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Agricultural Trade Potential between India and ASEAN: An Application of Gravity Model§

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Abstract

The study has analysed the competitiveness and potential of agricultural trade between India and ASEAN members for the period 1995-2014. The Revealed Comparative Advantage Index has been used to assess the competitiveness of agricultural commodities exported by India in comparison with ASEAN countries. The study has found that India has export competitiveness in cotton, rice, oilcake meals and tea compared to ASEAN countries. The gravity model has been employed to find the overall agricultural trade potential between India and ASEAN countries. The model estimates have indicated that partners' income and free trade agreement are positively influencing the bilateral trade. The border trade has found no significance in the bilateral trade pointing weak infrastructure at Indo-Myanmar border. Trade potential estimates have shown that India has exceeded the trade potential with Cambodia, Indonesia, Malaysia, Myanmar, and Vietnam while there is an opportunity to harness the trade potential with Brunei, Lao, Philippines, Singapore, and Thailand. The study stresses the importance of trade facilitation measures to enhance the trade with the ASEAN.

Key words: ASEAN, revealed comparative advantage, gravity model, FTA, trade potential

JEL Classification: Q 17, F 53, F 13, F 15

Introduction

India and ASEAN (Association of South East Asian Nations) countries share a dynamic and extensive relation in cultural and commercial engagement since long. The relation then promoted by India's "Look East Policy" in 1990s, to forge economic integration with its eastern neighbours (Sridharan, 1996; Sundaram, 2013). The bilateral trade relationship with the countries of ASEAN was strengthened by India's involvement as a sectoral and then as a full dialogue partner and subsequently, as a member of ASEAN Regional Forum in 1996 (Sen *et al.,* 2004). Since then the bilateral trade has increased more than 10-times, from US$ 4.7 billion in 1995 to US$ 67.9 billion in 2014, extending to several sectors including agriculture (ASEAN Secretariat, 2014). Currently, India is the tenth largest export destination of the ASEAN with a share of 3.4 per cent in total exports and 2.1 per cent in total imports of the ASEAN. As far as agricultural trade is concerned, the bilateral trade has grown by US$ one billion between 1995 and 2014, with increase in share from 13 to 25 per cent of India's total agricultural trade. The processed food stuff, beverages, tobacco and other value-added products exported by India have the huge demand in the ASEAN market. Among various farm products imported from the ASEAN, animal and vegetable fats and oils are dominating ones. Further,

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nearly three-fourth of agricultural import from Asia is sourced from the ASEAN (Shinoj, 2009).

India's strategic partnership with the ASEAN got another fillip in 2009, with the signing of 'Free Trade Agreement', to achieve greater cooperation in trade, investment and services sector. The ASEAN India Free Trade Agreement (AIFTA) is considered as one of the largest Free Trade Agreements in the world, covering a market of nearly 1.8 billion people with a combined GDP of US$ 2.8 trillion. However, there are apprehensions about the Agreement that India will not gain significantly from the ASEAN, as most of the member countries have lower tariff rate (Pal and Dasgupta, 2008). And this point towards the need of analysing the competitiveness of agricultural commodities exported to ASEAN members. Hence, this study has explored India's export competitiveness vis-à-vis of ASEAN countries in some selected agricultural commodities. Also, finding the determinants and trade potential in agricultural sector is worthwhile since the earlier studies have been mainly on the total trade (Chakravarthy and Chakrabarty, 2014) sector- specific (Yean and Jia, 2014), and commodity-specific (Veeramani and Saini , 2010).

Methodology and Data Sources

Revealed Comparative Advantage (RCA) Index

The RCA Index developed by Balassa (1965) is one of the popular methods of indicating competitiveness in the international trade. It shows how much competitive is a product in country's export compared to that product's share in the global trade. A product with high RCA value is competitive and can be exported to countries with low RCA value. Through this measure we can identify the extent to which India has comparative advantage or disadvantage in a commodity with respect to the ASEAN countries. The RCA index is computed by Equation (1):

$$B = \frac{(X_{ij}/X_{ik})}{(X_{nj}/X_{nk})} \quad \ldots(1)$$

where,

X_{ij} = Exports by country 'i' of commodity 'j',

X_{ik} = Exports by country 'i' of a set of commodities 'k',

X_{nj} = Exports by a set of countries 'n' of commodity 'j', and

X_{nk} = Exports by a set of countries 'n' of a set of commodities 'k'.

If the RCA index value is more than unity for a given commodity, then the country is considered to have a revealed comparative advantage in export of that commodity. In this paper, mean RCA has been calculated for India and 6 other ASEAN countries across 9 commodity/commodity groups which together contributed more than 60 per cent to its export basket during the period 1995-2014.

Gravity Model

The gravity model is similar to Newton's law of gravitation which states that the gravitational pull between two physical bodies is proportional to the product of their body mass divided by the squared distance between the gravity centres. The model has been successfully applied to different types of flows such as migration, foreign direct investment, and more specifically, to international trade flows (Zarzoso, 2003). The first empirical study with gravity model of international trade was done by Tinbergen (1962) and Poyhonen (1963). The theoretical application of gravity model in trade describes that trade flows between two countries are proportional to the product of each country's 'economic mass', generally indicated by Gross Domestic Product (GDP), divided by the distance between the respective economic centres — usually using distance between the countries' capital cities as a proxy. Thus, it is postulated that the trade flow between the two countries is directly proportional to the two country's income and inversely proportional to the distance between them. The basic form of the gravity model is given by Equation (2):

$$T_{ij} = Yi * Y_j / D_{ij} \quad \ldots(2)$$

where,

T_{ij} = Bilateral trade flows between country 'i' and 'j',

$Y_i \& Y_j$ = National income of country 'i' and 'j', respectively measured in terms of GDP, and

D_{ij} = Distance between the capital cities of country 'i' and country j (in km).

The GDP represents the market size and purchasing power of the trading partners which postulates that the countries are expected to trade more with the increase in their economic size. The distance variable indicates not only higher transportation costs, but also is correlated with larger cultural differences, which can retard the transfer of information and establishment of trust. Therefore, the distance variable is negatively correlated with the bilateral trade. Taking the geographical distance alone to approximate economic barriers of the international trade is not well accepted. Therefore, inclusion of dummy variables like sharing common border, common language, common colony and land lock, has become a common practice to capture qualitative aspects of the trade. Two countries sharing a common border will have more trade due to stronger social and economic relations at the public level. If the trading partners share a common language, transaction costs of trading are expected to be reduced, as speaking the same language facilitates trade negotiations (Melitz, 2008). The countries which had common colony in the past, are also found to have increased bilateral trade relations between them. The countries that often enter into bilateral and regional trading agreements, also have shown increased bilateral trade. Given the multiplicative nature of the model, the natural logarithms can be taken to obtain the linear relationship and the Equation (2) was augmented as Equation (3):

$$\ln T_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln Dist_{ij} + \beta_4 \text{comborder} + \beta_5 \text{landlock} + \beta_6 \text{comlang} + \beta_7 \text{comcol} + \beta_8 \text{FTA} + u_{it} \quad ...(3)$$

where,

$\ln T_{ij}$ = Natural logarithm of bilateral trade flows between countries 'i' and 'j' in time't',

$\ln GDP_{it}$ and $\ln GDP_{jt}$ = Natural logarithm of GDP of countries 'i' and 'j' in time't',

$\ln Dist_{ij}$ = Natural logarithm of bilateral distance between countries 'i' and 'j',

Comborder = Binary variables that take the value 1 if both countries share border, and 0 otherwise,

Landlock = Binary variables that take the value 1 if country is landlocked, and 0 otherwise,

Comlang = Binary variables that take the value 1 if countries have common official language, and 0 otherwise,

Comcol = Binary variables that take the value 1 if both countries were under same colonizer, and 0 otherwise,

FTA = Binary variables that take the value 1 if countries have common membership in ASEAN FTA, and 0 otherwise,

u_{it} = Error-term, which is assumed to be normally distributed with zero mean and constant variance for all observations and to be uncorrelated.

The nominal value of bilateral trade data for the period 1995 - 2014 (in US $) has been obtained from UNCOMTRADE database and ITC trade map. The World Development Indicators, World Bank (for GDP) and Centre for Prospective Studies and International Information (CEPII, France) (for distance, boarder, language, and common colony) were the other data sources referred for the study. The GDP and trade values were converted to real value at 2010 price using GDP deflator. The distance data available in CEPII measured in kilometres, were calculated by great circle distance formula, which takes into account the longitude and latitude of the capital of each country.

Data

A panel data pertaining to the bilateral agricultural trade between India and ASEAN countries for 20 years (1995-2014) was prepared for the analysis. Auto correlation and heteroscedasticity are the two common problems that occur in the panel data. Therefore, the modified Wald test (Greene, 2000) was applied to find out group-wise heteroscedasticity. It tests the hypothesis of homoscedasticity, which assumes constant variances of the error-term across units. With a result of $\chi^2(10) = 962.86$ being statistically significant ($p < 0.00$), the assumption of homoscedasticity was rejected. The Wooldridge test was also implemented to find serial correlation in the idiosyncratic errors of linear panel–data model (Drucker, 2003). Under the null hypothesis of no serial correlation, the residuals from the regression of first–differenced variables should have an autocorrelation of –0.5. This implies that the coefficient on the lagged residuals in a

regression of the lagged residuals on the current residuals should be -0.5. Following the test results [F (1, 9) = 255.15], the null hypothesis (p <0.00) was rejected and autocorrelation in the error- term was assumed. The Breusch Pagan LM test (Breusch and Pagan,1980) value, χ^2 (45) = 137.43, also rejected the null hypothesis (p <0.00) of variance of residuals are independent of explanatory variables indicating heteroscedasticity. The Pesaran's test of cross-sectional independence was applied, and rejected the null hypothesis of no cross- sectional dependence with test statistic of 3.12 (p <0.00). Therefore, to obtain consistent and efficient estimators, the panel data was estimated by Feasible Generalized Least Squares (FGLS) method. The assumption behind FGLS is that all aspects of the model are completely specified; here that includes that the disturbances have different variances for each panel and are constant within the panel. The advantage of FGLS estimation is that it is able to handle both heteroscedasticity and serial correlation (Akhter and Ghani, 2010; Mulenga, 2012). The FGLS is the most appropriate model if the exact form of heteroscedasticity in the data is ignored since it weighs the observations according to the square root of their variances and is robust to any form of heteroscedasticity (Zarzoso *et al*., 2007).

The result of the gravity model from Equation (3) was then used to calculate the trade potential between India and ASEAN countries following Batra (2004). These estimated values essentially depict the trade potential with each of the partner countries, given the constraints of distance, GDP, openness, closeness, landlock, common language, common colony and free trade agreement.

$$\text{Trade potential} = \frac{\text{Estimated value of trade}}{\text{Actual value of trade}} \quad \ldots(4)$$

If the ratio exceeds one with respect to a partner country, it points towards potential for expansion of trade with that country in terms of model predicted values, and the values below one suggests that India has already exceeded its trade potential with the country in terms of model predicted values.

Results and discussion

The data on agricultural trade with India and ASEAN countries as a proportion of total global as well as ASEAN trade for triennium ending 2014 are given in Table 1. It can be seen that Indonesia, Vietnam and Malaysia were the most preferred partners of India with more than 5 per cent share of its total trade with the world. Among ASEAN countries, their share goes to 36.62 per cent, 24.57 per cent and 20.74 per cent respectively. Thailand and Myanmar occupied fourth and fifth positions with respective shares of 2.07 per cent and 1.14 per cent at the world level and 8.30 per cent and 4.57 per cent at the ASEAN level. Philippines and Singapore have also reported a significant share of trade at 2.29 per cent and 2.42 per cent respectively at the ASEAN level. Trade with relatively less-developed countries of the ASEAN; Brunei, Cambodia

Table 1. Agricultural trade between India and ASEAN countries as a per cent share with that of total ASEAN and world trade, TE 2014

Country	ASEAN trade			World trade		
	Export	Import	Total	Export	Import	Total
Brunei	0.20	0.00	0.09	0.03	0.00	0.02
Cambodia	0.59	0.04	0.30	0.10	0.02	0.07
Indonesia	14.07	56.80	36.62	2.36	25.39	9.16
Lao	0.23	0.00	0.11	0.04	0.00	0.03
Malaysia	15.49	25.43	20.74	2.60	11.37	5.18
Myanmar	1.64	7.19	4.57	0.28	3.22	1.14
Philippines	4.52	0.29	2.29	0.76	0.13	0.57
Singapore	4.24	0.80	2.42	0.71	0.36	0.61
Thailand	12.05	4.94	8.30	2.02	2.21	2.07
Vietnam	46.97	4.52	24.57	7.87	2.02	6.14

Table 2. Revealed comparative advantage in selected agricultural commodities (Mean RCA, 1995-2014)

Commodities	India	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Cotton	4.65	0.90	0.28	0.04	0.40	0.42	1.50
Coffee	1.01	2.17	0.32	0.04	0.90	0.25	7.59
Tea	5.70	1.69	0.05	0.00	0.67	0.03	1.36
Spices	5.75	6.36	1.42	0.13	9.08	0.23	7.27
Rice	11.22	0.00	0.03	0.02	0.28	9.72	7.45
Marine products	1.57	2.12	0.37	1.25	0.86	1.86	3.08
Oil cake meals	3.34	0.64	0.73	0.97	0.04	0.01	0.02
Sugar	0.73	0.29	0.31	1.16	0.26	2.52	0.13
Tobacco	1.52	0.70	0.01	1.80	0.31	0.29	0.05

and Lao, were very low during this period. It is also evident that India had trade deficit with Indonesia, Malaysia, and Myanmar, as their import share was higher than export share, compared to other countries.

Keeping the higher export share of agricultural trade with the ASEAN countries, our focus turned to the analysis of commodity level export potential of India to the ASEAN countries (Table 2). The selected commodities together accounted for about 60 per cent of India's export basket of agricultural commodities. Due to technology like Bt cotton, improved quality, hybrid variety, and better management, India could become the world largest producer and exporter of cotton with the mean RCA index value of 4.65, with only Vietnam standing as a competitor with the index value of 1.50. The growing demand for Indian cotton in the ASEAN market, especially in the textile industries of Vietnam and Indonesia, will definitely benefit the Indian exporters. Though India has created a niche for coffee in international market, its competitiveness is found to be low (1.01) compared to that of Indonesia (2.17) and Vietnam (7.59) which are the major coffee producers in the world. Besides this, both the countries are top suppliers of unroasted coffee to India which is mainly used for re-exporting. Being the second largest producer, India holds a better position in tea export (5.70), whereas again Indonesia (1.69) and Vietnam (1.36) are on the opposite side. The value addition, special varieties like Darjeeling tea, helps India to achieve a major share in the market. India has lower RCA in spices (5.75) compared to Indonesia (6.36), Singapore (9.08) and Vietnam (7.27). Malaysia has also emerged as a competitor in spice export with the value of 1.42. Food safety issues and increased domestic demand are the major hindrances in the export prospect of spices from India. Being the second largest producer and exporter, Indian rice has a higher RCA value of 11.22, compared to its competitors, Thailand (9.72) and Vietnam (7.45). India exports more of non-basmati rice which is low priced compared to the ASEAN competitors. The popularity of basmati rice has not gained much in the ASEAN markets, except in Malaysia and Singapore.

In exports of marine products, Indonesia, Thailand, and Vietnam are the major competitors to India, but interestingly the ASEAN is largest buyer of Indian marine products that envisage its export potential. Indian oil cake meal with RCA index value of 3.34, one of the highly demanded commodities in the world market, faces no competition, and can gain from the ASEAN countries who are the major buyers. India does not have a comparative advantage in export of sugar as it hasn't been a consistent exporter due to high domestic consumption, where Thailand and Philippines exhibited competitiveness with index value of 2.52 and 1.16 respectively. Currently, India doesn't have lower cost competitiveness in producing raw sugar and restrictive export policy hinders the sugar export. Known for the export of unmanufactured tobacco, India faces competition only from Philippines (1.80). Again, Indian tobacco is highly demanded among ASEAN countries which further raises its export prospect. So, it appears that prospects for India in the ASEAN market are on the bright side.

Determinants of India's Agricultural Trade with ASEAN

India and ASEAN countries together hold a strong economic relation as the Asian neighbours and also to

maintain peace and security in the region. The increased trade during the past 20 years might be influenced by many factors that can be assessed by the gravity model (Table 3). The variable GDP was found positive and significant which shows that one per cent increase in the GDP of India and ASEAN countries will increase the bilateral trade by 1.35 and 1.28 per cent, respectively. The variable distance was observed to be negative and significant, which shows that trade will decrease by 1.68 per cent with increase in bilateral distance. Interestingly, common border variables did not show any significant effect on the bilateral trade. This confirms the earlier study by Gul and Yasin (2011) that sharing a common border is not necessary to have increased trade between the countries. India shares a common boundary with Myanmar which spreads across 1643 km along the North-Eastern part of the country. Though Myanmar is the fourth trading partner with India, border trade is very dismal due to poor infrastructure, rough terrain, and unsecure trading environment which was also reported in the earlier studies (Routray, 2011; Cook, 2013; Singh, 2013). The actual trade between India and Myanmar is quite difficult to quantify due to trade via a third country like Singapore, and inadequate availability of trade data, as pointed out by Dey and Majumdar (2014). This invites monitoring of the activities and development of trade infrastructure on account of strategic position of Myanmar as a gateway to other parts of the region. Since, trade between India and Lao, the only landlocked country in the set, found to be very low, which is quite obvious that landlocked variable has a negative but significant effect on trade.

Table 3. Results of gravity model estimation

Dependent variable: ln(total agricultural trade)

Variable	Coefficient	Z statistic
Constant	-7.85	-1.78
	(4.40)	
lnGDPi	1.35***	5.06
	(0.27)	
lnGDPj	1.28***	40.47
	(0.32)	
lndistance	-1.68***	-6.77
	(0.24)	
Common border	0.05	0.14
	(0.35)	
Landlock	-2.96***	-6.69
	(0.44)	
FTA	0.43***	3.69
	(0.11)	
Comlang	0.16	1.08
	(0.15)	
Comcol	0.94***	5.88
	(0.16)	
Wald chi2(8)	3880.51	
Prob > chi^2	0.0000	

Notes: *** p<0.01

The figures within the parentheses are standard errors

The common colonial relationship with the ASEAN countries was found to positively influence the bilateral trade while common language didn't show any significant influence on trade. The FTA variable was found statistically significant and positively affected the bilateral trade with a value of 0.43 per cent which is a positive sign for both the economies in further integration process.

India's Agricultural Trade Potential with ASEAN Countries

Having estimated the gravity model, we further computed the trade potential by calculating ratio of trade potential (P) as predicted by the model and actual trade (A) for the year 2014 (Table 4). If the value of P/A exceeds one, the implication is in terms of potential expansion of trade with the respective country. The result shows that trade potential with Cambodia, Indonesia, Malaysia, Myanmar and Vietnam, has already exceeded. This is also an indication to maintain good trade association with these countries, to earn foreign exchange, which also will help India to facilitate its efforts for the economic integration in the Eastern region. There exists an untapped trade potential with Brunei, Lao, which are the low-income economies in the ASEAN region, and are in the path of transition. As indicated in Table 1, Brunei and Lao have lowest shares in agricultural trade with India compared to other countries; their geographic features as well as economic backwardness could be the trade-hindering factors. India still has the opportunities to expand agricultural trade with Philippines, Singapore and Thailand as they already maintain a good business environment with India. With the completion of free trade agreement, the bilateral trade will be expected to grow manifold and can harness the trade potential also.

Table 4. India's trade potential with ASEAN countries for the year 2014

Country	Actual value (A) ('000 $)	Potential value (P) ('000 $)	Ratio P/A
Brunei	10995.38	13211.63	1.20
Cambodia	42989.02	24909.72	0.58
Indonesia	4531211.95	1838224.65	0.41
Lao	14171.95	19848.21	1.40
Malaysia	3035236.79	931527.69	0.31
Myanmar	785361.97	234315.08	0.30
Philippines	326570.13	527990.30	1.62
Singapore	337763.09	816220.32	2.42
Thailand	1062993.99	1752746.95	1.65
Vietnam	4292157.16	468993.60	0.11

Conclusions

India and ASEAN countries have preserved a long-term economic relationship through bilateral trade and it is continuing after the signing of free trade agreement. The agricultural trade between two sides is increasing compared to global trade where ASEAN stand as a major supplier of agricultural commodities to India in Asia. India has considerable export potential in the region, as exhibited by the relatively higher comparative advantage index in cotton, rice, tea, and oil cake meals.

As per the gravity model estimates, bilateral trade has been found promising, but the inefficiency in the border trade with Myanmar is the major concern to be addressed. India should expedite infrastructure development process to promote the border trade as Myanmar is the gateway to other ASEAN nations. Export promotion measures should be taken to increase the trade with less-developed countries of the ASEAN, the Brunei and Lao as untapped potential lies in these countries. India still has the opportunity to expand its trade with Philippines, Singapore and Thailand while maintaining the same pace with rest of the ASEAN members. Since commitment under free trade agreement is yet to be accomplished by 2020, the way for exploring potential for both partners is still left untapped. The measures like trade facilitation, improvement in production and export competitiveness, faster conclusion of bilateral talks are needed to increase trade and further integration within the region.

References

Akhter, N. and Ghani, E. (2010) Regional integration in South Asia: An analysis of trade flows using the gravity model. *The Pakistan Development Review,* **49**(2):105-118.

ASEAN Secretariat (2014) *ASEAN Statistical Year Book*. Jakarta, Indonesia.

Balassa, B. (1965) Trade liberalization and revealed comparative advantage. *The Manchester School of Economics and Social Studies,* **33**(2):99-123.

Batra, A. (2004) *India's Global Trade Potential: The Gravity Model Approach*. Working Paper No.151, Indian Council for Research on International Economic Relations, New Delhi.

Breusch, T. and Pagan, A. (1980)The LM test and its application to model specification in econometrics. *Review of Economic Studies*, **47**(1): 239-254.

Chakravarty, L.S. and Chakrabarty, R. (2014) A gravity model approach to Indo-ASEAN trade-fluctuations and swings. *Procedia - Social and Behavioral Sciences,***133**: 383-391.

Cook, B. A. D. (2013) National security and the Eastern promise of Myanmar in transition. *Foreign Policy Research Centre Journal*, **3**: 129-132.

Dey, P. and Majumdar, M. (2014) *Developing Cross-border Production Net Works between North Eastern Region of India, Bangladesh and Myanmar: A Preliminary Assessment*. Research and Information System for Developing Countries, New Delhi.

Drucker, D. (2003) Testing for serial correlation in linear panel-data models. *The Stata Journal,* **3**(2):168-177.

Greene, W. (2000) *Econometric Analysis*. Prentice–Hall, Upper Saddle River NJ.

Gul, N. and Yasin, M.H. (2011) The trade potential of Pakistan: An application of the gravity model. *The Lahore Journal of Economics*, **16**(1): 23-62.

Hanouz, D.M. and Geiger, T. (2010) *Enabling Trade in the Greater ASEAN Region*. World Economic Forum, Geneva.

Melitz, J. (2008) Language and foreign trade. *European Economic Review,* **52** (4): 667-699.

Mulenga, C.M. (2012) *An Investigation of the Determinants of the Intra Industry Trade between Zambia and its Trading Partners in the Southern African Development Community (SADC)*. Working Paper Series No. 2012-01. Trade and Industrial Policy Strategies, Pretoria, South Africa.

Pal, P. and Dasgupta, M. (2008) Does a free trade agreement with ASEAN make sense?. *Economic and Political Weekly,* **43**(46):8-12.

Pal, P. and Dasgupta, M. (2009) The ASEAN-India free trade agreement: An assessment. *Economic and Political Weekly*, **44**(38):11-15.

Poyhonen, P. (1963) A tentative model for the volume of trade between countries. *Weltwirtschaftliches Archiv,* **90** (1):93-100.

Routray, P.B. (2011) India-Myanmar relations: Triumph of pragmatism. *Jindal Journal of International Affairs,* **1** (1): 299-321.

Sen, R., Asher, M.G. and Rajan, R. S. (2004) ASEAN-India economic relations: Current status and future prospects. *Economic and Political Weekly*, **39**(29): 3296-3307.

Shinoj, P. (2009) *India-ASEAN Trade in Agriculture: Retrospect and Prospect*, Policy Brief No. 29. National Centre for Agricultural Economics and Policy Research, New Delhi.

Singh, B. (2013) Indo Myanmar Relations: Looking East from the North East. *Foreign Policy Research Centre Journal*, **3**: 170-181.

Sridharan, K. (1996) *The ASEAN Region in India's Foreign Policy*. Dartmouth Publishing Co., Aldershot.

Sundaram, A. (2013) Look east policy. *International Journal of Advancements in Research & Technology*, **2**(5): 169-185.

Tinbergen, J. (1962) *Shaping the World Economy, Suggestion for an International Economic Policy.* The Twentieth Century Fund , New York.

Veeramani, C. and Saini, G. (2010) *Impact of ASEAN-India FTA on India's Plantation Commodities: A Simulation Analysis*. Indira Gandhi Institute of Development Research, Mumbai.

Yean, S.T. and Jia, Y.A.K. (2014) Re-examining the impact of ACFTA on ASEAN's exports of manufactured goods to China. *Asian Economic Papers*, **13**(3):63-82.

Zarzoso, M.I. (2003) Gravity model: An application to trade between regional blocs. *Atlantic Economic Journal*, **31**(2): 174-187.

Zarzoso, M.I., Lehmann, N.F. and Vollmer, S. (2007) *The Log of Gravity Revisited.* CeGE Discussion Paper No. 64. University of Göttingen, Germany.

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