Analysis of Trade Diversion and Trade Creation Effect Between India and Thailand - A Gravity Model Approach

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ABSTRACT

The gravities of globalisation are forcing nations to pursue more proficiency through superior markets, incline in competition, access to superior technology, and more investment channels through RIA's (Regional Integration Arrangements). These arrangements lead to assist neighbouring nations for mutually beneficial reasons, as well as to take anticipatory action against the spill over of unrest and mass economic movement. The objective of study is to explore the trade diversion and trade creation effect between India and Thailand with Gravity model approach from 1997 to 2015. The model estimated with panel data for India and Thailand countries for the period 1997 to 2015 and analyse the trade flows between both the countries. Model estimates regression equations to evaluate the impact of regional trade agreements during 1997 to 2015. The model ordinary least squares model has been used to estimate the dummies that capture specific fixed effects on nations. The study revealed that predictable factors act as the same way as the model predicts. Results of study shown that the assessed coefficients of variables observed as statistically significant. The R^2 (adjusted values) ranges from 0.544 (low) to 0.604 (high). The values used for comparison purpose employing in the gravity model to examine trade creation and diversion effect. R-square has a high value implies that coefficients are highly significant. The India and Thailand relations demonstrate that there is momentous progress to expand the intra-bloc trade with preferential liberalisation within the regional arrangement.

Keywords: Regional Trade Agreements (RIAs), Thailand-India, Gravity Model, Trade Creation Effect, Trade diversion Effect.

1. INTRODUCTION

There has been drastic change occur in world economy in even and vertical range. The adjustments on the global economy have influenced by rest of world, it depicts that no country can disconnect itself totally from others nations and survive. The latest advent in the information technology has produced recent dynamism waves and compact whole world into a global community. The procedure of cumulative economic integration and rising economic interdependence among the countries of the world is broadly known as globalization. By emerging in global trade, all nations can use its assets most proficiently, focused on the activities i.e. best suitable to pursue and can obtain significant economies of scale. The global trading system has been witnessing a proliferation of regional economic integration scheme or trade blocs (also known as Regional Trade Agreements (RTAs)) designed to achieve various economic and political purposes. The growth of RTAs has been very rapid, particularly since 1990's. The total number of RTA up to January 2014 was 377 notified to GATT/WTO. A large additional number of RTAs are expected to become operational and substantial and 583 RTAs are proposal under negotiation (World Trade Organization, 2014). As the latest quick development of RTAs begin in 1990's but the seeds of development were arguably sown in 1980's (Salvatore, 2004). Trade is an exceptional attribute of globalization for economic planning. Each and every production factors are not sufficiently existing in a nation. For grafting diverse needs of nations lead to engage themselves with intercontinental trade. It assists as chief engine of economic growth and development (Cherunilam, 2006).

India is a fast developing global power and dynamic economic player in the region responsible for peace and stability. India with its recent economic clout, capacity building measure and IT prowess, together with the gradual shift in the foreign policy outlook to suit to be rapid change in global geo-political issues deserve a special status in the BIMSTEC region. Together with Thailand India can change the economic profile of region and provide the edge of regional prospective over national sovereignties (Devi, 2007). In the course of recent decades 'Look East' India strategy has been supplemented by 'Look West' Thailand approach assist in bringing the two nations nearer. Both Thailand and India, situated in each other broadened neighborhood, share novel civilizatization joins backpedalling a few centuries. Thailand and India assume an active part in manufacturing significant collaboration between two nations. The BIMSTEC space has risen as an essential and indistinguishable piece of India's developing Look East approach. In 2012, Thailand and India are celebrating 65 years of their strategic relations. As of late, political links have strengthened as mirrored in a progression of high level state visits by pioneers of the both nations. Trade and commercial relationships and tourism endure to cultivate gradually. Both nations are imperative provincial accomplices connecting Southeast Asia and South Asia. The execution of the India-AESAN agreement on Trade in Goods (2010) is a recent turning point of their association (Ministry of External Affairs, Thailand, 2016). The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation is an international association involving a cluster of seven countries i.e. South East Asia and South Asia named as Sri Lanka, Bhutan, India, Nepal, Bangladesh, Myanmar and Thailand. Basically, BIMSTEC was formed with the goal to combine both Thailand's 'Look West' with the 'Look East' strategy of India So, BIMSTEC can be clarifying as relationship among SARRC and ASEAN countries. The uniqueness of BIMSTEC is in multi-sectoral approach compared to other Asian blocs. Being an organizer part and the biggest part regarding populace and region, India in spite being preoccupied with the notion of getting its corporation with ASEAN boosted efforts to live up with belief of its colleagues in the BIMSTEC and to convey forward the BIMSTEC vision of commonly valuable local collaboration. Common collaboration in quantities of region in the BIMSTEC

district are pretty much secured by India two-sided economic relationships with individual country and this nurture the rate of economic growth by tapping provincial synergies. The purpose of study is to analyse of trade diversion and trade creation effect between India and Thailand by using gravity model approach for time series data from 1997 to 2016 after the formation of BIMSTEC.

2. NEED OF STUDY

Most of the study emphasized to analyse the trade relation on two dimension quantity of imports and quantity of exports. There has been very less literature available for trade diversion and trade creation effects between the India and Thailand. To overcome the gap, this study analysed the trade diversion and trade creation effect between India and Thailand with Gravity model approach.

3. RESEARCH METHODOLOGY

To analyse the bilateral trade flow between both countries i.e. India and Thailand, Gravity Model has been used. The experimental base for the investigation of gravity models, which relate trade flows between nations to the scope of their markets and the cost of moving goods between them. The gravity approach to modeling trade had extensive history, initially used in the 1960s by Tinbergen (1962) and Linnemann (1966). The technique acquire its name from the equivalent with the physical energy of gravity determined by the joint accumulation of two bodies and the (inverse square) of the distance among them. In economics, the gravity approach was fundamentally a theoretical but proves awfully successful empirically in amplification a huge proportion of trade flows. The technique was also used to clarify other type of international flows, mainly notably migration. The gravity approach was located on a firmer theoretical base by Anderson (1979) and Bergstrand (1985). These derivations of the gravity model exhibit that it is not merely an ad hoc data process but is a reduced-form version of a theoretical demonstration of world trade. Ekanayake et. al., (2010) utilize gravity model to measure the economic integration between the developing nations of Asian. Gravity model evaluate the creation of trade and diversion of trade impact of different regional trade agreements on trade flows inside and among member of ASIAN. Bhattacharyya and Banerjee (2006) used gravity model to answer the question with the use of panel data approach i.e. does the gravity model explain India's direction of trade?. The observations conclude that the size had powerful influence on India's trade as compare to level of development and trade of India respond lesser than proportionately to size and more than correspondingly to distance. Rahman (2006) used Gravity Model to evaluate the trade flow of Bangladesh with its main trading partner nations. The results stated that trade of Bangladesh is optimistically decided by the size of the economies, per capita gross national product disparity of the nations concerned and openness of the trading nations. Tripathi and Tripathi (2013) described the flow of trade from India using a Gravity Model from 1998 to 2012. The study revealed that political globalization and cultural closeness had optimistic stimulus in bilateral trade and size of economy, common border proxies have a direct effect of bilateral trade. The gravity model can explain the pattern of trade for regional block:

$$\text{Trade}_{ij} = \alpha \frac{\text{GDP}_i \times \text{GDP}_j}{\text{Dis}\tan\text{ce}_{ij}}$$

The equation for Gravity Model is:

$$\mathbf{VTF}_{ij} = \alpha_0 + \alpha_1(\mathbf{TGDP})_{ij} + \alpha_2(\mathbf{REF})_{ij} + \alpha_3(\mathbf{SIM})_{ij} + \alpha_4(\mathbf{DIS})_{ij} + \alpha_5(\mathbf{BOR})_{ij} + \alpha_6(\mathbf{CMLG})_{ij}$$
$$+ \alpha_7(\mathbf{BTA})_{ij} + \alpha_8(\mathbf{PCGDP})_{ij} + \varphi_i + \gamma_i + \lambda t + (\varphi\gamma)_i + (\gamma\lambda)_j + \varepsilon_{ij} \qquad (1)$$

where,

VTF_{ij} denote to Value of Trade Flow of i and j nations

TGDP = Sum of total Gross Demostic Product

REF = Relative Factor Endowment

SIM = Similarity Index

DIS = Distance between I and j nations

BOR = Border

CMLG = Common Language

BTA = Bilateral Trade Agreements

BIM = BIMSTEC Member

PCGDP = Per Capita Income

ε_{ij} = Error or Random Term

$$RFE_{ij} = |\text{In } PGDP_i - \text{In } PGDP_j| \qquad (2)$$

$$SIM_{ij} = 1 - \{\text{In } (GDP_i/(GDP_i + GDP_j))^2 + \text{In } (GDP_j/(GDP_i + GDP_j))^2\} \qquad (3)$$

RFE_{ij} value take as of zero if both nations having equal gross demostic product. SIM range lies from 0 to 0.5 i.e. $0 < SIM_{ij} < 0.5$ where 0.5 means 'Equal' and zero implies 'Absolute Divergence' in the size of nation. In Equation (I), the following binary or dummy variables are included:

BTA_{ij} = 1 if a country pair $(_{ij})$ has a bilateral trade agreement at period t

= 0 if otherwise

BOR_{ij} = 1 if a country pair $(_{ij})$ has a common border

= 0 if otherwise

$CMLG_{ij}$ = 1 if a country pair $(_{ij})$ has a common language

= 0 if otherwise

In equ. (I), φ, γ and λ are exporter, importer and time or business cycle effects, respectively. The interaction effects are exporter-by-importer $(\varphi\gamma)$, exporter-by-time $(\varphi\lambda)$ and importer-by-time $(\gamma\lambda)$.

Hypothesis:

H1: The larger economic dimension increases trade.

H2: Trade increases when partners are geographically close.

There are few studies examined by Anderson (2011), Leitao et. al., (2012), Kabir, and Salim (2010), Tripathi and Leiato (2013) revealed that GDP helps to increase trade. On flip side some studies examined

by Ghatak et. al., (2009) evaluated that a there has been negative connection between bilateral trade and distance. The geographically distance among India and BIMSTEC member nations excepted to negative and in case of India only, Bhattacharyya and Banerjee (2006), Batra (2004) Tharakan et. al., (2005), and De (2013), had examined indirect association between distance and bilateral trade of India.

Economic linkage play an imperative part of India's association with Thailand. It has been observed that from previous couple of years, there has been seen a quick development in trade. The bilateral trade increased six times since 2000 and cross US$ 6.6 billion. The trade figures stated that in 2009, trade declined by 17 per cent due to global financial and economic crisis (India's exports were US$ 1.7 billion, down by 34 per cent, whereas Thailand exports were US$ 3.2 billion declined by 3.6 per cent). Investment by Indian and Thai companies for individual nations is rising. India's investment is presently around US$ 56 million on the other hand, Thailand investment is US$ 90.55 million in India (Ministry of External Affairs, Thailand).
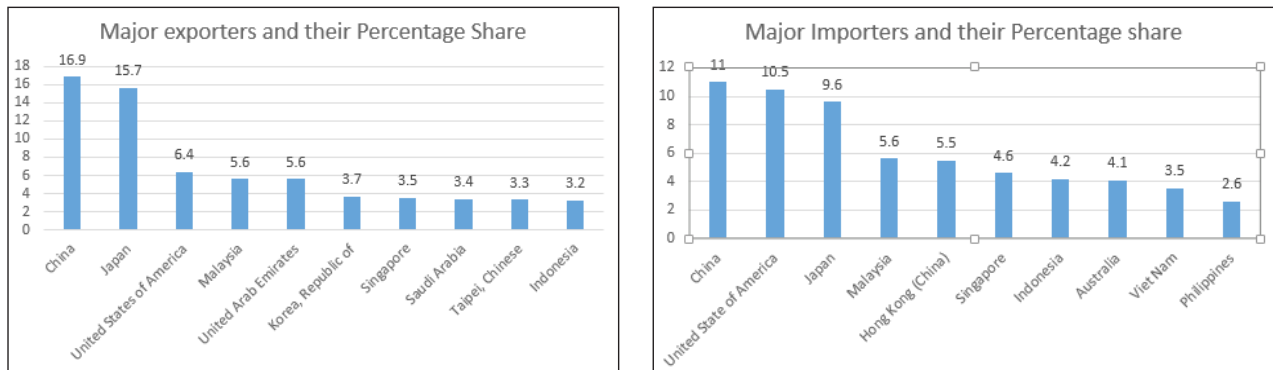
Graph 1: Thailand's main exporters and importer and their percentage share
Source: **ITC calculations based on UNCOMTRAD statistics.**

Graph 1 depicted the Thailand major trade market (Export and Import) for Thailand in globe. The share of Thailand in respected markets and their ranks in world exports as well as in imports has been given in graph. As import market, India occupy the 11th position market for Thailand with 2.5 per cent share and India acquires the 17th position for Thailand with 1.3 per cent share as export market.

4. GRAVITY ANALYSIS

Over the most recent 50 years, the gravity condition of trade has been generally used to estimate flow of trade one nation to others. After the contentions concerning its hypothetical establishment in 80's and about its determination in the 90's, the estimation of gravity models experienced an extreme civil argument about estimations methods in a years ago. Conventionally the multiplicative gravity model has linearized and estimated using Ordinary Least Square procedure with certain assumptions. Later on it has been observed that in the occurrence of heteroscedasticity, the Pseudo Poisson Maximum Likelihood (PPML) estimator perform better as compare to OLS which is not more resourceful. Next problem concern with literature related with zero values. Helpman et. al., (2008) reintroduced same argument with recommending a theoretical groundwork of these zero values based on a model with heterogeneity of firm. As of late, crafted by Martin and Pham (2008), have acquired some disparate outcomes when contrasting alternate estimators to manage heteroscedasticity and zero values complications. The model was first implemented to international trade by Tinbergen (1962).

The standard pattern of international trade has been decided by Tinbergen (1962) in the absence of trade barriers which succeed among 42 nations. Other than the standard gravity model, he also projected another models for trade agreements that includes dummy variables with the existence of a common border sharing between trading nations.

Afterward in 1970 the connections from a probability model of trades, but no one depend upon standard trade theories has been got by Leamer and Stern. Various authors in the exploration for a theoretical foundation and they derived models which are based on increasing returns. The factors that are ordinarily utilized as a part of gravity model are dummy variables which regulate the similarity in culture such as historical relationships and language etc. Some study stated that rising empirical literature discovered that historical connections are significant elements for international trade flows. Linnemann (1966) and Leamer and Stern (1971) proven that the gravity equation of trade is extremely operative to explain the bilateral flows. Yet, the model threw ample of debates. The theoretical structure was tapped into doubt and later justified by Bergstrand in 1989 for the factorial model.

Gross domestic product is incorporated to catch the components related with economic development. Additionally, it estimate the productive capability of exporting nations and the purchasing power of the importing nations. The real GDP variable coefficients are estimated to be positive.

The coefficient of distance (Dist_{ij}) is estimated to be negative. The proxy for transport their time and cost, access to market information and another aspects which create problematic situation for countries to get involve in trade. The predicted symbol for all dummy variables estimated to be positive which shows the notion that historical linkage, regional trade arrangements, proximity, and common language that help to create trade networks across the globe. Though, the estimated symbol of the dummy variable RTA (0) can either be negative or positive.

The RFE_{ij} is defined as the absolute value of the contrast for natural logarithm of per capita gross domestic product between nation India and nation Thailand. The selection of the variables as an independent variables are based on the standard theory of comparative advantage for trade. The variable goals to catch technology and their variances among nations to explain trade structures. In spite of fact, the variables are normally estimated through absolute value of the difference for natural logarithm of capital-labour ratio, because of absence of data related with per capita GDP, used in place of capital-labour ratio. The estimated symbol of variable is positive.

The estimated sign of the similarity index considered as positive because of the similarity with respect to GDP per capita infers to amplified similarity in size of nation specific product multiplicity in the segregated commodities sector and which leads to an enlarged trade volume (Ekanayake, et. al., 2010).

5. EMPIRICAL RESULTS

The model estimated with panel data for 4 set of regression to examine the impact of regional trade between the nations during the periods of 1997-2015. The model has been predicted using OLS with nations dummy to catch specific fixed effects. The first variable i.e. distance has been projected negative sign and noted as extremely significant in all estimated models. The results provided strong evidence for first hypothesis that costs related with transport and distance related are significant element for flow of trade.

The expected symbol for the second variable i.e. border has been positive in all estimated model. Though, variable is not statistically important in model. The common language used as dummy and results revealed that this variable is statistically significant, with projected positive symbol in model. The RFE

coefficient is statistically significant in three out of four equations in the model. The positive sign in result suggests that bi-directional flow of trade are related positively to inter-region differences at technological advancement levels. The similarity index coefficient is significant statistically in model for 3 equations out of four equations. The projected dummy variable coefficients, RTA (I) predicted as positive mark and statistically significant in all the model equations. RTA (I) is assessing the amount of trade creation effects of the regional trade agreement between India and Thailand. The bilateral trade agreements coefficient i.e. dummy variables are statistically insignificant in all cases in gravity model. They acquired negative sign in three from four cases in the model. The dummy variables coefficients are positive in most cases and significant which indicated that multilateral trade agreements tend to improve further trade as compare to bilateral trade treaties.

Table 1
Gravity Model Estimation for India and Thailand

Group variable	Year	Number of groups	19
R-sq: Within	0.9182	Obs. per group: min	6
Between	0.9754	Avg	6.0
Overall	0.9135	Max.	6
F(5,90)		1131.62	
Corr (u_i, Xb)	0.0824	Prob > F	0.0000

The given Table 1 has shown gravity model estimation for India and Thailand. The predictable variables act as the way as the model predicts, and the expected coefficients considered significant statistically. The value of R^2 (adjusted Value) ranges from 0.524 (low) to 0.640 (high). The values are suitable for a cross sectional study as well as comparison to obtain in another studies who employed gravity model to observe inter-regional trade movements. The real GDP coefficients are positive in estimated model. The results are significant statistically at the 1 per cent significance level. R-square has a high value as shown in table implies that coefficients are highly significant. The values of *r*-square are 0.9849 within model, 0.9567 between model and overall value of *r*-square is 0.9327.

Table 2
Gravity Model Estimation for India and Thailand

	Lngdp	*Coef.*	*Std. Err.*	*t*	*P>|t|*	*[95% Conf. Interval]*
Distance	−.0003452	.0000724	−4.76	0.000	−.0005659	−.0002276
Sim	68.1114	2.241422	30.63	0.000	60.89301	69.36988
Rfe	1.9321	.1716647	−6.97	0.000	2.284775	−1.250264
Border	−2.21456	.13510476	−18.87	0.000	−2.403177	−1.941997
Land_locked	−.8242311	.11678	−6.83	0.000	−1.006044	−.5508966
Constant	−17.13215	1.134004	−16.29	0.000	−20.385	−15.92729
sigma_u				.57001621		
sigma_e				.25124661		
Rho			.76825328 (fraction of variance due to u_i)			
F test that all u_i			0			
F(18, 90)			18.42			
Prob > F			0.0000			

The results of estimation for India and Thailand has been shown in Table 2. The result for ordinary gravity trade model (Eq. 1) for Trade flow is significant. Model has been assessed by OLS with nations dummy which capture the specific fixed effects. In model, GDP per capita of India's bilateral trade partners and India's GDP per capita (GDPi) has been considered as market size variables and result depicts that both have direct relationship and significant at 1 per cent level. The joint coefficient for GDP is significant and positive, and from results it proven that the larger economic dimension increase trade. GDP per capita of India's trade partner i.e. Thailand with 7.6 per cent rise in bilateral trade of India and indicates that the size of market stimulates India's bilateral trade.

Geographical proximity variable i.e. geographical distance between India and Thailand (Distance) and border as a dummy variable is significant statistically having impact on bilateral trade of India in the model. The coefficient of distance is negative and significant, supporting the basic idea of gravity model. This proved the hypothesis is accepted that the trade increase when partners are geographically close. However, border dummy coefficient sign assist the expected hypothesis, and coefficient sign of distance variable assist the expected hypothesis and show that geographical proximity matter for bilateral trade od India. The results of gravity model also stated that the distance variable provide strong evidence for the hypothesis i.e. costs related with transport and distance are an imperative element for the flow of trade.

Additionally, coefficient of SIM is also significant and positive which indicates that similarity in size of nation specific product diversity in the distinguished commodities sector leads to increase in capacity of trade.

The relative factor endowment variable coefficient is statistically significant and stated that bilateral flow of trade is relatively positive for inter-regional differences at technological advancement levels. From results it is clear that, the coefficient of the land_locked dummy is statistically insignificant and concluded that this variable not significantly important for strengthening trade. In nutshell, all coefficients of variables and dummies variables are generally significant and positive which indicates that agreements tend to improve bilateral trade between India and Thailand.

6. SUGGESTIONS AND POLICY TO IMPROVE TRADE

India's trade relations with Thailand have been strengthened since 1997, as a part of her "Look East Policy". Her complementary economic structure with Thailand involves significant mutual gains.

- The need to identify the areas of cooperation and competition in intra-state trade base on production complementarities and on the other hand, here is requirement of rule simplification with a motive to increase trade liberalisation between both nations.

- Direct involvement of stakeholders is of prime importance and thus business communities, technocrats, and representatives of the knowledge community must interact to identify new avenues of cooperation.

- This is an imperative need of hour, for converting India's "Look East" policy to "Act East" to strengthen the trade between both the nations.

- Need of hour, both nations enhance the investment inflow in their countries because intra-region FDI remains rather small and its potential remains to be exploited.

7. CONCLUSION

Trade relations between India and Thailand have been analysed and discussed in the present study. India's trade relations with Thailand as member of BIMSTEC have been strengthened since 1997, as a part of her "Look East Policy". Her complementary economic structure with ASEAN involves significant mutual gains. India-Thailand bilateral trade has been growing steadily in recent time. India has to take the lead in BIMSTEC and reorient by delivering on promises made in timely manner. Both countries help to fetch new momentum for both nations by noticeably growing its competences to undertake extensive development, connectivity and energy projects. The reason behind less trade between the both countries, India is lacking in leadership and not been very active being important in region. India has usually been on margins and not been able to shape it's economic and security architecture. Taking up issue of connectivity keeping in mind India's poor implementation record with BIMSTEC nations. In order to attain superior level of economic collaboration among the nations, it is very significant to recognise and escalate the pattern of individual nation as well as find the possible space for economic and trade collaboration.

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