

India–CPPTP Trade Integration: An Analysis of Potential Trading Opportunity

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Course Project

ECO412A: International Economics and Finance

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Introduction

CPTPP(Comprehensive and Progressive Agreement for Trans-Pacific Partnership) is a Free Trade Agreement between countries on the Pacific Rim: **Canada, Mexico, Peru, Chile, New Zealand, Australia, Brunei, Singapore, Malaysia, Vietnam and Japan** signed in December 2018. It aims to liberalise trade and remove almost all tariff barriers on goods and services traders. It covers nearly all goods ranging from financial services to telecommunications to food.

Signatory countries of CPTPP account for around 13.4% (US\$13.5 trillion) of global GDP and 15% of global trade. CPTPP is one of the world's largest FTA by GDP with a population of 500 million people in the increasingly rich region of Asia-Pacific.

India refrained from joining CPTPP as it placed relatively higher labour and environmental standards. The FTA's draft includes narrowly detailed qualifications on standards for investments protection, provisions to protect the host country's right to regulate trade and imposition of detailed transparency requirements.

Earlier known as TPP(Trans-Pacific Partnership) in 2008, the group was forced to change its name, along with some provisions to CPTPP, after the USA left TPP in 2017 under the Trump administration.

India actively trades with the CPTPP group. In 2017, India had a balance of account deficit with the group. India exported US\$41 billion to member countries, with Singapore, Vietnam and Malaysia being the largest importers. On the other hand, India imported around US \$58 billion worth of goods and services, with Australia, Japan and Malaysia being the biggest exporters to India. In 2017 India's Top exports to the group were Precious Stones, Oil & Mineral Fuels and industrial Machinery, respectively, while India mainly imports Oil & mineral Fuels, Precious Stones & metals and Metal Ores respectively. Over the years, these values and the trade have gone up substantially.

Objective

Through this project, we aim to find answers to the following questions and analyse counterfactual situations.

- How would bilateral trade value and volume of India with CPTPP nations change if India were to join the CPTPP group?
- How would such an agreement affect trade amongst existing CPTPP members and Non-Members?

Moreover, we wish to quantify any trade diversion or creation effects that can be observed post-analysis using the structural gravity model.

While there are numerous methods available in the rich literature around gravity model estimation (such as PPML, Non-linear least squares), we wish to try and compare different

methods to get the best estimates to answer the above questions. Following are some of the methods, we wish to employ:

- Two-way fixed effects methodology
- Poisson Pseudo Maximum Likelihood regression
- Non -Linear Least Squares Estimator

Approach

We analyse a situation wherein India joins CPTPP under the existing FTA. Let this new group be known as CPTPP+. To get estimates for trade under the new CPTPP+ regime, we would be employing a structural gravity model. Equations obtained under this model can be solved using numerous methods, each one of them having its own pros and cons.

We would be employing PPML and Non-Linear Least Squares Estimator to derive estimates from the gravity model, taking into consideration global trade flows.

Literature Review

Gravity Model:

Initial versions of gravity model were largely based on intuitive factors that could have affected trade. In 1979 the model was modified to include other parameters and variables to better explain empirical evidence by Anderson 1979. The primitive gravity model proposed by Tinbergen 1962 states that economic size positively affects the value of trade flow, while distance negatively affects it. Over the years, economists have tried to explain trade using this model along with qualitative parameters such as cultural differences, population etc. Modern structural gravity model was then proposed by Anderson and Wincoop in 2003. They argued that bilateral trade between nations was dependent on bilateral trade barriers between the two, and was relative to the product of the two countries' multilateral trade resistance. Major development in estimation of the model was the introduction of the PPML estimator in 2006 by Silva and Tenrenyo. According to them, the standard interpretation of the OLS elasticities of the traditional gravity model was biased and inflated due to the heteroskedasticity of trade data. Other newer methods for estimation of gravity model include non-linear least squares estimation.

India and CPPTP:

Research findings show that the formation and implementation of FTAs might have a negative impact on non-member countries. But only a few of articles have looked on quantitative effects of FTA, further research is needed in this area to understand topic more clearly. This review of literature looks at the impact on non-participants qualitatively and quantitatively in the case of formation of FTA like CPTPP.

Research by Tianguo Li and Laihui Xie (2015) claim that the participation of India in CTPP will bolster India's position as one of the leaders in financial, capital and software sectors and thus will cause welfare gain in India. While non-participation will have an adverse impact on the Textile industry of India.

Another important FTA is RCEP, RCEP has higher trade barriers against third parties in contrast to CPTPP. Thus the Trade diversion effect is higher in case of RCEP. estimation shows higher welfare loss for excluded RCEP countries as compared to loss CPTPP can inflict on excluded countries. (Dan Ciuriak 2014)

Rahman and Anjum Ara tried to quantify the welfare effect of CPTPP on south asian countries using the GTAP model. Their study found that if CPTPP countries opt for deeper FTA which they are doing. The South Asian nations will experience a decrease in export and welfare loss. Being the biggest economy in the region, India will experience the most real GDP loss. Similar Study by Akman et al (2015) gives the same view as it mentioned that regional trading agreements (RTAs) will have an unfavourable impact on third parties. The fear of being left out will make them join RTAs.

According to Petri and Plummer (2016), due to GDP growth and liberalisation in CPTPP countries, they will experience an increase in FDI which indicates that the rest of the world will face obstacles to attract FDI.

Methodology

Data Requirements:

Data required for this analysis consists of all trade data for member nations of CPTPP and India, including but not limited to variables such as value of merchandise exports, GDP of exports and importers, geographical distance, contiguity of land border and language spoken. We would be extracting data from the following three databases for our analysis:

- **International Monetary Fund (IMF)**
- **World Integrated Trade Sources (WITS)**
- **United Nations Conference on Trade and Development (UNCTAD)**
- **CEPII**

Method and Model:

The general gravity model formulation is as follows:

$$\text{Trade}_{ij,t} = (\text{gdp}_{j,t}) * (\text{gdp}_{i,t}) / \text{dist}_{ij} * \epsilon_{ij,t}$$

However, upon estimation using ordinary least squares, one finds that it is ridden with problems(omitted variable bias) leading to incorrect estimates. Hence, we use structural gravity model as follows:

Log-linear specification of structural model for its estimation in India-CPTPP trade can be written as

$$\log X_{ij,t} = \beta_1 \log(\text{gdp}_{\text{exp}}) + \beta_2 \log(\text{gdp}_{\text{imp}}) + \beta_3 \log(\text{distance}_{ij}) + \beta_4 \text{border}_{ij} + \beta_5 \text{TB}_i + \beta_5 \text{t}_{ij} \\ + \beta_6 \text{TB}_j + \beta_7 \text{language}_{ij} + \sum_{k=1}^{k=12} \mathbf{a}_k \text{Imp}_k + \sum_{k=1}^{k=12} \mathbf{b}_k \text{Exp}_k + \epsilon_{ij,t}$$

For analysis of India's trade with CPTPP, data from member countries (11 in total) and of India will be required. In order to estimate the gravity equation for India-CPTPP Trade the value of merchandise exports, GDP of exports and importers, geographical distance, contiguity of land border, spoken language were taken. Further year dummies to capture the effects of specific geopolitical events that could affect trade.

Specification for evaluation of trade diversion and creation by two way fixed effects method can be written as

$$\log X_{ij,t} = \beta_1 \log(\text{gdp}_{\text{exp}}) + \beta_2 \log(\text{gdp}_{\text{imp}}) + \beta_3 \log(\text{distance}_{ij}) + \beta_4 \text{border}_{ij} + \beta_5 \text{TB}_i + \beta_5 \text{t}_{ij} \\ + \beta_6 \text{TB}_j + \beta_7 \text{language}_{ij} + \beta_9 \text{TC}_{ij} + \beta_{10} \text{TD_1}_j + \beta_{11} \text{TD_2}_i + \sum_{k=1}^{k=12} \mathbf{a}_k \text{Imp}_k + \sum_{k=1}^{k=12} \mathbf{b}_k \text{Exp}_k + \sum_{i=1}^{i=n} \mathbf{T}_i + \epsilon_{ij,t}$$

For doing estimation using PPML we will be using generalised linear model to estimate the gravity model in its multiplicative form

$$\log \lambda_{ij} = \beta_1 \text{gdp}_{\text{exp}} + \beta_2 \text{gdp}_{\text{imp}} + \beta_3 \text{distance}_{ij} + \beta_4 \text{border}_{ij} + \beta_5 \text{TB}_i + \beta_6 \text{TB}_j + \beta_5 \text{t}_{ij} \\ + \beta_7 \text{language}_{ij} + \beta_8 \text{otherRTA}_{ij} + \beta_9 \text{TC}_{ij} + \beta_{10} \text{TD_1}_j + \beta_{11} \text{TD_2}_i + \sum_{k=1}^{k=12} \mathbf{a}_k \text{Imp}_k + \sum_{k=1}^{k=12} \mathbf{b}_k \text{Exp}_k + \epsilon_{ij,t}$$

For the analysis of trade-creation and trade-diversion effects in CPTPP+ all original member countries and India are included. This model, along with variables included previously, also includes the existence of other RTAs between partners and three trade creation and diversion dummies. The three trade creation and trade diversion dummies capture trade creation, exporter trade diversion and importer trade diversion. Further, to capture multilateral trade resistance terms for countries, we have used 12 importer and 12 exporter dummies.

- $\mathbf{X}_{ij,t}$ - Imports to country i from country j
- gdp_{exp} - Exporter GDP
- gdp_{imp} - Importer GDP
- Distance_{ij} - Distance between importer and exporter nation
- Border_{ij} - whether the nation i,j share common land border takes value 1 if they share common land border
- \mathbf{T}_i - year dummies i^{th} takes value 1 for i^{th} year b/w [1,n]

- TC_{ij} - measure of exporter trade creation, takes value 1 if both i, j nations are part of CPTPP+, otherwise 0
- TD_{1j} - measure of exporter trade diversion, takes value 1 when the exporter is part of CPTPP+, otherwise 0
- TD_{2i} - measure of importer trade diversion, takes value 1 when the importer is part of CPTPP+, otherwise 0
- Imp_k - Importer dummies variable which takes value 1 if k^{th} nation is importer $K \in [1, 12]$
- Exp_k - Exporter dummies variable which takes value 1 if k^{th} nation is exporter $K \in [1, 12]$
- $\epsilon_{ij,t}$ - error term

This model seeks to capture trade-creating and trade-diverting effects of the proposed CPTPP+. It requires the inclusion of external trade partners to capture its diverting effects.

We restrict our gravity model only to merchandise trade as data related to services for all member countries is largely unavailable. Further, we will also look for any significant year dummy to know the global events that might have caused it to be significant.

Results

Following are the results of the above models on R. First, we find for trade between CPTPP and then for CPTPP+.

Table 1: Estimates for CPTPP Nations

	Fixed Effect	NLS	PPML
(Intercept)	-3.0755 (3.903)	0.679 (2.38)	24.34 (3.83)
dist_log	-0.176*** (0.039)	-0.125*** (0.02)	-1.21*** (0.16)
Simple.Average	-0.009 * (0.004)	-0.008 ** (0.002)	-0.05*** (0.014)
CommonLanguage	0.19** (0.07)	0.135** (0.043)	0.167 (0.324)
CommonBorder	-0.03 (0.14)	-0.067** (0.086)	-1.027 (0.557)
tbexp	0.07* (0.03)	0.059** (0.0221)	0.71 (0.16)
tbimp	0.13*** (0.03)	0.09*** (0.019)	0.22 (0.12)
ausimp	-1.40 ** (0.53)	2.46 (6.73)	-0.28 (1.88)
brnimp	-7.65 ***	-14.72	-7.75

	(0.72)	(240.67)	(8.95)
canimp	-1.35 *	3.77	-0.38
	(0.57)	(7.86)	(2.18)
chlimp	-0.53*	2.80	1.46 **
	(0.88)	(1.75)	(0.52)
indimp	-1.949*	2.39	-1.48
	(0.94)	(10.59)	(2.78)
jpnimp	0.52	8.73	1.75
	(0.55)	(12.81)	(3.56)
mysimp	2.68 **	1.97 *	1.26 **
	(0.91)	(1.00)	(0.47)
meximp	0.98	4.76	1.25
	(0.62)	(6.03)	(1.78)
nzlimp	-1.78 **	-1.44	-0.49
	(0.62)	(3.30)	(0.76)
perimp	-0.53	NA	NA
	(0.86)		
sgpimp	NA	NA	NA
vnmimp	NA	NA	NA
ausexp	1.23 *	-3.66	1.09
	(0.49)	(7.08)	(1.95)
brnexp	-4.02 ***	5.26	-3.55
	(0.59)	(18.43)	(4.49)
canexp	1.16 *	-2.95	1.69**
	(0.52)	(8.31)	(0.53)
chlexp	0.98	0.34	0.69
	(0.87)	(3.21)	(0.72)
indexp	-1.1	-6.72	-0.81
	(0.9)	(11.43)	2.9
jpnexp	2.53 ***	-4.40	2.79
	(0.51)	(13.54)	(3.69)
mysexp	NA	NA	0.215
			(0.51)
mexexp	NA	NA	1.96
			0.68
nzlexp	-0.12	1.56	0.21
	(0.59)	(2.51)	(0.74)
perexp	-0.17	NA	-0.75
	(0.83)		(0.75)
sgpexp	NA	NA	NA
vnmexp	NA	NA	NA
loggdpep	0.20(0.21)	0.050	-0.08
		(0.135)	(0.28)

loggdimp	0.29(0.19)	0.123 (0.121)	-0.264 (0.182)
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*** p < 0.001; ** p < 0.01; * p < 0.05

Table 2: Estimates of gravity model when india becomes part of CPTPP

	Fixed Effect	NLS	PPML
(Intercept)	-6.57 (3.81)	-1.97 (2.4)	-0.578 (1.431)
dist_log	-0.167 *** (0.24)	-0.12*** (0.02)	-1.21*** (0.164)
Simple.Average	-0.004 (0.03)	-0.005* (0.02)	-0.05 *** (0.02)
CommonLanguage	0.185** (0.07)	0.122 (0.04)	0.167 (0.324)
CommonBorder	-0.01 (0.13)	-0.05** (0.08)	-1.02 (0.57)
tradecreation	1.09* (0.45)	0.61* (0.29)	1.4 (1.76)
impdiversion	0.165 (0.61)	0.11 (0.40)	1.13 (9.05)
expdiversion	NA	NA (NA)	NA (NA)
tbexp	0.048 (0.029)	0.04 (0.02)	0.55 *** (0.16)
tbimp	0.14*** (0.029)	0.096*** (0.02)	0.55 *** (0.11)
ausimp	-0.71* (0.35)	2.46 (6.73)	-0.28 (1.88)
brnimp	-0.157 (0.47)	-14.72 (240.67)	-7.75 (8.95)
canimp	-0.88* (0.416)	3.77 (7.86)	-0.38 (2.18)
chlimp	-0.011 (0.09)	2.80 (1.75)	1.46 ** (0.52)
indimp	NA	NA	NA
jpnimp	-1.14 (0.63)	8.73 (12.81)	1.75 (3.56)
mysimp	0.35** (0.111)	0.265*** (0.065)	1.26 ** (0.47)
meximp	-0.42 (0.33)	4.76 (6.03)	1.25 (1.78)
nzlimp	-0.16 (0.087)	-1.44 (3.30)	-0.49 (0.76)
perimp	NA	NA	NA
sgpimp	NA	NA	NA

vnmimp	NA	NA	NA
ausexp	-0.41 (0.37)	-3.66 (7.08)	1.09 (1.95)
brnexp	0.187 (0.5)	5.26 (18.43)	-3.55 (4.49)
canexp	-0.56 (0.44)	-2.95 (8.31)	1.63 (2.25)
chlexp	0.021 (0.10)	0.34 (3.21)	0.69 (0.72)
indexp	NA	NA	NA
jpnexp	-0.94 (0.68)	-4.40 (13.54)	2.79 (3.69)
mysexp	-0.036 (0.12)	NA	NA
mexexp	-0.39 (0.37)	NA	NA
nzlexp	-0.13 (0.09)	1.56 (2.51)	0.21 (0.74)
perexp	NA	NA	NA
sgpexp	NA	NA	NA
vnmexp	NA	NA	NA
loggdpxp	0.325 (0.19)	0.15 (0.12)	-0.8 (6.1)
loggdpximp	0.374* (0.18)	0.194 (0.114)	4.432 (4)

*** p < 0.001; ** p < 0.01; * p < 0.05

Inferences

We analyse both cases wherein India joins CPTPP (CPTPP+) and the other where India is not part of the CPTPP. We use three estimation methods, Two way fixed effects, PPML and NLS as outlined above to find the impact of different factors on imports, trade creation and diversion.

We first outline results for the CPTPP case without India (Table 1). In each of three estimation methods, the correlation between distance and imports is negative which is inline with the gravity model. The coefficient for importer and exporter GDPs are also positive, as one would expect from the gravity model. In all three estimation methods we find a negative correlation between tariff rates and imports. Other factors like common language, common borders have also had a positive effect on trade.

For the case where India joins CPTPP (Table 2), we find results largely consistent with the gravity model. The estimates of Exporter and Importer GDP, distance between countries, tariff rates and geographical and social barriers affect import values in a similar manner to that of our model estimation with CPTPP countries and is inline with the gravity model theory. That is, we find that exporter and importer GDPs have a positive effect on imports. Distance between countries is negatively correlated with imports and other factors like common language, common borders had a positive effect on trade. Moreover, the coefficient of trade creation dummy is positive implying an increased value of trade between CPTPP+ countries. This is as expected as countries which were producing some goods at higher prices in their own country will begin importing cheaply products from India. For importer diversion dummies, two way Fixed Effects and PPML give a positive relation which justifies the theory as trade with non-member countries will shift to member countries. However, NLS estimate shows a negative relation with imports. For some variables estimates were not available due to correlation between the independent variables.

We also find that estimates for trade creation in case of CPTPP+ are positive in all the three models, signifying increased trade between the countries and India. There is also a trade diversion effect reflected by positive estimates for import diversion variables (although this is negative in case of NLS).

Conclusion

As per the gravity model, an increase in the GDP of the exporter or the importer had a positive effect(although not significant as per our estimates) on the trade between countries while distance had a significant and negative impact on trade value. Variables such as common language, and contiguity of land borders had a positive impact(and significant for fixed effect model) on merchandise imports.

After the formation of CPTPP+, we find that trade between CPTPP members and India has increased. Trade diversion has also been observed in case of two way fixed effects and PPML. Overall, counterfactual analysis gives us the result that India should join CPTPP and form CPTPP+ as it would be beneficial for trade amongst these countries. Not joining on the other hand would lead to decreased trade between India and CPTPP.

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