar	India	2015	1013.99	413.41	-600.58	
Nepal	India	2015	419.09	148.62	-270.47	

Source: Authors' estimates

Table 3: Cases of Under-Exports in the Region (US$ million)

Exporter	Importer	Year	Current Exports	Potential Exports	Difference
Thailand	India	2015	5211.84	28755.97	23544.14
India	Bangladesh	2015	5521.52	19250.51	13728.99
Bangladesh	India	2015	517.89	5519.03	5001.14
India	Thailand	2015	3113.56	7001.55	3887.99
Thailand	Bangladesh	2015	844.90	2996.23	2151.33
Sri Lanka	India	2015	642.39	1808.11	1165.72
Sri Lanka	Thailand	2015	33.48	116.87	83.39
Myanmar	Bangladesh	2015	18.82	80.60	61.77

Source: Authors' estimates

Although there are cases of over-exports in the region, the total intraregional exports will be much higher from a better BIMSTEC integration. Our estimates show the overall potential exports by BIMSTEC member states in the region stands at 38.9 billion US dollars.

2 We present the case of 2015 as an example to avoid too many tables. Furthermore, 2015 was the last year where data for all the countries (except for Bhutan) was available. Our estimates of other years are robust as well.

5. Conclusion

We use a theoretically consistent structural gravity model to estimate the potential intra-regional exports by BIMSTEC member states. Our estimates show that potential BIMSTEC exports, as indicated by the structural gravity equation, is at a significantly higher level than the current exports. BIMSTEC exports seem to be around US$39 billion lower than its potential. Only Nepal and Myanmar seem to be over-exporting to the region. Thus, a deeper BIMSTEC integration indicates a significant potential for regional export gains.

References

Anderson, James E., and Eric van Wincoop. 2003. "Gravity with Gravitas: A Solution to the Border Puzzle." *American Economic Review* 93(1): 170-192.

Bailey, D., & Katz, J. N. (2011). Implementing Panel-Corrected Standard Errors in R: The pcse Package. *Journal of Statistical Software, Vol. 42* (No. 1), pp 1-11.

Banik, N. (2006, December 23). How promising is BIMSTEC? *Economic and Political Weekly* .

Chirathivat, S., &Mallikamas, S. (2005, Dec 31). The Potential Outcomes of China-ASEAN FTA Politico-Economic Implications for Participating Countries. *China and Southeast Asia* , pp 80-108.

Feenstra, Robert C. 2004. *Advanced International Trade: Theory and Evidence* (chapter 3). Princeton: Princeton University press.

Head, Keith, Thierry Mayer, and John Ries. 2010. "The erosion of colonial trade linkages after independence." *Journal of International Economics* 81(1): 1-14.

Hosein, R., &Khadan, J. (2011). Exploring the Potential Benefits of the Proposed CARICOM-Canada FTA. *Journal of International and Global Economic Studies, Vol 4* (No 1), pp 74-87.

Inkyo, C. (2004). East Asian Economic Integration: Implications for a U.S.-Korea FTA.

Kabir, M., & Salim, R. (2010). Can Gravity Model explain BIMSTEC's Trade.*Journal of Economic Integration, Vol. 25* (No. 1), pp 143-165.

Neogi, D., &Chawdhury, A. B. (2017). Has India-BIMSTEC Economic Integration helped in increasing India's Trade in the Region? A Panel Data Analysis. *3rd International Conference on Social Sciences, Economics and Finance.*Montreal,Canada.

Paramanik, R. N., &Kamaiah, B. Direction of Trade, Exchange Rate Regimes and Financial Crises: The Indian Case.

Shrivastava, S. (2005). BIMSTEC: Political Implications for India. *The Indian Journal of Political Science, Vol. LXVI* (No. 4).

Strutt, A. (2008). *Quantitatively Assessing a BIMSTEC- Japan FTA : A CGE Analysis.* Kolkata: Centre for Studies in INternational Relations and Development.

Annex

Table A.1: Potential Exports by BIMSTEC Countries as predicted by gravity equation (for the year 2015)

Country	Current exports	Potential exports	Difference	per cent change
BGD	0.6	5.8	5.2	859.6
IND	18.6	30.5	12.0	64.4
MMR	4.4	1.3	-3.1	-70.6
NPL	0.4	0.2	-0.3	-63.3
LKA	0.7	1.9	1.2	155.6
THA	10.7	34.6	23.9	224.4
BIMSTEC*	35.4	74.3	38.9	109.8

Note: * The analysis doesn't include Bhutan because of lack of data.

Source: Authors' computations

III

India's Performance in Global Value Chains: An Analysis of the High-End Electronics Sector

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III

India's Performance in Global Value Chains: An Analysis of the High-End Electronics Sector

1. Introduction

Advancements in technology have provided a revolutionary leap in the production processes of goods. The production system today is not concentrated within the geographical borders of a nation, rather it is spread out through fragmentation and disintegration across geographies. Thus, what is traded today between nations are not always the final product, as postulated by the classical theorists, but parts and components that sometimes cross territorial boundaries many times before making it to the final consumer. Basically, the different stages of production get distributed in different locations as per their comparative advantages e.g low wage, efficient sourcing of inputs, rich endowment of natural resources, etc.

2. Global Value Chain: A Review of Literature

Traditional trade theories, such as the comparative advantage theory of Ricardo put forth in 1817 is based on the assumption of perfectly competitive markets consisting of homogeneous producers trading only in final products. It is further assumed that these products are produced using the factors of production of the exporting country. The Ricardian theory stated that countries trade in those goods in which they have a comparative advantage that arises as a result of differences in labour productivity (World Bank, 2017). Subsequently, the Heckscher-Ohlin model stated that trade occurs due to differences in factor endowments and countries produce and export only those goods that they can make at a relatively lower opportunity cost. Therefore, it was assumed that labour- and capital-abundant countries would produce and trade in goods that are labour and capital intensive respectively. These classical theories, therefore, mainly explained trade in 'dissimilar' goods (Ranjan and Raychaudhuri, 2016).

However, empirical evidence provided by Grubel and Lloyd (1975) found evidence of trade in 'similar-similar' goods (Ranjan and Raychaudhuri, 2016). Since the traditional theories failed to explain intra- industry trade, Krugman (1979,1980) pioneered the new trade theory as an explanation of this phenomenon. Krugman's simple general equilibrium model considered imperfect competition in an industry producing differentiated products. The model assumed that, on the demand side, consumers derived utility by consuming a variety of differentiated products, known as consumers 'love of variety'. On the other hand, the production side faces increasing returns to scale due to which the feasibility of firms producing a variety of goods is low. Since consumers demand a variety of goods, and these are not produced within the country, identical foreign firms specialise in the production and exporting of only one variety of differentiated good. So, a

combination of 'love of variety' and economies of scale ensures that differentiated goods are produced and exported by different firms globally.

While it explained intra-industry trade, the new trade theory was not sufficient to explain specialised trade flows as observed in Bernard and Jensen (1995). As per Bernard and Jensen (1995) only few firms within the industry engage in exports. This is because most firms do not earn enough profits to cover the large fixed costs that they need for exporting. They further stated that exporting firms are larger, more productive, pay higher wages, and are more likely to survive than non- exporting ones. Other studies such as Aw and Hwang (1995), in the case of Taiwan, and Clerides et al. (1998) in the case of Colombia, Mexico and Morocco, found similar evidences of higher productivity of export firms.

The main empirical question that arose from these studies was, whether the most productive firms indulged in export (selection effect) or if exporting firms, through a learning effect, became more productive over time. These differences in heterogeneity between exporting and non-exporting firms, more specifically the reasons for export premia, were explained in what came to be known as the 'new-new trade theory' as put forth by Melitz (2003). Assuming a fixed cost to enter exporting activities, the model focuses on restructuring of firms to explain the heterogeneity within the economy. With the opening up of trade, firms lose sales within the domestic market. This results in the least productive industries to exit the market due to undergoing losses. However, exporting firms are able to capture the foreign market to substitute for the loss of domestic sales leading to an increase in production and thus labour demand, causing a rise in the real wage. As a result of this increased wage, some of the less-productive firms that were just breaking even, now undergo losses and are forced to exit the market. Trade liberalization, therefore, increases the average productivity level in an industry.

While the theories from the traditional to the 'new-new' mainly focused on trade in final goods, advancements in transportation, information and communication technology, increasing trade liberalization has resulted in the possibility of the entire production process being divided into various production centres spread across different national boundaries. Newer theories, such as those focusing on GVCs focus on the value added in the cross-border transfer of tasks within the production chain.

The main characteristics of the GVC paradigm is derived from the theory of production fragmentation (Jones and Kierzkowski,1990) and observations of trade in intermediate goods (Feenstra, 1998) which brought about further elaboration of key concepts such as unbundling (Baldwin, 2006) and trade in tasks (Grossman and Rossi-Hansberg, 2008a)

Jones and Kierzkowski (1990) defined fragmentation, as the "splitting up of a previously integrated production process into two or more components". They stated that the fragmentation of the production process is possible through the utilization of service activities. Fragmentation allows production in different countries to be formed into cross border production networks that can be within or between firms. Feenstra (1998) further connects the 'integration of trade' with the 'disintegration of production' in which production activities carried out in the foreign country are combined with activities carried out at home. The rising integration of economies through trade has resulted in a disintegration of MNCs, since companies are finding it cost effective to outsource domestically or offshore to foreign locations a significant portion of their non-core manufacturing and service activities. This has led to a growing proportion of international trade occurring in components and other intermediate goods (Yeats, 2001).

Baldwin (2006) further elaborated the concept in his unbundling perspective. Historically, economic activities of production and consumption were in close proximity and were

confined within small scale communities. It was only with the development of international trade in the 19th century and the expansion of land and sea transportation that there was an unbundling of production and consumption sites from the same community. This geographical unbundling coincided with the establishment of industrial zones of mass production. High productivity in these industrial zones was achieved through division of labour and conglomeration of all activities in the same factory to ensure effective communication and coordination with different tasks.

Further unbundling of production activities took place in the 1980s with the development of ICT, when production no longer had to be confined to a particular place and could relocate across borders to take advantage of the cost differences in production factors. The second critical dimension of the development of GVCs lay in the concept of, what came to be known as vertical integration, put forth by Henry Ford in the 20th century. The business model he adapted aimed to "integrate various segments (functions) of a production process under a single capital and management umbrella through the acquisition of a variety of companies" (World Bank, 2017) Today, vertical integration across countries is in the form of foreign direct investment (FDI) by the MNCs who influence the decision of value added across countries.

2.1 Concept of GVCs

Conceptual origins of the chain system of production process can be traced back to the world-systems analysis of Wallerstein (1974) and Wallerstein and Hopkins (1986). The idea culminated from their efforts to understand how capitalism has been holding up in the globalized world, using commodity chains. A commodity chain refers to the "network of labour and producton processes whose end result is a finished commodity".

However, these commodity chains covered only the production processes. Management scholars like Porter (1985), in his seminal paper on Competitive Advantage attempted to link these production chains of firms with their competitiveness and consequently emerged with the term value chains. Value chain of any firm or organization is a sequential chain of activities that attempts to show how each of the activity adds value to the organization's products or services. Development scholars Gerefii and Korzeniewicz (1994) idea of Global Value Chain (GVC) was borrowed and built on the concept of Global Commodity Chains and Porter's Value Chains to capture the changing nature of trade and their implications on development.

As defined by Gereffi, et. (1994) and adopted by the Duke University GVC Initiative, "*The value chain describes the full range of activities that firms and workers perform to bring a product from its conception to end use and beyond. This includes activities such as research and development (R&D), design, production, marketing, distribution and support to the final consumer. The activities that comprise a value chain can be contained within a single firm or divided among different firms.*"

Such a value chain attains a global status when the entire chain gets fragmented and divided among multiple firms spread out in different geographic locations, and it is this chain that is being largely called a Global Value Chain.

Henderson (2002) further extended the concept of Global Production Network (GPN), which besides covering the value added at each stage of production chain also takes into consideration the non-chain members in the production process. These include direct non-chain participants (firms and organizations) and indirect non-chain participants (governments and trade unions).

2.2 Drivers of GVCs

The drivers of GVCs are not necessarily different from the forces that determine traditional trade. With GVCs being the by-products

of globalisation, the role of technology and economic liberalization in driving Global Value chains is by and large self-explanatory. Both technological progress and trade facilitation are in fact, necessary conditions for economies to be integrated with the global value chains. Advancements in technology paved way for reduction in transportation costs, information costs and communication costs, thus facilitating participation in GVC especially the emerging and developing economies. Removal of trade barriers is the other important pre-requisite for as noted by Baldwin (2012). Since, supply-chain trade is regionalized and hence requires bilateral, plurilateral and multilateral agreements between economies to come into play.

Besides the above two, there are various country-specific factors that determine an economy's sustenance in the GVC. These pertain to the economy's domestic production structure: *the productive and technological capabilities of the economy*. This might include i) Labour cost arbitrage ii). Cost arbitrage iii) Skilled Labour and managers iv). Trade Logistics and Support Services v). Ease of doing business vi). Proximity to markets, etc.

2.3 Issues in Measurement GVC

When it comes to GVC Analysis, there have been two broad approaches depending on the objective of the analysis, the kind of data required (aggregate or disaggregated) and the methodologies that goes into the analysis.

a) Macro Approach:

Conventional treatment of GVCs has been macro-economic, allowing more coverage, lower complexity, assessment of the economy's true participation in global trade and it's cross country-comparability. As identified by the World Bank (2017), this school of GVC either applies international trade on parts data, or customs statistics on outward and inward processing of/in trade or the input output tables.

b) Micro or Firm-level Approach

A recent and growing trend has been to treat GVCs using firm-level business records appropriated i) from international FATS (Foreign Affliates) data , or ii) from the firms themselves using survey-based techniques. The idea has been to trace the culmination of the end product by identifying the composition of inputs and the sales networks that operate at both the intermediate and the end stages. Basically, these product-level analysis tears down the entire production chain thus enabling firms to undertake i) reverse engineering of the products ii) identify the offshoring components in the chain.

3. Structure of Global Value Chains

There are four broad dimensions that are considered in global value chain analysis which are classified into business functions, geography, governance and institutional context, each of which are highlighted below.

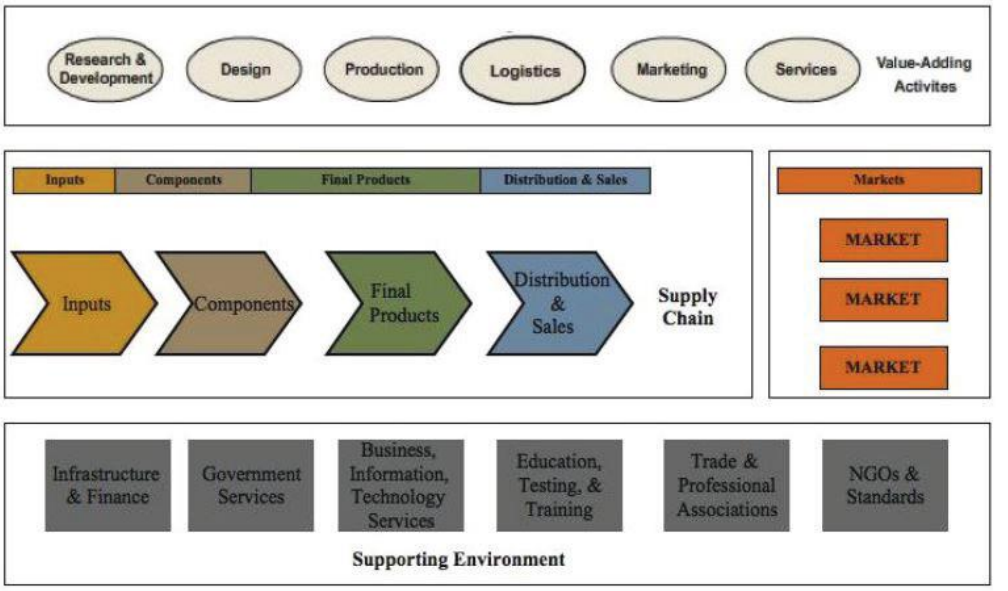
There are four broad dimensions that are considered in global value chain analysis which are classified into business functions, geography, governance and institutional context, each of which are highlighted below.

Business functions: Business functions consists of supply chain and value adding activities. Supply chain includes inputs, components, final products and distribution and sales, while value adding activities include research and development, design, production, logistics, marketing and services.

Geography: The countries that participate in the production process leverage their comparative advantage. The optimization process depends on the labour costs, proximity to markets and raw materials, access to research and development, design and marketing.

Governance: Governance is about the ability of the lead firm to exert control along the value chain by setting parameters and conditions and

Figre 1: Structure of GVCs



Source: Handbook on Accounting for Global Value Chain

ensuring its enforcement by the others along the chain

Institutional context: GVCs are a complex network that must be embedded within the economic, social and environmental institutional dynamics. These dynamics plays an important role in the organization of the value chain

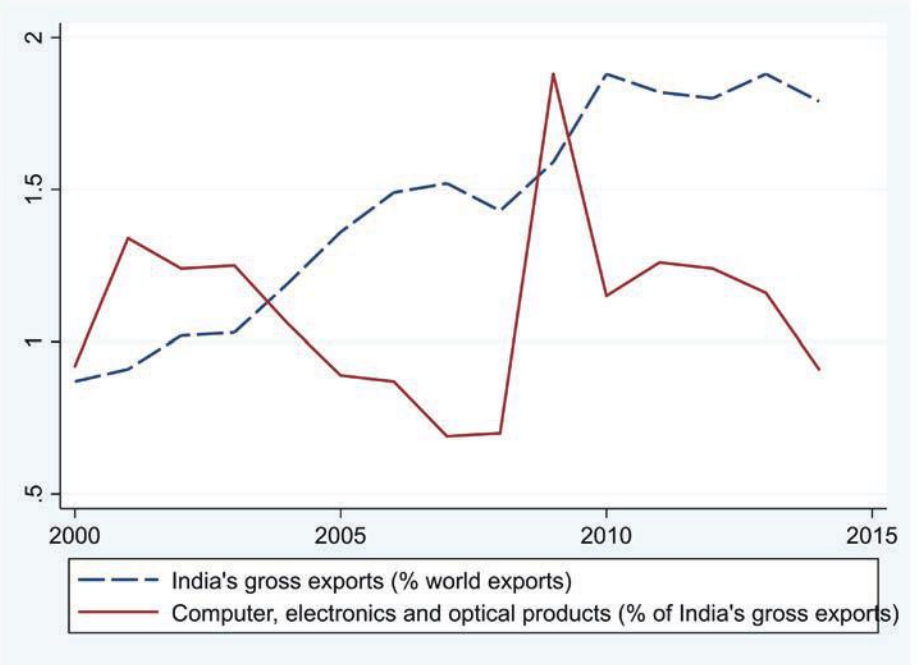
In this setup, it can be argued that firms that form a part of the GVC displays higher levels of specialization and productivity. The firms within the GVC in terms of value added, income, productivity and related assets and liability measures tend to dominate the industrial sectors. They also tend to differ in their dynamics regarding the rate of growth of key variables and macroeconomic statistics.

4. Decomposition of Gross Exports

India's total exports to world increased from 0.87 per cent in 2000 to 1.79 per cent in 2014. The average share of computer, electronics and optical products exports to India's total export was 1.10 per cent in 2014 (Figure 2). However, the exports of computer, electronics, and optical products sector has shown greater volatility over the period. The increased exports in the year 2000 started declining during 2001-07. The sector witnessed enormous growth in exports during 2007-2009 and started falling in shares in the subsequent period.

We look at the decomposition of India's gross exports at aggregate level and at sectoral level to understand the performance of Indian exports in the global value chain sector. In the literature, there exists broadly two methods for decomposing the gross exports, namely, Koopman, Wang and Wei (2014) decomposition and Wang-Wei-Shu decomposition (2018). The advantage of Wang-Wei-Zhu method over Koopman, Wang and Wei (2014) decomposition is that it allows to decompose the gross trade at bilateral-sectoral level while latter allows only at aggregate level. The data source used is the input-output tables provided in the World Input-Output database (WIOD). In this paper, we look at the decomposition of gross exports of India at aggregate level and of India's computer, electronics and optical products sector.

Figure 2: Gross Exports



Source: Authors' Calculation using WIOD

4.1 Decomposing the Gross Exports of India at the Aggregate Level

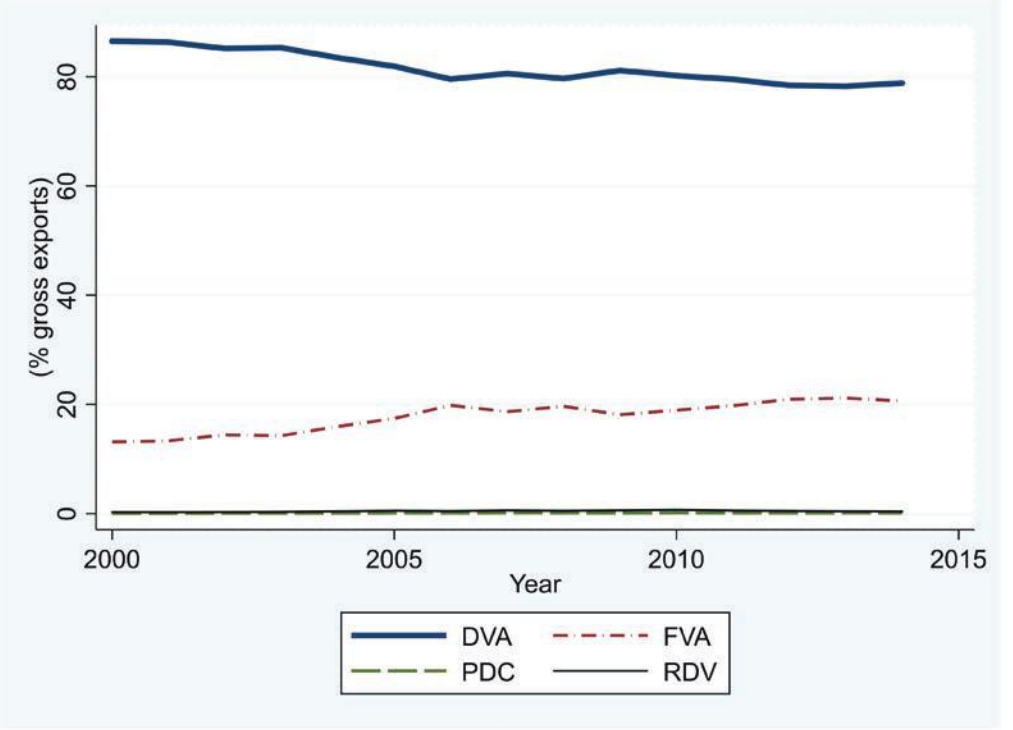
The gross exports of India at aggregate level is decomposed using, Koopman et al., (2014) for the period 2000 to 2014 (as presented in Table 1). Tracing the value added suggests the following, first, though an overall increase in gross exports is observed, we notice falling domestic value

Table 1: Decomposing India's Gross Exports

Year	DVA	FVA	RDV	PDC	FL	GVC
2000	86.54	13.13	0.28	0.04	8.55	21.68
2001	86.34	13.34	0.28	0.04	8.95	22.29
2002	85.20	14.44	0.30	0.06	8.81	23.25
2003	85.32	14.28	0.34	0.06	8.78	23.06
2004	83.50	15.97	0.44	0.08	9.21	25.18
2005	81.92	17.43	0.55	0.10	8.65	26.08
2006	79.58	19.83	0.48	0.11	8.39	28.22
2007	80.60	18.67	0.60	0.13	8.52	27.19
2008	79.69	19.66	0.54	0.12	8.13	27.79
2009	81.17	18.12	0.60	0.11	7.28	25.39
2010	80.22	18.95	0.69	0.14	7.66	26.60
2011	79.54	19.77	0.57	0.12	7.13	26.90
2012	78.43	20.95	0.51	0.11	6.77	27.72
2013	78.26	21.18	0.45	0.12	6.90	28.08
2014	78.87	20.61	0.41	0.11	6.75	27.36

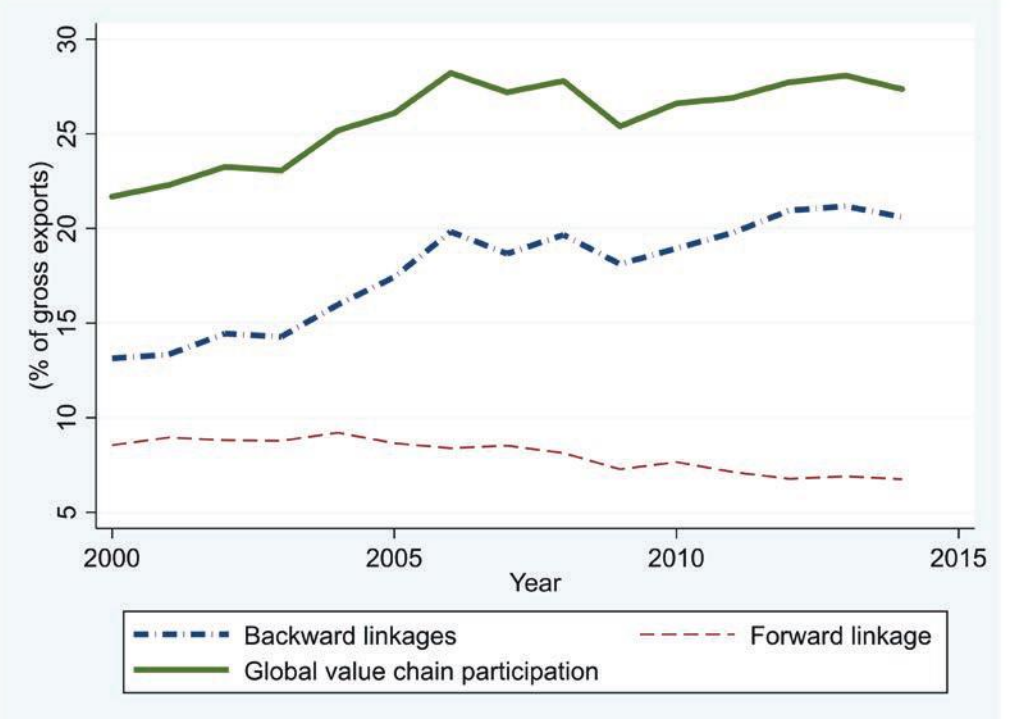
Note: DVA is the domestic value added; FVA is the foreign value added or backward linkage in global value chains(GVCs); RDV is the domestic value of intermediate exports that finally return home. PDC is the pure double counted intermediate exports produced at home. FL is the forward linkage in GVCs. All the values are as a percentage of gross exports. Source: Authors' calculation using WIOD database.

Figure 3: Decomposing India's Gross Exports at the Aggregate Level.



Source: Authors' calculation using WIOD

Figure 4: Forward and Backward Linkages of Global Value Chain Participation



Source: Authors' calculation using WIOD database

added (DVA) from 87 per cent in 2000 to 79 per cent in 2014 with foreign value added (FVA) increasing from 13 per cent in 2000 to 21 per cent in 2014 (Figure 3). In other words, on an average over the period 2000-14. Indian gross exports comprise of 82 per cent of domestic content and 18 per cent of foreign content. The remaining 0.56 per cent of gross exports is due to domestic intermediate exports that finally return home (0.47per cent) and pure double counted intermediate exports produced at home (0.10 per cent).

Further, we calculate the global value chain participation of India using the forward and backward linkages extracted from gross exports. The linkages (both forward and backward) and GVC participation as a share of gross exports are presented in Table 1. The trends indicate the increased GVC participation over the years from 2000 to 2014 with declining forward linkages from 9 per cent to 7 per cent and increasing backward linkage from 13 per cent to 21 per cent (Figure 4). The backward linkages greater than the forward linkages indicate that India is on the downstream part of the value chain or a supplier of intermediate inputs. The indicators also suggest that on an average about 26 per cent of gross exports is sustained due to participation in GVCs of which 8 per cent is due to forward linkage and 18 per cent is due to backward linkages.

4.2 Decomposing gross exports of India's computer, electronics and optical products sector

In this section, we look at the decomposition of gross exports of India's computer, electronics and optical products sector using Wang-Wei-Zhu decomposition (2018). The decomposition of the gross exports of this particular sector is provided for the following years: 2000, 2005, 2010 and 2014.

The Wang-Wei-Zhu decomposition method splits gross exports at bilateral level of a particular sector into four main categories namely, domestic value added which is finally absorbed by foreign countries (DVA) including both the direct importing country and other foreign countries, foreign value added used in the production of exports (FVA), return value added (RDV) is the portion of domestic value added which is initially exported but at the end returns home embedded in the imports from abroad and consumed domestically, and purely double counted terms (PDC) is the term that accounts for the back and forth intermediate goods trade. These different components of gross exports provide valuable information regarding the cross-country production sharing processes.

India's domestic value added (DVA) in 2000 is 76 per cent but we see a decline in 2005 to 72 per cent. However, in 2014, the domestic value added as a percentage of gross exports was almost at the same level as in 2000. The foreign value added used in the production of India's exports declined to 19 per cent from 21 per cent in 2010. This indicator provides us the information about India's backward linkage in global value chains. Both domestic value added and foreign value-added components of gross exports are following the same trend during the study period. Indian exports were depent overwhelmingly on their own domestic value added, i.e., about 75 per cent from India and 19 per cent from other countries in 2014. This could possibly be the result of Indian government's National Electronic Policy (2012) aimed at boosting domestic manufacturing and improving India's global market share.

Certain size of India's gross exports that is not containing any domestic value added that eventually returns to home being embedded in the imports, i.e., RDV is trivial for India (0.3 per cent in 2014). This points to the fact that India is likely to be at the bottom of the value chain, i.e., in downstream position.

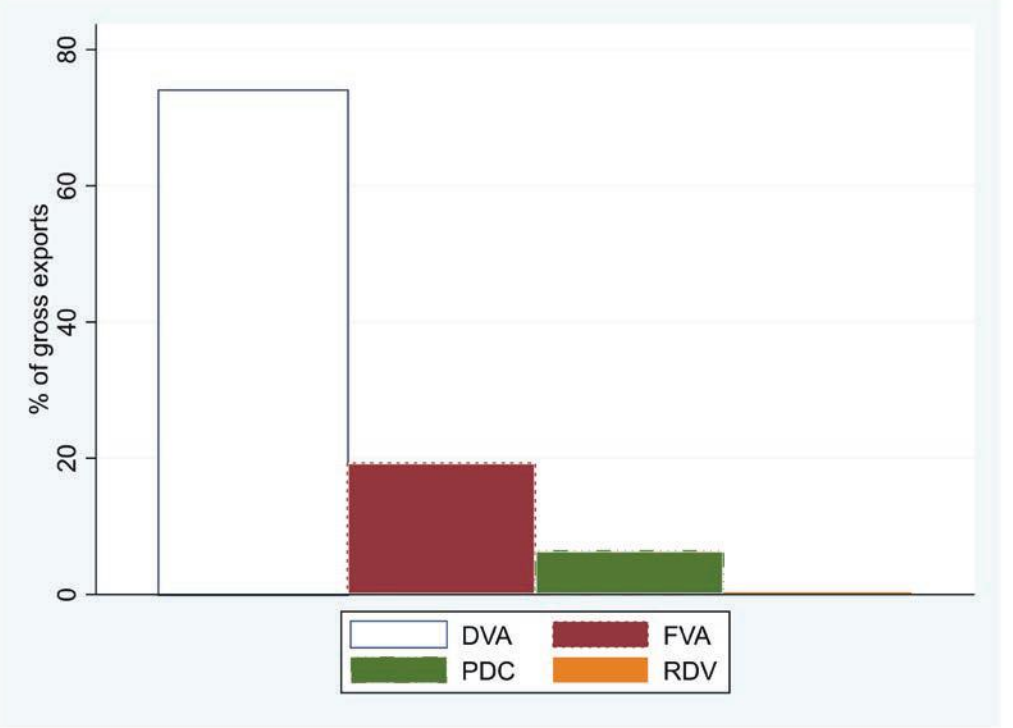
India's global value chain participation in the computer, electronics and optical products has decreased over the years. Global value chain

Table 2: Decomposing India's Gross Exports of Computer, Electronic and Optical Products Sector

Year	DVA	FVA	RDV	PDC	FL	GVC
2000	75.60	15.81	0.30	8.29	25.33	41.14
2005	71.95	21.05	0.33	6.66	16.59	37.64
2010	73.08	21.60	0.27	4.91	12.88	34.48
2014	75.16	18.78	0.31	5.75	16.84	35.62

Note: DVA is the domestic value added; FVA is the foreign value added or backward linkage in global value chains(GVCs); RDV is the domestic value of intermediate exports that finally return home. PDC is the pure double counted intermediate exports produced at home. FL is the forward linkage in GVCs. All the values are as a percentage of gross exports. Source: Authors' calculation using WIOD database

Figure 5: Decomposition of India's Gross Exports of Computer, Electronics and Optical Products



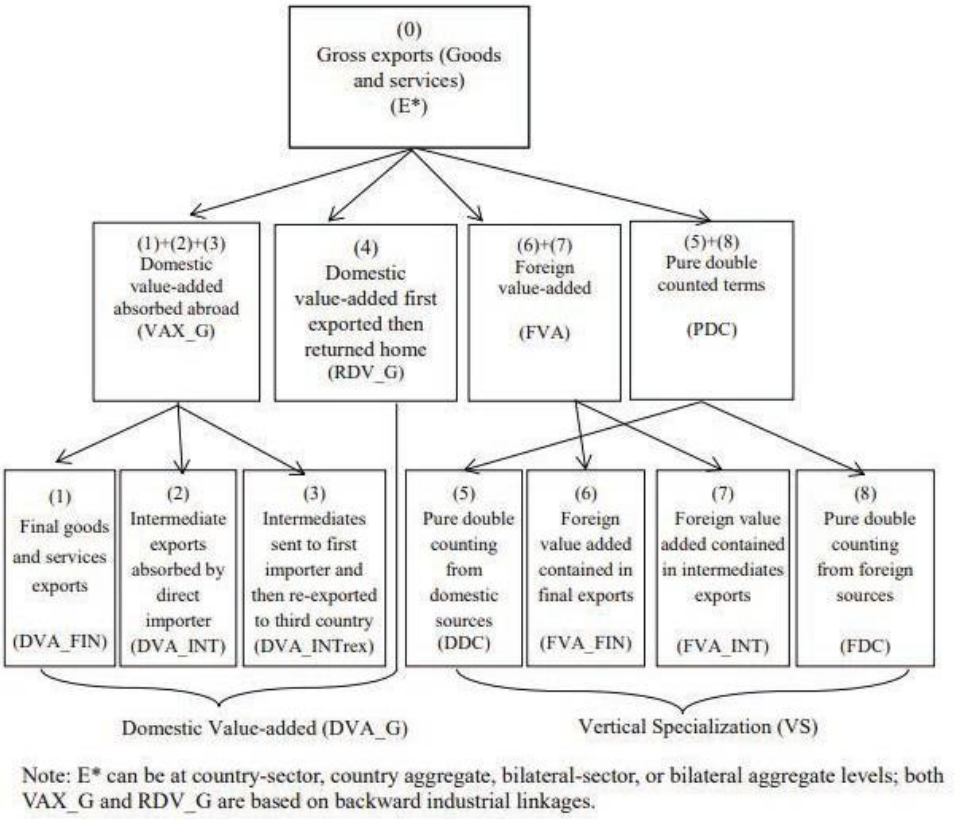
Source: Authors' calculation using WIOD database

participation is defined as the sum of forward and backward linkages as a percentage of gross exports of this particular sector. Foreign value-added content used in the production of Indian exports increased to 21 per cent in 2010 from 15 per cent in 2000. The backward linkage is the domestic value added in intermediate exports re-exported to third countries. The net decrease in global value chain participation is driven by the decrease in forward linkage. The falling trend of forward linkage shows that India's domestic value added going into the exports of other countries is decreasing. This is not a favourable situation for any country which is aiming to upgrade its position in the global value chains.

4.3 Trends in Tracing structures of Vertical Specialization in India

Vertical specialisation (VS) is a summary

Figure 6 : Gross Trade Accounting: Conceptual Framework



Source: Wang-Wei-Zhu (2018)

statistic to measure international production sharing which is widely used in the literature (e.g., Hummels, Ishii, and Yi (2001), and Antras (2013)). However, as shown in Figure 6 about gross export decomposition, there are different components within VS, and each has a distinct economic meaning and describes various types of cross-country production sharing arrangement. For instance, a high share of foreign value added in India's final goods exports (FVA_FIN) may mean that India mainly involves in final assembling actions based on imported parts and participates in cross-country production distributing on the low end of a global value chain. While a growing foreign value added share in India's intermediate exports (FVA_INT) might imply India is improving its industry to start manufacturing intermediate goods for other countries, primarily when considerable of these goods are shipped to third countries for final goods production. The latter is an indication that the country is no longer at the bottom of the GVCs.

Pure double counting terms in a country's exports (PDC) can only occur when there is back and forth trade of intermediate products. An increasing weight of PDC share in VS indicates the deepening of cross-country production sharing. Intermediate goods have to cross national borders multiple times before they are part of final goods production. Hence, understanding the relative significance of these parts and their dynamic course over time in a country's total VS can help us to assess the extent and pattern of cross-country production sharing and discover the significant drivers of the general increase of VS in a country's gross exports during the last two decades.

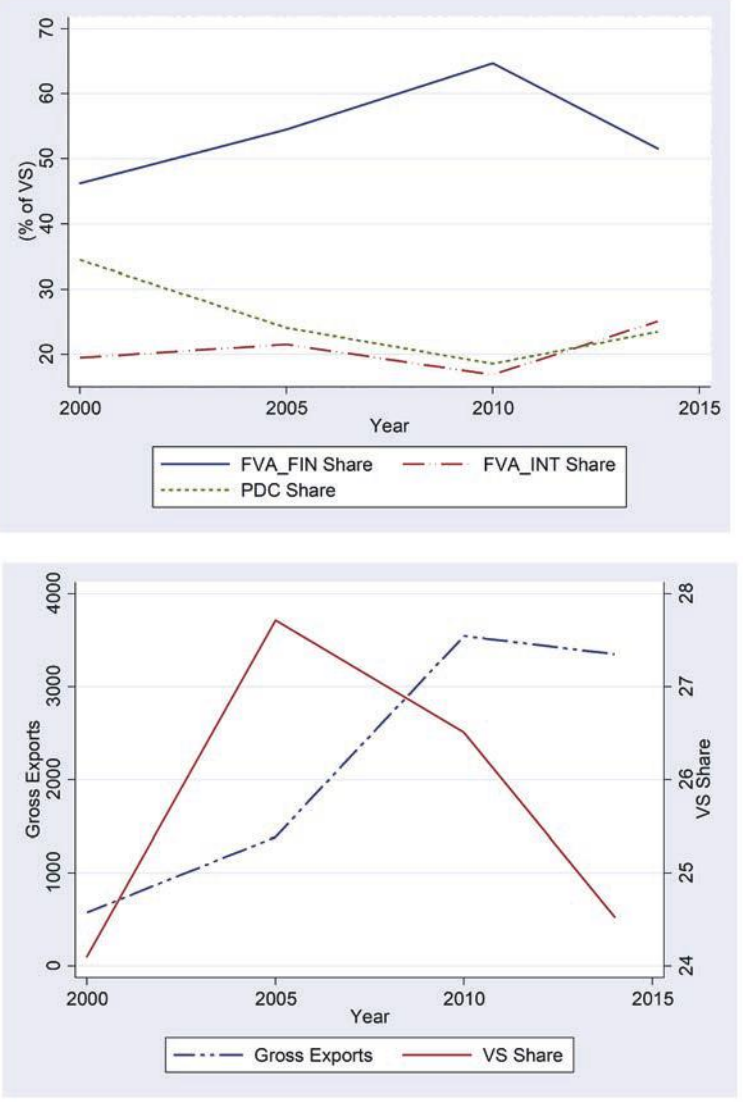
As shown in Table 3, the VS share in gross exports of India's Manufacture of computer, electronic and optical products (WIOD sector 17) increased by 3.7 percentage points (from 24.1% in 2000 to 27.7% in 2005, column 3), but decreased by 3.2 percentage points (from 27.7% in 2005 to 24.5% in 2014). Interestingly, the VS structure information, reported in the last three columns, indicates that this net increase or decrease is mainly driven by an increase or

Table 3: Decomposition of VS

Year	Gross Exports	VS Share (in gross exports)	FVA_FIN Share (% of VS)	FVA_INT Share (% of VS)	PDC Share (% of VS)
2000	573	24.09	46.17	19.41	34.40
2005	1384	27.71	54.47	21.48	24.04
2010	3545	26.50	64.68	16.80	18.50
2014	3349	24.52	51.51	25.05	23.43

Source: Authors' Calculation using WIOD

Figure 7: Decomposition of Vertical Specialization (VS)



Source: Authors' Calculation using WIOD

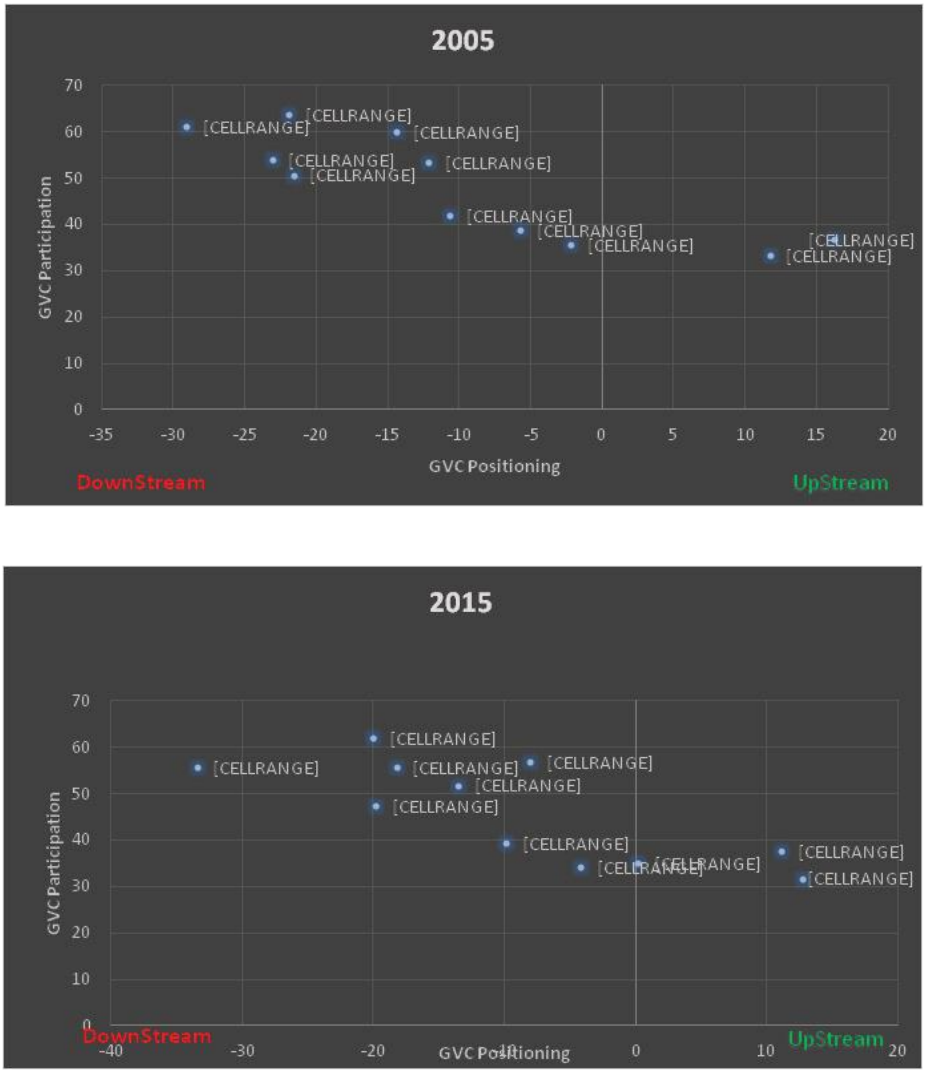
decrease of FVA_FIN. The share of FVA_FIN rose (from 46.1% in 2000 to 64.7% in 2010) and FVA_INT share first increased (from 19.4% in 2000 to 21.5% in 2005), then decreased (from 21.5% in 2005 to 16.8% in 2010) and again increased (from 16.8% in 2010 to 25% in 2014). The PDC share declined first significantly (from 34.4% in 2000 to 18.5% in 2010) and then increased (from 18.5% in 2010 to 23.4% in 2014). This may be the result of a strategic shift from import substitution to export oriented development; it is also consistent with a move from the upper stream portion of the production chain to a more downstream position.

5. Comparison of GVC Participation and positioning for selected countries

This section roughly calculates the participation index and positioning index by using both forward and backward linkages for each selected country based on trade in value added (TiVA) statistics calculated from the Inter-Country Input-Output (ICIO) tables.

GVC participation index can be computed by the sum of forward and backward linkages, while GVC positioning index can be roughly computed from the difference between forward

Figure 8: GVC Participation Vs Position for Selected Countries, 2005 and 2015



Source: Authors' compilation using TiVA Database

linkage and backward linkage. If the forward linkages are larger than backward linkages, it implies that the country is positioned upstream in the global value chain and provides raw material or intermediate goods to downstream countries. If forward linkage is less than backward linkage, this implies that the country is positioned downstream in the global value chain while using intermediate inputs from upstream countries.

In terms of participation, downstream countries tend to have higher participation rate in the global value chain. This trend has not changed over the study period. In terms of positioning, only Japan and USA are positioned upstream. It is seen that Asian countries though positioned downstream; they have a tendency to move upstream. Only Vietnam has move further downstream over time. India and EU are positioned downstream and have no change.

6. Policy Perspective

Domestic Value Added (DVA) in the gross exports of the sector was high in 2000 but declined a decrease in 2005 and 2010. However, it showed an increase in 2014. This may be due to the National Policy on Electronics (2012). But, India is still in the downstream segment of GVC participation of the sector. The policy which promotes domestic electronics and components production should be formulated to increase India's participation in GVC's by increasing forward linkages in the domestic value chain. Poor trade infrastructure has reduced India's GVC participation in this sector. Thus, there is a necessity to introduce a policy package for attracting investment in order to improve the infrastructure of the nation.

The Union Cabinet in February 2019 gave its approval to the National Policy on Electronics 2019 (NPE 2019), proposed by the Ministry of Electronics and Information Technology (MeitY). The Policy envisions positioning India as a global hub for Electronics System Design and Manufacturing (hence ESDM) by encouraging and driving capabilities in the country for developing core components, including chipsets, and creating an enabling environment for the industry to compete globally.

References

Antras, P. (2013). Firms, contracts, and global production. CREI Lectures in Macroeconomics. Manuscript on the author's website

Aw, B. Y. & Hwang, A. R. (1995). Productivity and the export market: A firm-level analysis. *Journal of Development Economics,* 47, 313–32

Baldwin, R. (2006). *Globalisation: The Great unbundling(s).* Helsinki: Economic Council of Finland.

Bernard, A. & Jensen, J. (1995). Exporters, jobs and wages in U.S. manufacturing, 1976–1987. *Brookings Papers on Economic Activity. Microeconomics,* 1995, 67-119

Clerides, S., Lach, S., & Tybout, J. (1998). Is learning by exporting important? Microdynamic evidence from Columbia, Morocco. *Quart Journal of Economics,* 113(3), 903–47.

Dash, A. & Chanda, R. (2017). *Indian firms in electronics global value chains: Sectoral Analysis.* CWS Working paper No: 41

Ernst, D. (2014). *Upgrading India's electronics manufacturing industry: Regulatory reform and industrial policy.* Hawaii: East-West Centre.

Francis, S. (2015). *An analysis of India's merchandise export performance during 1999–2013: Existing competencies and emerging policy challenges.* Department of Commerce, Ministry of Commerce and Industry, Government of India, New Delhi.

Grossman, G. M., & Rossi-Hansberg, E. (2008). Trading tasks: A simple theory of off shoring. *American Economic Review,* 98(5), 1978–97.

Grubel H.G. & Lloyd, P. (1975). *Intra-industry trade: The theory and measurement of international trade in differentiated products.* London: MacMillan.

Hummels, D., Ishii, J., & Yi, K. M. (2001). The nature and growth of vertical specialization in world trade. *Journal of international Economics,* 54(1), 75-96.

Jones, R., & Kierzkowski, H. (1990). *The role of services in production and international trade: A theoretical framework.* In The Political Economy of International Trade, edited by R. Jones and A. Krueger. Oxford, U.K.: Basil Blackwell, 31–48.

Kallummal, M. (2012). *Process of trade liberalisation under the Information Technology Agreement (ITA): The Indian experience.* CWS Working Paper No CWS/WP/200/3, Centre for WTO Studies, New Delhi.

Koopman, R., Wang, Z., & Wei, S. J. (2014). Tracing value-added and double counting in gross exports. *American Economic Review,* 104(2), 459-94.

Krugman, P. (1979). Increasing returns, monopolistic competition and international trade. *Journal of International Economics,* 9, 469–79.

Krugman, P. (1980). Scale economies, product differentiation, and the pattern of trade. *American Economic Review,* 70(5), 950–959

Melitz, M. J. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica,* 71 (6), 1695–725.

Ranjan, P., & Raychaudhuri, J. (2016). *The 'new-new' trade theory: A review of the literature*. In International Trade and International Finance. Edited by Priya Ranjan, Jibonayan Raychaudhuri. New Delhi: Springer, 3-21.

Saraswati, J. (2013). A national export-led growth plan: Lessons from the software industry. *Economic & Political Weekly,* 48 (7), 21–24.

Saripalle, M. (2015). Tamil Nadu's electronics industry: Lessons for 'Make in India. *Economic & Political Weekly,* 50 (26 & 27), 99–103.

Wang, Z., Wei., S., & Zhu, K. (2018). *Quantifying international production sharing at the bilateral and sector evels.* NBER Working Paper No. 19677.

World Bank (2017). Global value chain development report 2017: Measuring and analyzing the Impact of GVCs on Economic Development. Washington DC: The World Bank.

Yeats, A. J. (1998). *Just how big is global production sharing?* Policy Research Working Paper 1871, Washington DC: The World Bank.

IV

Relationship between Exports and Employment in India: A Review

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IV

Relationship between Exports and Employment in India: A Review

Introduction

Trade is considered to be one of the main drivers of growth in most countries of the world particularly in the 2000s. Studies suggest that there exists a causal relationship between economic growth and international trade both at the cross-country level and in the long-run. By this paradigm, to act as an engine of development, trade must culminate towards steady improvements in human welfare by expanding the range of people's choice, reducing poverty and providing employment opportunities. From this point of view, a country's performance in trade and development cannot be seen as the mere sum of its economic growth and export performance rather high export growth needs to be backed by strong employment generation as well.

Employment generation through trade can be viewed from two angles. First, trade is a force of structural change in an economy which is expected to have uneven and asymmetric effects across sectors, firms and workers. Second, trade can induce productive transformation since export demand allows economies of scale and scope of it to expand. Imported intermediates and equipment can raise the productivity of domestic factors. Trade-related foreign investment can bring finance, new technologies and knowledge embedded in goods. Participation in international supply chains promotes specialization, efficiency and innovation.

Neo-classical trade theories such as Heckscher-Ohlin (H-O) model suggest that a country abundant in a particular factor will specialise in exports intensive to that factor. This would raise the demand of that particular factor. So, if a country is abundant in labour (generally developing countries), H-O theory suggests that it will specialise in labour-intensive exports. Sectors exporting would expand their production process and this may pull up the demand for labour. Thus, theory predicts further rise in employment opportunities due to trade.

Trade can cause both destruction of jobs and creation of jobs. Exports can also affect the nature of jobs in an economy (Slaper, 2015). Effect of international trade in employment generation depicts dissimilar results in terms of manufacturing sector and service sector. There is a unanimous view that opening up of economy post-liberalization did not lead to an increase in employment in the manufacturing sector. That sector remained more or less stagnant over the years (Goldar, 2009). suggests that expansion of trade failed to raise employment in the manufacturing sector primarily due to the changing product composition of trade and the changing direction of trade. Another view suggests that skill-intensive nature of India's exports is responsible for shedding of excess labour by most firms in the manufacturing sector.

Usually, export-led growth would imply that an emerging market economy would

try to develop its manufacturing industries, which would be focusing on labour-intensive production processes. This happens as labour-intensive production processes move out from developed economies (which are capital intensive) to developing economies (usually characterised by surplus labour and scarce capital). In that parlance, India is a unique case.

Unlike typical Rostow path of growth process, services sectors have developed faster than manufacturing sectors, led by the impressive growth in IT services. India has established itself as a reckoning exporter of IT services. In this regard, it becomes very important to analyse the employment effects of exports generated by the services sector.

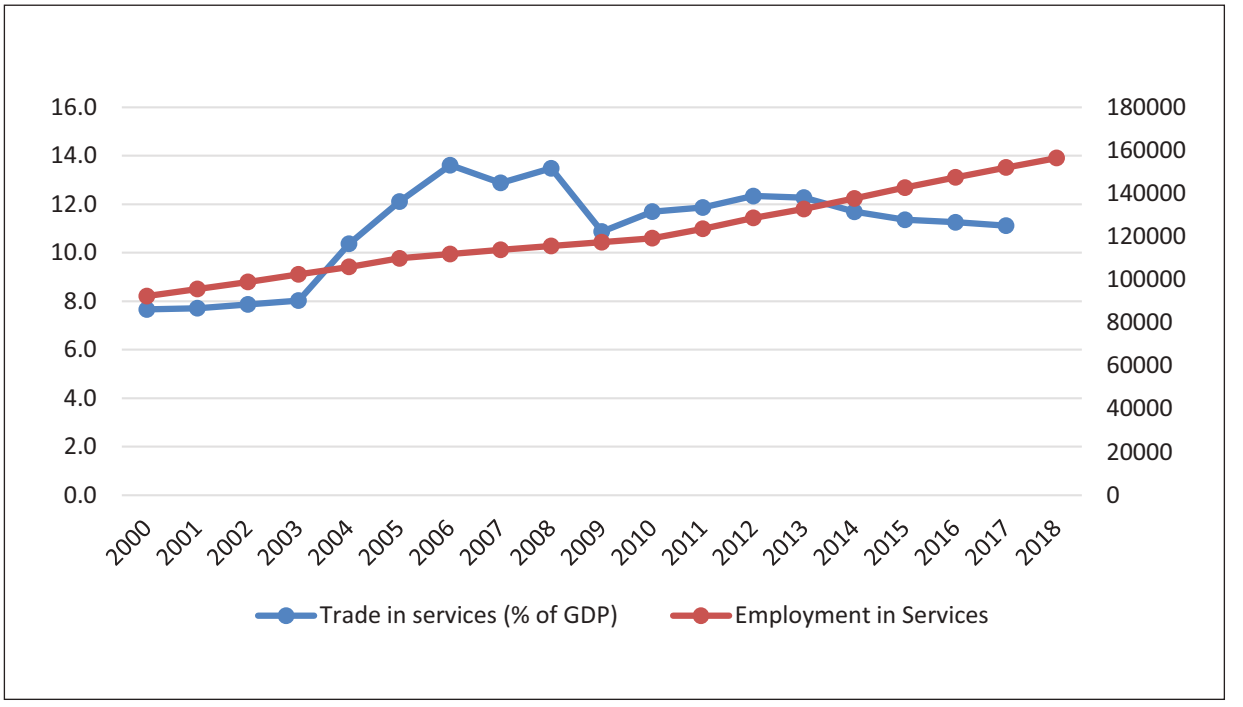
Trends in Services Growth in India

The services sector has emerged as major driving force of the world economy contributing a growing share to gross domestic product (GDP) and employment. India is now experiencing a service-led growth path. Service sector is the largest recipient of FDI with inflow of US $70.91 billion between 2000 and 2018.

As far as the cross-country comparison is concerned India and China both have experienced rapid economic growth. But their growth pattern is dramatically different. China has experienced a manufacturing-led growth while India has side-stepped the manufacturing sector, and took a big leap straight from agriculture into services.

Figure 1 presents evidence of a strong relationship between trade in services and employment in services. Rise in employment in services seems to experience different relationship with trade over time. It can still be said to be positively correlated for most part of the years.

Figure 1: Trends in Trade in Employment Levels and Services in India



Source:

Trade-Employment Linkages in India

International trade provides the incentives to create new opportunities for workers, consumers and firms across countries and regions by forming up a positive business climate, flexible labour markets, high-quality education and skill training systems (OECD, 2012). India offers a standard framework to examine the effect of international trade on manufacturing employment, since the time when the country started to enhance trade integration with the world economy, i.e. post-1990s. Many studies have been undertaken in the past to investigate the effect of international trade on manufacturing employment in India, using different methodologies and time frameworks.

A study by Banga, (Banga, 2005) has analyzed the impact of FDI, trade and technology on wages and employment in Indian organized manufacturing industry in the post reform period. The analysis was based on panel data estimations that were carried out using generalized method of moments (GMM), keeping in mind the unique characteristics of Indian labor markets. To capture the effect of trade liberalization on wages and employment, the paper uses Effective Rate of Protection (ERP) and the export-intensity measure (ratio of exports to sales). The model also uses industry dummies to control for industry specific fixed effects. The results indicate that trade openness, as measured by ERP and export-intensity ratio, has no significant impact on wages. This result is consistent with the fact that government intervention plays a key role in wage determination in the organized sector. Also, the author finds that the export orientation of an industry has a favourable impact on employment. This is in accordance with the Heckscher-Ohlin prediction that trade leads to a redistribution of employment from the import sector to the export sector. In India, exports are dominated by labor-intensive goods leading to increase in employment.

Das (2008) studies the connection between trade policy reforms and labor market indicators within organized manufacturing industries in India. He uses panel data for set of 75 industries (from ASI) classified into 3 use-based sectors: intermediate goods, capital goods and consumer goods for the period 1980-2000. The period of study has been classified into four distinct phases of liberalization: 1980-85, 1986-90, 1991-95 and 1996-2000. The study reports that through the successive phases of trade liberalization, the labour-intensive industries such as cotton textiles, textile products, leather products experienced consistently higher employment growth and upward pressure on real wages. During 1990s, the sectors of chemicals, energy, basic metals and metal products also exhibited high employment growth rates. Thus, trade liberalization helps labor-intensive development and helps employment growth gain momentum, in turn leading to upward pressure on wages.

Vashisht (2015) assesses the impact of trade on manufacturing employment in India using two methodological approaches. Using the growth Accounting Approach, the study finds that the direct impact of trade on employment in the manufacturing sector has been positive. It has helped creating more than 2.3 million net jobs in the country. To capture the indirect effect of trade on employment, it uses the labor demand estimation technique. The indirect effect of trade on employment is negative as an increase in export orientation as well as an increase in import penetration has reduced the derived labor demand.

Dutt (2003) has dealt with another context of the connection between trade and employment. This paper seeks evidence for H-O theory in the context of liberalization undertaken in India since 1991. Time series analysis in the data from the registered manufacturing sector showed that the decline in trade restriction has resulted in the rise of employment as well as the growth rate of employment.

Kucera and Roncolato (2011) in their detailed work to find out the impact of trade liberalization

on employment and inequality finds out that it has resulted in the generation of 2.3 million new jobs, with 75 per cent of loss resulting from trading with developing countries. Social Accounting Matrix (SAM) is used in a Leontief multiplier model to estimate the effects of trade liberalization on employment. The results from the study rejected the expected comparative advantage that India had with regard to labour.

A joint report formulated by the World Bank/ILO (2019) postulates that an increased amount of exports in India can increase the job opportunities, and also raise average wages. However, the report also highlights the biggest beneficiaries of the wage gains tend to be the high-skilled workers, and predominantly the male workers. In case of low skilled workers, there will be a shift towards the formal jobs. The study has used an innovative approach which examines the effect of changes in exports on local employment and wages. The study is carried out by combining the disaggregated data from household-level or worker-level surveys with trade data from India and Sri Lanka.

A large percentage of Indian workers do not have regular jobs, and the wage differentials across the Indian economy remains pervasive. Also, with the increase in population the pressure on labour market gets exaggerated, requiring around one million extra jobs each month. Besides this, there has been a reduction in trade from 55.8 per cent to 41.1 per cent of GDP during 2012-2017. The results of the World Bank/ILO study explain that India's exports are largely capital-intensive products, like chemicals and fabricated metals. This highlights that the direct benefits for workers are confined to a very small amount. Therefore the study suggests that by formulating and implementing right policies, it will be easier for India to ensure that greater export orientation will enhance workers' gains from trade and would possible bring more equitable distribution, helping the disadvantaged groups (Artuc, 2019).

These results are similar to the results obtained by Hasan et al. (2013) although with different methodology examining the Indian manufacturing sector it is found that India uses more capital-intensive technology as compared to other countries at similar levels of development with similar factor endowments.

A study by Sasidharan (2015) for the period of 1980–2005 examined the effect of international trade on the manufacturing employment and wages in India. Since India tends to be a labour-abundant country, the empirical evidence suggests the role of trade openness in labour market in terms of employment and wages. The study has employed three standard modelling approaches i.e., factor content, growth decomposition and panel data modelling approaches, to corroborate the role of trade in determining employment and wages. It has used panel data at the industry level, which is extracted from Annual Survey of Industries (ASI) and World Bank. The results of the study explain that there exists no significant impact of international trade on employment generation in the manufacturing sector in India. However, there is slight evidence regarding any significant impact of export orientation on employment. In addition, the import penetration tends to have damaging impact on employment generation (Sasidharan, 2015). The absence of positive impact of exports on the employment generation can be attributed to the slow growth in labour-intensive exports. One of the possible reasons behind the slower employment growth in labour-intensive manufacturing sector are the rigid labour laws (Panagariya, 2007), hence, it requires a reformation if one has to boost the employment generation.

Likewise, Hasan (2012), employed a state- and industry-level data on unemployment rates and trade protection for examining the linkages between trade and unemployment (instead of employment). The findings of the study suggest that unemployment does not increase with trade liberalization. Moreover, the study establishes that to the extent there is a statistically significant relationship, unemployment is rather falling

with trade liberalization in particular settings. The state-level investigation shows that urban unemployment falls with increase in trade in states having relatively more flexible labour markets as well as larger employment shares in net exporter industries. Additionally, the industry-level investigation highlights that labour in industries undergoing higher cutbacks in trade protection had lower probability of getting unemployed, particularly in net export industries.

There is little evidence that the short-run effect of a tariff cutback could be a rapid rise in unemployment prior to decrease to a lower steady-state unemployment rate. The results suggest trade liberalization has an unemployment reducing effect, however this effect can be accompanied with a small lag. In short-run there could be an increase in the level of unemployment, particularly in case of industry-specific unemployment. The empirical finding also highlights that trade liberalization is more successful in reducing urban unemployment for states with a larger portion of the urban workforce engaged in net-export sectors. In conclusion, the empirical results provide support for domestic labour market reforms without which India cannot fully realize the trade induced benefits for its economy.

References

Artuc, E. et al. (2019). *Exports to jobs: Boosting the gains from trade in South Asia.* International Bank for Reconstruction and Development/ The World Bank and the International Labour Organization: Washington DC, available at https://openknowledge.worldbank.org/bitstream/handle/10986/31274/9781464812484.pdf?sequence=4&isAllowed=y

Banga, R. (2005). *Impact of liberalization on wages and employment in Indian Manufacturing Industries.* ICRIER Working Paper No. 153

Das, D. K. (2008). *Trade liberalization, employment, labour productivity, and real wages: A study of the organized manufacturing industry in India in the 1980s and 1990s.* International Labour Organization, Subregional Office for South Asia.

Dutt, P. (2003). *Labor market outcomes and trade reforms: The case of India. The impact of trade on labor: Issues, perspectives, and experiences from developing Asia,* 1-45.

Goldar, B. (2009). *Impact of trade on employment generation in manufacturing in India.* New Delhi: Institute of Economic Growth.

Hasan, R., Mitra, D., & Sundaram, A. (2013). The determinants of capital intensity in manufacturing: the role of factor market imperfections. *World Development,* 51, 91-103.

Hasan, R., Mitra, D., Ranjan, P., & Ahsan, R. N. (2012). Trade liberalization and unemployment: Theory and evidence from India. *Journal of Development Economics,* 97(2), 269-280.

Kucera, D., & Roncolato, L. (2011). Trade liberalization, employment and inequality in India and South Africa. *International Labour Review,* 150(1□2), 1-41.

Panagariya, A. (2007). Why India lags behind china and how it can bridge the gap. *The World Economy,* 30 (2), 229-248.

Sasidharan, S. (2015). Impact of foreign trade on employment and wages in Indian manufacturing. *South Asia Economic Journal,* 16(2), 209-232.

Slaper, T. (2015). Does export growth create jobs? *Indiana Business Review,* 90 (2) 1-6.

Vashisht, P. (2015). Creating manufacturing jobs in India : Has openness to trade really helped? Working Paper 303, available at http://www.esocialsciences.org/Download/repecDownload.aspx?fname=A201571615201 5_35.pdf&fcategory=Articles&AId=7126&fref=repec

Vashisht, P. (2016). Creating manufacturing jobs in India: Has openness to trade really helped? *Journal of Asian Economics,* 42, 53-64.

V

A Gravity Model for Bilateral Export Performance of India with Top Trading Partners: A Panel Data Analysis

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V

A Gravity Model for Bilateral Export Performance of India with Top Trading Partners: A Panel Data Analysis

1. Introduction

Trade of goods and services has become an important part of macro economy of any country for growth and development. Regardless of the level of development; country's trade depends heavily on regional and global market. International trade has acted as engine for economic growth in many countries, especially the newly industrialised countries in East Asia. Trade helps developing countries to produce at cheaper cost and increase the value of their products. It also facilitates diversification of export markets to open new market to avail new production possibilities. "Trade has become the lens through which development in perceived, rather than other way around" (Rodrik, 2001). Trade also helps in strengthening ties between countries as a consequence to improve its relation stronger as well generates deeper economic integration. Besides, the share in global market and opportunity for developing countries has increased much faster than developed countries. Trade has made easy for developed countries to grow enormously and increase its contribution in the world economy.

Trade has bought great advantage to these countries such as (1) Greater economies of scale; (2) generating more employment opportunities along with higher income and improved standard of living; (3) trade openness lead to free flow of goods among the countries making easier for nation to export without any barriers; (4) increase in supply of goods and services and lowering consumer prices. "Overall, the great growth of the global trade has been fostered partly due to creation of several institutions such as GATT (General Agreement on Tariff and Trade), the UNCTAD, the WTO (World Trade Organization) and the OPEC (organization of the petroleum exporting countries)" (Capella, 2015).

This topic has been chosen on the basis of importance of trade for India with its top trading partners. India has high potential to gain from trade. Developing countries are growing faster than developed countries, and China has shown tremendous expansion and growth. The objective of the study is to analyse the export performance of India with top trading partners. The paper uses gravity model analysis for bilateral export of India with top trading countries.

This paper is divided into five sections. In Section 1 introduction part will be taken which will deal with theoretical background and also presents the stylized facts of the Bilateral trade performance of India with top trading countries. Section 2 presents literature review regarding gravity model and their empirical results. Section 3 presents the model development and

data discussion. The estimation result via fixed effect and random Effect model reported in section this confirmed the existence individual (country specific effect) effect and the Hausman test suggest that the fixed effect model is appropriate for the current study in the panel estimation. The last section 5 provides the conclusion and summary of the study.

2. Trends in India's Foreign Trade

Since independence important changes have taken place in terms of composition, direction and volume of trade as well. Since 1950-51, India's foreign trade in terms of size and volume increased considerably from INR 1214 cr. in 1950-51 to 3169 cr. in 1970-71 to INR 1412285 cr. in 2006-2007. Prior to 1950, increase in the volume of trade was very slow. Therefore during the period from 1950-51 to 1960-61 import showed increasing trend by 85.5%. At the same time, exports remained stationary and were confined to only primary goods. It was the second plan model when India demanded necessary machinery and capital equipments which led to the increase in the import bill. Further, devaluation in 1966 led the value of import to rise by 41% from 1960-61 to 1960-70. Due to increase in their prices by OPEC countries in case of petroleum, oil and lubricants (POL) the value of imports have increased creating problems for the Indian economy.

After adoption of rapid industrialization in the second plan structure of the India's foreign trade change completely, more emphasis were given to export and the policy of import substitution changed the nature of imports. Changes in the direction of trade were also bought together since 1950s. India has diversified its trade relation not only to few countries but also has joined many organizations such as ASEAN, SAARC, BRICS and many others. One such big problem for the Indian economy was trade deficit which continued for most of the time except 1972-73 and 1976-77. Before reform, trade deficit of India were INR 2 cr. and increase to INR 599 cr. which was mainly due to large capital and raw material import. During 1973-74 export remains stagnant but import bill rose sharply. On the other hand trade deficit in 1980s was INR 5838 cr. due to oil shock in 1977 to 1980 whereas in 1990s it was INR 10645 cr. which resulted mainly due to large import of POL (petroleum, oil and lubricants) and high oil prices but along with the growth of export trade deficit came down during 1991-92.

India's trade policy during late 1970s and early 1980s was heavily relied on quotas. Imports were permitted to only those firms, whom authority gave license. On the contrary economic reform and liberalization in 1991 allowed some relaxation with reduction in tariff protection and abolition of licensing system; on certain firms tariffs were totally abolished. This policy was mainly concerned with export oriented growth and to encourage domestic production. India opened up a number of sectors to foreign direct investment and further liberalized this policy to greater extend.

Trade performance of India in 2000-01 to 2003-04 was much improved, export showed little improvement and trade deficit was confined to thousand INR cr. There was increase both in import and export during 2004-05. There was a great shock worldwide including India in 2008 global recession, during 2009-10 growth of export and import decline. Balance of trade also showed negative growth with 2.9%. However in 2010-11 to 2011-12 with the increase in both export and import, balance of trade too increased. After 2013 there were again significant growth in both export and import. In 2014-15 trade performance improved significantly with increased in export and slightly decline in its import in first quarter but in second quarter export lost its momentum due to supply constraint and at the same time import pick up particularly on non-gold and non-oil.

Recently New foreign trade policy has been announced which will focus mainly on exports and will based on export promotion without

equally supporting import substitution, with an aim to make India a significant partners in global trade by 2020. Make in India and digital India is also included in new foreign trade policy. Merchandise export from India scheme (MEIS) and Services export from India scheme (SEIS) are the two important features of new foreign trade policy.

3. Literature Review

The gravity model has been used in some studies about international trade especially for export in many countries. Bhattacharyya and Banerjee (2006), used a gravity model to analyse India's yearly bilateral trade data with all its trading partner in the second half of the 20th century. The study pointed out that India's trade more with developed rather than underdeveloped countries. India's trade responds less than proportionally to size and more than proportionally to distance. The study concluded size has a more determining influence on India's trade than the level of development of the trading partner. From the recent literature, one can easily be formulated that political globalization and cultural proximity have a positive influence in bilateral trade, And also the economic size and the common border has a positive impact on bilateral trade. And also in the twelfth five-year plan (2012-2017) what we witnessed that international trade value has been growing faster than GDP and also the volume of export of goods and services as a percentage of GDP has increased 14% in 2000 to 40.5% in 2011. Balassa (1966) and Balassa and Bauwens (1987) found that an increase in bilateral trade happens when the transportation cost decrease. Bhattacharyya and Banerjee (2006) took 177 countries and formulated the theory that India's focuses on potentially to distance than the country size and also traded with the developed country than the underdeveloped country. Sabyasachi Tripathi and Nuno Carlos Leitao 2013 had a different result in his research he found that trade between India and distance country have significant result unlike others economist suggested. Other reviews are as follows:

Kumar and Ahmed (2015), examines the nature of trade flows in the South Asia region within gravity model framework. The panel gravity model data has been estimated for the period of 1985 to 2011. The study found that geographic distance might be impeding trade, and tariff has a negative effect on the trade. The study also reveals that an increase in GDP will result in an increase in trade flows. This process in the region will further enhance GDP growth rate by efficient utilization of resources and trade-induced learning.

Batra (2006) has attempted to analyze the trade India's trade potential by using the gravity model approach for the year 2000. In addition to estimating the basic gravity equation, she has also estimated the augmented gravity equation to measure the effects of other variables that may affect the trade. The augmented gravity equation include GNP per capita, distance, border/adjacency, common language, colonial links, islands, and regional trading agreements. The study found the plausible income and distance elasticities and estimates for other geographical, cultural and historical characteristics. The result of the study showed that India has maximum trade potential with the Asia Pacific region followed by Western Europe and America. Considering the country wise analysis potential for trade expansion is maximum with China, UK, Italy and France. With countries like Georgia, Turkmenistan, and Uzbekistan India can expand the trade ten times or more than the actual trade. Among the specific country groupings, India's trade potential is maximum with Pakistan in SAARC with Philippines and Cambodia in ASEAN and with Oman, Qatar and Kuwait in GCC.

Rehman and Das (2006) have developed an augmented gravity model to identify trade creation and trade diversion effects originating from SAFTA and other nine RTAs. By employing the panel data approach with

country pair specific fixed effects and years specific effect they found a significant intra-block export creation in SAFTA. However, they also found the evidence of net exports diversion in SAFTA. They found that Bangladesh, India and Pakistan are expected to gain from joining the RTAs. However, Nepal, Maldives and Srilanka are expected to be loosers.

Among the other nine RTAs FTA, NAFTA, SADC, MEARCOSOUR, CAN, EAC are associated with the intra-block export creation and net export diversion. EU and Bangkok agreements are found to be intra-block exports diverting and net exports diverting. BIMSTEC was found to be an intra-block export diversion. RTAs was not found to be net export creating. Almost one-third of the members of the RTAs were found to be positively affected from RTAs

Rajesh et al (2016) analysed the trade potential between India and China to compare the bilateral trade flows between the two countries from the period 2004 to 2013. They used the random effect panel regression to establish the relationship between trade flows and different variables including distance, gross domestic product, per capita income, contiguity, common language and common colonizer. They found that India's and China's trade flows are greater with geographically closer countries. The study highlighted that India's trade flows are higher with the countries having GDP but lower per capita income whereas China's trade is influenced by the higher per capita income of the trading partners and common language.

Srinivasan and Archana (2009) have examined the India's trade flows around the world and the impact of various PTAs in which India or its trading partner or both are members. The study is based on the 189 trading partners for the period of 1981-2006. By using the gravity model of trade on in the older sense they concluded that India is not getting benefited by the PTAs and should push for the multilateral trade liberalization. They analysed the data set on the firm level also and found that there is a heterogeneity in the firm level exports Exporting firms are significantly larger, more R&D intensive, low wage intensive, and more profitable than non-exporting firms.

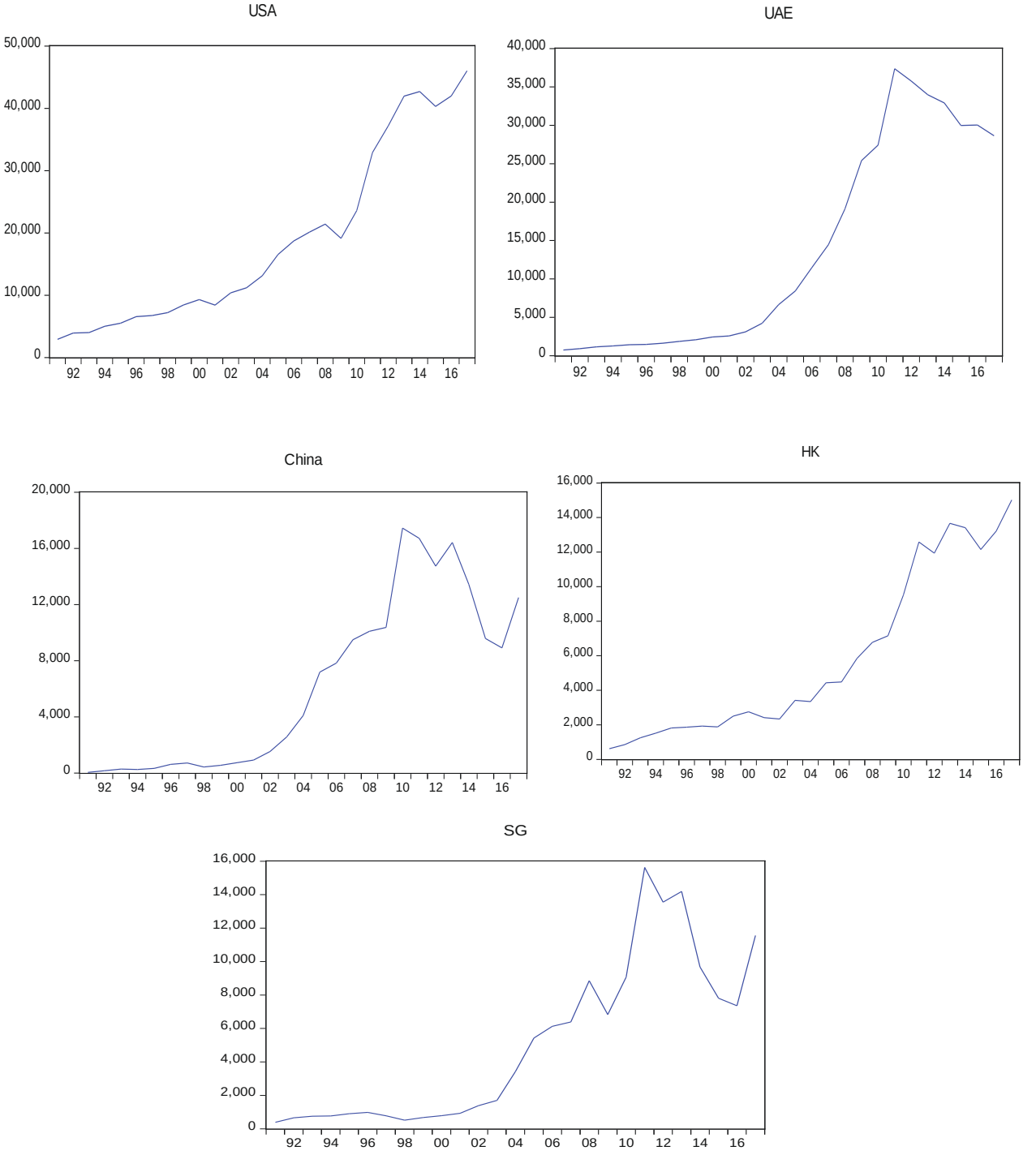
Nag and Nandi (2006) have explored India's trade dynamics in the SAARC region by using the gravity model of trade. They found India's trade with the SAARC members has grown significantly. They estimated India's trade function by using the gravity model and found GDP and per capita GDP is positively related to India's exports. The rise in India's relative price with respect to world's price is negatively related to India's exports. The trade complementarity among most o the SAARC members are positive but the current trade conditions produce contradictory results. (by employing gravity model) This proves that more regional integration among the SAARC members is necessary to the success of the whole region and India in particular which have high trade complementarity index in the SAARC region.

Batra (2006) had used an augmented gravity approach to analyse world trade flows with 146 countries sample. He used co- efficient of trend to predict potential for India for estimation. OLS with cross section for 2000 has been used. The study found that all three traditional gravity effects are intuitively reasonable having a statistically significant t statistics. Cultural and historical similarities also affected positively bilateral trade. The study identified tremendous trade potential with China and trade can be increased to considerable extent if the constraints and barriers are removed. Estimation also identified huge trade potential with Pakistan.

4. Bilateral export performance of India with top trading partners (in million US dollar)

Major export of India is to US, UAE, China, Hong Kong and Singapore which accounted for 49% of all exports in 2017. Analysis of top

trading partners countries in figure 1 shows that the highest value of export of India is with US. The export earning of India with Hong Kong was more than China during 1991 to 2003. Afterwards by 2001 the export growth of India with China rose sharply with a value of around 4098 million US dollar during 2004 onwards. Furthermore, China and Hong Kong growth rate was not much affected by global financial crisis during 2008-09, therefore smooth rise in its export with China were seen. Export was slightly fallen during 2010 to 2012 with China



Source: UN Comtrade

and again in 2013 export growth was rising and finally declined in 2014. The export performance of India with Singapore is more or less constant.

5. Empirical Analysis

Gravity model of trade was first given by Tinbergen in 1962 which explain bilateral trade flows through physical law of gravity in which trade depends upon mass of the country and distance. The classical and new trade theories did not explain the size of the trade flow. It is gravity model which explained the bilateral trade size between the two countries. In his model, he used GDP as a measure of size of the economy and distance between the two countries to analyze the international trade flows. According his model, export from country i to j is determined by their economic size (GNP), geographical distance and populations. The gravity model can be shown as:

$$X_{ij} = M_i M_j / D_{ij}$$

Where

X_{ij} is the gravitational force

M_i M_j is the masses of two objectives

D_{ij} is the measurement of distance.

This is the basic gravity model which has only two explanatory variables, first, size of the economy which is positively related to trade whereas distance is inversely related to trade. Later it was reformulated and incorporated other variables such as common culture, common border regional trade agreements etc. There is huge literature in international trade based on gravity model. However purpose of review is to observe how the gravity model is applied in real world. The model is now applied by many economists to trace the pattern and performance of the trade in world economy and model gives best fit and explain larger part of bilateral trade.

Database

For any empirical analysis availability of a good database is a necessary condition. In this paper the dataset for the present study has been taken from the various sources to examine the bilateral export performance of India comprising trade with top partner's countries annually for the period 1991 to 2017. Data on Gross Domestic Product (GDP per capita constant 2005 US $) and population density (measure as land are per km) were obtained from world Development Indicator, World Bank 2018. Export data were collected from UN Comtrade; the geographical distance between Delhi (capital of India) and the capital cities of respective trading partners are obtained from the Great circle distance in kilometers which is a shortest distance between the two points on the surface of a sphere. Internal conflict data which is used as dummy has been obtained from international country risk guide (ICRG). For analysis purpose statistical software package Eviews and Stata is used.

Model development

In the study we have used gravity model specified by Matyas (1997), Deardorff (1997), and Anderson and Wincoop (2003) to estimate the trade function for India. "The basic idea of the new approach is that in bilateral trade the 'absolute size' of a country in terms of income and population is not so important rather the 'relative size' of the trading partners determines the export supply and import demand (Kundu, 2015)". The model presented as follows:-

$$EX = f(Y, PD, D, IC)$$

For estimation purpose different techniques of static panel data has been used in our model in analyzing bilateral export of India with top countries. The gravity model is most often used in log linear form. Therefore OLS regression has been applied to this log linear and adding time subscript (t) and an error term, the model has the following form

$$\ln EX_{ij} = \beta_0 + \beta_1 \ln Y_{ij} + \beta_2 \ln PD_{ij} + \beta_3 D_{ij} + \beta_5 IC_{ij} + \mu_t$$

The above variables can be interpreted as follows. We expect the sign of β_1 to be positive which implies that increase in economic growth

will increase export; sign of β_2 will be positive implying population demands more goods therefore more export. The third variables which have taken in our model is distance (D_{ji}) which is a proxy for transportation cost and has a negative impact which will impact export because more transportation cost will decline export . The expected sign of β_3 will be negative. Lastly, the internal conflict is expected to be negative. This is mainly due to war, terrorism, dispute.

Panel Data Framework

For empirical analysis various types of data are available namely cross section, time series and panel data. Panel data is a combination of time series and cross section observation and also known as pool data. In this paper balance panel data are used. "Panel data gives more informative data, more variability, less collinearity among variables, by combining time series and cross section observation (Gujarati, 2012)".

In this type of data we selected all 66 observations together and run the OLS regression model neglecting time series and cross section nature of data. We have taken five countries namely US, UAE, China, Hong Kong and Singapore (top trading partners) and four variables such as export, GDP per capita, Population density, Distance and internal conflict. Therefore we want to check the relationship between Export and the other four explanatory variables. Our data is annually from 1991 to 2017.

Fixed Effect Model

"The Fixed effect model or least square dummy variables (LSDV) models allow for heterogeneity among subject by allowing each entity to have its own intercept value (Gujarati, 2012)". Fixed effect model can estimate individual and time specific effects from time- and individual-variant variables, however it cannot detect the individual- specific effects regarding the individual-variant but time-invariant variables such as distance variables between two trade partners in the gravity model Keum (2010). This model capture time specific effects for the variables which are invariant over time.

Random Effect Model

This model assumes individual effects (μ_i) are independently and randomly distributed and our five countries have a common mean value for the intercept. Random effect model can estimate either individual or time specific effects of certain variables even though they are either individual specific but time invariant variables or time specific but individual invariant variables any of which is impossible in FEM.

Hausman Test

After estimating the above model we will check which model is appropriate to accept by applying Hausman test, therefore our null hypothesis can be drawn as

H_0 = Random effect model

H_1 = Fixed effect model

If we reject the null hypothesis it means p values is statistically significant and we will accept that fixed effect model is appropriate for the present study, otherwise random effect model. We have also tested fixed effect through joint significance of the dummy variables by applying F and chi square test.

6. Results and Inference

Unit root test

We propose three types of panel unit root tests (ADF fisher and Im et al., 2003, IPS) to test the stationary properties of panel data. These tests allow individual unit root processes autoregressive coefficients to vary across cross-sections. The Im–Pesaran– Shin (IPS) and ADF-fisher and PP tests assume an individual unit root process across the cross-section for the null of a unit root to obtain panel results. The application of these unit root tests is essential in identifying the order of integration of the variables.

Results of panel unit root test are presented in Table 1 show that economic growth, population density, distance and internal conflict are non-stationary at level. After the first difference all the variables become stationary and there is no problem of unit root. This indicates that 1% significance level; the null hypothesis is rejected .

Here we have estimated the basic three kinds of panel data method which is generally used in the literature i.e. fixed effect and random effect model and finally to check which model is appropriate by applying Hausman specification test.

The results of Fixed effect model or least square dummy variable (LSDV) model checks for the individual effects by allowing its own (intercept) through dummy variable. "The term fixed effects is due to the fact that, although the intercept may differ across subject, each entity's intercept does not vary over time that is, it is time invariant" (Gujarati at el. 2012). To test whether countries are poolable or not an F test was performed and the result output showed the null hypothesis of equality of individual effects to be rejected which means that a model with individual effects must be preferred.

The fixed effects model contain too many parameter and leads to the loss of degrees of freedom which can be avoided if we assume individual effect are randomly distributed and uncorrelated with explanatory variables. Generally random effect model is used when sample is drawn from large population randomly. But the selection of sample is not random in this case. We estimated random effect model to see the difference and after that Hausman specification test is conducted.

Hausman specification test is basically tests the null hypothesis of H_0: $E(u_{it}/X_{it}) = 0$, if it is rejected then fixed effect model is appropriate and give unbiased and consistent estimate. We have applied the Hausman test to check which model is more appropriate. The result of the Hausman test shows that there is a substantial difference between the two estimators, if we compare the result of fixed effect and random effect regression. The results of Table 4 suggest that the Fixed Effects Model (FEM) is appropriate panel data estimator for the present study. It is clearly shown that Chi-square statistics (X^2) value for 3 df is statistically significant with low p values which strongly rejects the null therefore we can choose the fixed effects model over random effects model. This implies that null of random effect model is rejected at 1% level of significance. In such case, random effect model provides inconsistent estimates and interpretation of the result will be focus on the fixed effect model.

Table 3 reports the fixed effect model results. The direction of effects is as in the line with the expectation that the economic size (GDP per capita) is statistically significant and positive while distance has negative impact on export. However the magnitude of the coefficient in fixed is different from those in the random effect estimation. The results show the impact of economic growth, population density, distance and internal conflict on export. The coefficient of the economic growth is significant and positive together with low p values reject the null hypothesis. This implies that 1% increase in economic growth will increase India's export to partners country by 2.44%. This may happen due to increase in the production of goods in partner's country which resulted more export from India.

Regarding the impact of population density which statistically significant and has positive impact on export. This positive relationship between population density and export implies that 1% upsurge in population density will upsurge export by 3.53%. this may be due to the fact that demand for goods and services increases due to increase in population in partners country, this lead to more demand for export from India

On the contrary, the negative sign of the coefficient of the distance is consistent with

Table 1: Results of Unit Root Test

	level		First difference	
Variables	Intercept	Intercept & trend	Intercept	Intercept & trend
IPS unit root test				
EX	0.130	-1.696	-5.604*	-4.150*
Y	0.928	-1.225	-4.471*	-3.475*
PD	0.424	-2.450*	-4.094*	-3.152*
D	3.584	4.256	2.217*	2.451*
IC	-1.120	-10.165*	-12.056*	-10.438*
ADF unit root test				
EX	9.252	17.746	51.467*	36.982*
Y	4.046	14.487	39.326*	29.521*
PD	11.076	25.295*	39.418*	42.335*
D	7.258	9.524	25.254*	9.257*
IC	20.699**	279.594*	92.738*	113.648*
PP unit root test				
EX	9.595	8.232	57.893*	42.572*
Y	7.274	5.784	44.703*	35.599*
PD	69.865*	24.756*	34.013*	270.169*
D	5.214	30.254	81.245*	44.251*
IC	16.801***	276.811*	93.190*	271.744*

Note: *, ** and *** indicates rejection at 1, 5 and 10 % level of significance

Table 2: Results of Fixed Effect Model

Variables	Coefficients	P value
Constant	-24.132	0.000
Economic growth	2.442	0.000
Population density	3.531	0.000
Distance	-1.245	0.000
Internal conflict	0.063	0.163
R-square	0.90	

Table 3: Results of Random Effect Model

Variables	Coefficients	P value
constant	19.468	0.000
Economic growth	0.608	0.000
Population density	-0.069	0.135
Distance	-0.44	0.050
Internal conflict	-0.618	0.000

Table 4 Results of Hausman Est

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	702.088377	3	0.000

a prior expectation; this has been indicated in the result by many models including the first in 1962 by Tinbergen. In fixed effect model bilateral distance between India and respective trading partners is significant which shows negative impact of distance on export. 1% rise in distance (transportation cost), export will increase by -1.24%. The proxy for distance is transportation cost this indicates that larger the distance between the countries higher will be the transportation cost this lowers the export to partners country.

Table 2 also gives the relationship between the coefficients of determination R^2. If adding (dropping) a group of variables to the model gives an F value greater (less) than 1, R^2 will increase (decrease) (Gujarati at el. 2012). The inclusion and exclusion of a group of variables significantly increases or reduces the explanatory power of the entire regression model. R square is the difference between the explained sum of squares (ESS) and residual sum of squares (RSS). The model is said to be better if it is closer to 1, however it lies between 0-1. Whereas adjusted R square recorded is 0.90%.

7. Conclusion

The main objective of the paper is to examine the factors that are driving India's bilateral trade relationships with its major trading partners. India has no conflict with its top trading partners, neither in the economic nor political front. India has certain amount of border conflict with China which is in a dormant state. Minor conflicts of India with the US and China are not that important which could disrupt bilateral trade relationship or cause a trade war. In this context, bilateral export behaviour is examined using panel data analysis. Variables used in the gravity model are non-stationary in nature at the level but stationary at the first order of difference. The results of the gravity model analysis, using such variable in the panel indicate that economic size of partner countries is important for fostering bilateral trade. Population density plays a critical role in augmenting bilateral trade. Of course, distance is detrimental factor for the flow of bilateral trade. This result is consistent with the trade literature. Interestingly, internal conflict has no effect on bilateral trade flows of India since coefficient of the variable is turning out to be insignificant in the model. The robust fixed model explains the reason for the smooth flow of Indian exports to its top trading partners.

Reference

Anderson, J. E., & Wincoop, E. V. (2003). Gravity with gravitas: A solution to the border puzzle. *American Economic Review*, 93(1), 170-192.

Bailey, D., & Katz, J. N. (2011). Implementing Panel-Corrected Standard Errors in R: The pcse Package. *Journal of Statistical Software,* 42 (1), 1-11.

Banik, N. (2006). How promising is BIMSTEC? *Economic & Political Weekly,* 41(51).

Chirathivat, S., & Mallikamas, S. (2005). The potential outcomes of China-ASEAN FTA politico-economic implications for participating countries. *China and Southeast Asia*, 80-108.

Feenstra, R. C. (2004). *Advanced international trade: Theory and evidence.* Princeton: Princeton University press.

Head, K., Mayer, T. & Ries, J. (2010). The erosion of colonial trade linkages after independence. *Journal of International Economics* 81(1), 1-14.

Hosein, R., & Khadan, J. (2011). Exploring the potential benefits of the proposed CARICOM-Canada FTA. *Journal of International and Global Economic Studies,* 4 (1), 74-87.

Inkyo, C. (2004). *East Asian economic integration: Implications for a U.S.-Korea FTA.*

Kabir, M., & Salim, R. (2010). Can gravity model explain BIMSTEC's Trade. *Journal of Economic Integration,* 25 (1), 143-165.

Neogi, D., & Chawdhury, A. B. (2017). *Has India-BIMSTEC economic integration helped in increasing India's trade in the region? A panel data analysis.* 3rd International Conference on Social Sciences, Economics and Finance. Montreal, Canada.

Paramanik, R. N., & Kamaiah, B. (n.d.). Direction of trade, exchange rate regimes and financial crises: The Indian case.

Shrivastava, S. (2005). BIMSTEC: Political implications for India. *The Indian Journal of Political Science,* LXVI (4).

Strutt, A. (2008). *Quantitatively Assessing a BIMSTEC- Japan FTA: A CGE analysis*. Kolkata: Centre for Studies in International Relations and Development.

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