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Impact of India -Japan Free Trade Agreement: An Assessment from Trade Creation and Trade Diversion Effects

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Abstract

The study examines the impact of India-Japan Comprehensive Economic Partnership Agreement (CEPA) on aggregate and disaggregate exports in terms of trade creation and trade diversion effects. We apply a theoretically justified gravity model using OLS and PPML methods with country pair and time fixed effects. We use a panel dataset of 51 countries from the year 2000 to 2023. The results show the existence of trade creation and export diversion effects at aggregate level. The sectoral level analysis demonstrates trade diversion in agricultural trade and trade creation in manufacture trade after the implementation of India-Japan CEPA. GDP, distance, population, common language and common border are influencing bilateral trade significantly.

Keywords: *Trade creation and trade diversion effects, India-Japan CEPA, Gravity model, PPML*

Introduction

Spread of Regional Trade Agreements (RTAs) among world economies is a major trend in the past few decades. These RTAs can be in the form of Preferential Trade Agreements (PTAs), Free Trade Agreements (FTAs), Customs union, Common market and Economic union. According to World Trade Organisation (WTO), the number of RTAs has touched 375 as of May 2025. Failure of multilateralism sparked the emergence of regionalism as an alternative for economic integration (Jayasinghe & sarkar; 2008). The formation of FTAs enhances trade volume between the member countries through the effective reduction of trade costs (Anderson & Yotov; 2016). Increased trade among PTA members can lead to less favourable trade conditions to excluded countries (Kuenzel & Sharma; 2021). This will result in the 'demonstration effects' of FTAs and this would lead to signing of FTAs by the excluded countries. Now a days, the scope of FTAs goes beyond the traditional trade liberalisation policies. As they become deeper several policy areas such as investment, Intellectual Property Rights (IPR), e-commerce, Sanitary and Phytosanitary Measures (SPS) and Technical Barriers to Trade (TBT) become part of it. Therefore, deeper trade agreements are more positive and they posse more positive influence on trade flows than the 'shallow' agreements (Mattoo et.al;2017).

India has also joined the journey of regionalism especially after 1990s. India considers the formation of FTAs as complimentary to multilateral trading system under WTO (Economic Survey; 2024). The country has FTAs with many of its trading partners and majority of them are in bilateral in nature. Diversification of export market and offering access to its raw materials and goods is the main purpose

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that motivates India to expand its trade liberalisation policies in the form of FTAs (Bharti & Nisa; 2023). India -Japan Comprehensive Economic Partnership Agreement (IJCEPA) is one of the deep bilateral FTAs of India which was enforced in the year 2011. The FTA aims to deepen economic ties between India and Japan through liberalised trade in goods and services, increased investment and improving business environment. Though it has been more than ten years since the implementation of IJCEPA, we can observe a dearth in the literature in the estimation of the impact of IJCECA on aggregate and sectoral trade flows. Although Kumar & Bharti (2019) explored this FTA under trade creation and trade diversion framework, the study fails to provides insights into the sectoral impacts. Therefore, this study aims to fill this research gap.

The contributions of this paper are follows. Firstly, it offers a revisit to the trade creation and trade diversion effects of India-Japan CEPA. Secondly, this paper extends the literature through focusing on the heterogenous impact of India-Japan CEPA on agricultural and manufacture sector. Thirdly, the study addresses the lagged effects of the FTA at aggregate and sectoral level. The results show trade creation effects of India-Japan CEPA at aggregate level which is contrary to the earlier findings (Kumar & Bharti; 2019). Sectoral level analysis reveals decrease in the bilateral agriculture trade and trade creation effects in manufacture trade between India and Japan.

The structure of this paper is as follows. Section 2 provide a brief overview of empirical literature on the trade creation and trade diversion effects of FTAs. Section 3 explains the methodology used in this paper. Estimation results and its discussion are provided in section 4. And section 5 offers concluding remarks.

Review of literature

A vast majority of studies focus on the Vinerian concepts of trade creation and trade diversion effects in the ex-post evaluation of FTAs. Replacement of trade from less efficient non-member to highly efficient member country is referred as trade creation effect. However, the expansion of trade among member countries can be at the cost shift in trade from highly efficient non-member countries. This is known as trade diversion effects.

The empirical investigations of the trade creation and trade diversion effects of FTAs are numerous in the literature. A vast majority of them focus on multilateral FTAs (Pham et.al;2024, Josic & Basic; 2021, Yang & Martinez- Zarzoso;2014, Rodriguez & Matschke; 2023, Deme & Ndriansy;2016). Pham et.al (2024) focused on the impact of Hong Kong- ASEAN FTA and found enhancement of intra-regional trade growth. Rodriguez & Matschke (2023) showed both increase and decrease in bilateral trade flows among Dominic Republic -Central America – United States (CAFTA-DR) FTA. However, the study reveals overall welfare improvement to most of its members. In an empirical investigation on the trade effects of Croatia's Central European Free Trade Agreement (CEFTA) and the European Union (the EU) membership, Josic and Basic (2021) found trade creation effect in CEFTA membership in imports, exports and total trade flows and trade diversion effect from EU's membership in the case of imports and exports. Deme & Ndriansy (2016) argued that economic integration among low-income countries is welfare improving taking Economic Community of West African States (ECOWAS) as a sample. Timsina & Culas (2019) discussed the trade creation and trade diversion effects of Australia's FTAs and pointed out the presence of overall trade creation effect. The study of Yang & Martinez- Zarzoso (2014) reveal the presence of trade creation effect in ASEAN-China FTA. Alhassan and Payasliolu (2023) argue that the quality of economic and political institutions has great influence in the determination of trade creation and trade diversion effects of an FTA. Taguchi (2018) investigated the trade impacts of SAFTA, India-Sri Lanka FTA (ISFTA) and Pakistan-Sri Lanka (PSFTA) from Sri Lanka's perspective. The study found

trade creation effect in ISFTA, import creation effect in PSFTA and the trade effects of SAFTA is not verified.

Many studies have shed light on the sectoral impact of FTAs. Trade creation effects in agricultural trade among member countries have been observed in different FTAs (Sun & Reed; 2010, Yang & Martinez-Zarzoso ;2014, Timisna & Culas; 2019, Jayasinghe & Sarkar; 2008, Lambart & McKoy; 2009, Zolin & Uprasen; 2018, Lateef et. al ;2018, Heo & Doanh; 2020, Drabik et.al; 2007). However, Philippidis (2013) reveals that agricultural trade effects in different FTAs such as EU, NAFTA, MERCOSUR, Andean pact, Caricom and CACAM have mixed impacts. Urata & Ukabe (2014) argued that developed countries have more advantageous trade in agricultural commodities than developing countries. Conversely, Vollarth et.al (2009) shows no evident change in the agricultural trade pattern after RTA formation. Yang & Martinez- Zarzoso (2014) demonstrated export trade creation effects in manufactured goods and chemical products under ASEAN -China FTA (ACFTA). Ando et.al (2022) examined trade effects of Japan's FTAs and revealed trade creation effects in the export of metal products and in the import of textiles and transport machinery.

Over the years India's FTAs have also been subject to empirical assessments both at aggregate and sectoral level (Singh; 2021, Khurana & Nauriyal; 2017, Kumari; 2025, Kumar & Bharti; 2019, Bhattacharya & Mandal; 2016, Sikdar & Nag; 2011, Khati & Kim; 2023, Bharti & Nisa; 2023, Jagdambe & Kannan; 2020, Veeramani & Saini; 2011). Singh (2021) examined the trade creation and trade diversion effects of IAFTA and found trade creation effect in both exports and imports. Similarly, Kumari (2025) revealed that AIFTA has been beneficial for both member and non-members. Sikdar & Nag (2011) also confirms trade benefits of AIFTA to India and ASEAN countries. However, Khurana & Nauriyal (2017) found pure trade diversion effect in AIFTA. Khati & Kim (2023) showed that AIFTA does not supported India's exports to ASEAN. The study identified non-tariff measures (NTMs) as a detriment to the free flow of goods between India and ASEAN. Bharti & Nisa (2023) pointed out that India's south Asian economic integration benefitted its FTA partners than India. Focusing on the sectoral impact Jagdambe & Kannan (2020) evaluated agricultural trade impacts of AIFTA and found trade creation effect. Veeramani & Saini (2011) showed trade creation effect in India's imports of planation commodities from ASEAN countries.

Studies on trade creation and trade diversion effects of India's bilateral FTAs are scant in literature although majority of India's FTAs are bilateral in nature. Notably, Kumar & Bharti (2019) studied the trade effects of India-Sri Lanka (ISFTA), India- Japan Comprehensive Economic Partnership Agreement (IJCEPA), and India-Bhutan FTA (IBFTA). The study found trade creation effects in ISFTA and IBFTA and trade diversion effect in IJCEPA. In the same vein, Bharti & Nisa (2023) reveal trade creation effects under ISFTA. However, these studies do not focus on the sectoral impact of these FTAs.

Methodology

The gravity model

Tinbergen (1962) and Poyhonen (1963) introduced Newton's law of gravity in international trade. According to them bilateral trade is a function of economic masses and the geographical distance between countries.

$$X_{ij} = \alpha\, Y_i\, Y_j / D_{ij} \qquad (1)$$

Whereas, X_{ij} is the bilateral trade flows between countries i and j. α denotes the constant term. Y_i and Y_j are the economic masses of countries i and j respectively. These are trade promoting factors.

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However, D_{ij} is the geographical distance between trading partners that inversely affects the bilateral trade flows. Later, Linnemann (1966) incorporated additional variables to the gravity model. Despite having huge empirical success, gravity model lacked theoretical justifications. Therefore, Anderson (1979) provided strong theoretical explanations to the model. Bergstrand (1985, 1989) contributed micro economic foundations. Deardoff (1998) explained gravity model with the help of standard gravity theories. Helpman & Krugman (1985) showed consistency of in H-O framework.

Anderson & Van Wincoop (2003) advocated that bilateral trade flows are mainly determined by Multilateral Resistance Terms (MRTs) and disregarding this would cause unbiased estimations of gravity model. Therefore, Baldwin & Taglioni (2006) incorporated MRTs by estimating gravity model in a panel setting and identified the issue of endogeneity bias coming out of FTA dummy variable. Hence, Baier & Bergstrand (2007) recommended the use of country pair fixed effects simultaneously with time varying fixed effects in order eradicate this endogeneity bias of FTA dummy variable.

The presence of missing observations in trade flows is a major econometric problem in the estimation of gravity model. This can be due to various factors such as measurement error, absence of trade or unreported data etc. These missing observations are considered to be zero (Helpman, Melitz & Rubinstein; 2008). As we convert the model into logarithmic form, these zero trade flows can be dropped out of estimation. This would result in biased estimation as we are losing significant information (Yang & Martinez; 2014). Therefore, Santos Silva & Tenereyo (2006) recommended the use of PPML method in the presence of zero trade flows which is also capable of addressing heteroscedasticity. PPML method allows estimation of gravity model in non-linear form. Further, trade flows are allowed in absolute values while keeping explanatory variables in log form, PPML coefficients can be interpreted in elastic values. Hence, PPML model is considered to be superior over other OLS estimations (Urata and Ukabe, 2014; Yang and Martinez-Zarzoco, 2014; Timisia & Culas, 2019; Pham et.al, 2024; Josic & Basic, 2021; Jagdambe & Kannan, 2020; Khurana & Nauriyal, 2017). Therefore, we rely on PPML method for the estimation of gravity model in this paper.

Analytical Specifications

We employ an augmented gravity model for the estimation of trade creation and trade diversion effects of IJCEPA. We estimated gravity in five different specifications instead of focusing just one. Initially we estimate equation (2) using OLS method which is explained below.

$$lnXijt = ϐ0 + ϐ1\ lnGDPit + ϐ2\ lnGDPjt + ϐ3\ lnDisij + ϐ4\ lnPopit + ϐ5\ lnPopjt + ϐ6\ Borderij + ϐ7\ Comlangij + ϐ8\ FTAbothijt + ϐ9\ FTAexpijt + ϐ10\ FTAimpijt + \varepsilon ij \quad (2)$$

Where, *Xijt* represents bilateral exports from country i to j in the year t. *GDPit* and *GDPjt* denotes reporter country GDP and partner country GDP respectively. It is taken in nominal form as suggested by Baldwin & Taglioni (2006). These variables will represent economic masses of trading countries. Both are expected to have positive coefficients. *Disij* is the geographical distance between the capitals of trading partners. It is added as a proxy for transportation cost. This variable holds an inverse relationship with bilateral trade volume.

Popit and *Popjt* are population size of countries i and j in the year t respectively. A positive coefficient of importer's population can be due to larger import demand as the population increases, whereas a negative coefficient denotes larger absorption capacity of importing country. Exporter's population may have a positive coefficient if the country exports more goods through the production of wide variety of goods and a negative coefficient represents increased domestic consumption (Deme & Ndrianasy, 2016).

Our key explanatory variables are the three FTA dummy variables such as *FTAbothijt, FTAexpijt* and *FTAimpijt*. *FTAbothijt,* is a dummy variable integrated to capture trade creation effect. It attains the value of 1 after 2011, if the country pair is India and Japan and zero otherwise. A positive coefficient depicts trade creation effect and reveals increase in bilateral trade than the normal level between India and Japan after the implementation of IJCECA. A negative coefficient will be the indication of decrease in bilateral trade after the FTA formation. However, adding just one policy variable will not disclose complete trade effects under an FTA. Therefore, following Endoh (1999), Carrere (2006) and Magee (2008) we have included two other FTA dummy variables in order to reflect trade creation and trade diversion effects of exports and imports which is different from the classical Vinerian trade creation and trade diversion effects. *FTAexpijt* is a binary variable that captures export trade creation or diversion effects. It gets the value of one if the exporter is India or Japan and the importer country is from the rest of the world and zero otherwise. A positive and statistically significant coefficient can be attributed to the trade creation effects in the export from member countries to non- member countries. An export diversion effect is well explained by a negative and statistically significant coefficient. *FTAimpijt* is integrated to show import creation and diversion effects. It attains the value of one if the importer is India or Japan and the exporter belongs to the rest of the world and zero otherwise. An import creation effect shows the increase in import by member countries from non-member countries. It is reflected by a positive and statistically significant coefficient. A negative and statistically significant coefficient would be the indication of import diversion effects and illustrates decrease in imports by member countries from non-member countries.

Borderij and *Comlangij* have been added as control variables showing the existence of common border and common official language respectively as explained in natural trading partner hypothesis. Common border has the value of one, if the trading partners share common border and zero otherwise. Country pairs having a common official language get the value of one and zero otherwise. The existence of common geographical border and common official language can enhance bilateral trade flows. There, these variables are expected to have positive coefficients.

By adding time fixed effects, we convert equation (2) into equation (3) and (4) and estimate using OLS and PPML methods respectively.

$$lnXijt = ß0 + ß1\ lnGDPit + ß2\ lnGDPjt + ß3\ lnDisij + ß4\ lnPopit + ß5\ lnPopjt + ß6\ Common\ border + ß7\ Common\ official\ language + ß8\ FTAbothijt + ß9\ FTAexpijt + ß10\ FTAimpijt + \lambda t + \varepsilon ij \quad (3)$$

and

$$Xijt = ß0 + ß1\ lnGDPit + ß2\ lnGDPjt + ß3\ lnDisij + ß4\ lnPopit + ß5\ lnPopjt + ß6\ Common\ border + ß7\ Common\ official\ language + ß8\ FTAbothijt + ß9\ FTAexpijt + ß10\ FTAimpijt + \lambda t + \varepsilon ij \quad (4)$$

Time fixed effects enable the absorption of macroeconomic factors which are time varying. However, the inclusion of time fixed effects will not reveal the true estimators of the model. Baier and Bergstrand (2007) suggest the use of country pair fixed in order to address the problem of endogeneity of FTA dummy variables. Therefore, we incorporate country-pair fixed effects along with the time fixed effects and explained below.

$$lnXijt = ß0 + ß1\ lnGDPit + ß2\ lnGDPjt + ß3\ lnDisij + ß4\ lnPopit + ß5\ lnPopjt + ß6\ Common\ border + ß7\ Common\ official\ language + ß8\ FTAbothijt + ß9\ FTAexpijt + ß10\ FTAimpijt + \lambda t + \pi ij + \varepsilon ij \quad (5)$$

and

$$Xijt = ß0 + ß1\ lnGDPit + ß2\ lnGDPjt + ß3\ lnDisij + ß4\ lnPopit + ß5\ lnPopjt + ß6\ Common\ border + ß7\ Common\ official\ language + ß8\ FTAbothijt + ß9\ FTAexpijt + ß10\ FTAimpijt + \lambda t + \pi ij + \varepsilon ij \quad (6)$$

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Equation (5) and (6) are estimated with OLS and PPML methods respectively. However, the inclusion of country-pair fixed effects will omit time invariant determinants such as distance, common border and common official language from the estimations.

Sample and Data sources

The estimation of gravity model is carried out using a panel data set of India and its 51 trading partners from the year 2000 to 2023. These 51 countries cover more than 90% of India's trade. However, we estimate the data set of 48 countries as the data of Taiwan is unavailable and one of the trading partners is unspecified. We source the data of bilateral trade data from IMF Direction of Trade Statistics (DOTS) and the data on agricultural and manufacture exports are collected from UN Comtrade database. We follow the SITC Rev. 4 nomenclature for the collection of sectoral data. Agriculture data consist of SITC 0, 1, 2 and 4 excluding 27 and 28. Whereas, manufacture data include SITC 5 to 8 excluding 68. The data on GDP and population have been obtained from IMF World Economic Outlook. Centre d'Études Prospectives et d'Informations Internationales (CEPII) provides the data on bilateral distance, Common border and common official language.

Results and Discussions

Table1 Panel data estimation of gravity model for total trade

	Pooled	Only time effects		Time- and country pair effects	
Variables	OLS (1)	OLS (2)	PPML (3)	OLS (4)	PPML (5)
lnGDPit	1.290***	1.374***	0.692***	0.583***	0.578***
	(0.006)	(0.026)	(0.036)	(0.047)	(0.041)
lnGDPjt	0.909***	0.994***	0.760***	0.633***	0.529***
	(0.005)	(0.025)	(0.051)	(0.039)	(0.049)
lnDistij	-0.878***	-0.876***	-0.566***		
	(0.012)	(0.045)	(0.044)		
lnPopit	-0.162***	-0.200***	0.044	0.725***	-0.460***
	(0.007)	(0.030)	(0.058)	(0.134)	(0.148)
lnPopjt	-0.045***	-0.082***	-0.008	0.226**	0.037
	(0.007)	(0.029)	(0.052)	(0.107)	(0.132)
Borderij	0.581***	0.558***	0.800***		
	(0.050)	(0.194)	(0.166)		
ComLangij	0.541***	0.519***	0.219		
	(0.027)	(0.094)	(0.142)		
$FTA_{both}ijt$	-0.961**	-0.794***	-1.176***	0.109	0.210***
	(0.386)	(0.099)	(0.317)	(0.097)	(0.051)
$FTA_{exp}ijt$	-0.035	0.216**	-0.228	0.010	-0.138***
	(0.058)	(0.123)	(0.191)	(0.044)	(0.049)
$FTA_{impi}jt$	0.251***	0.501***	-0.050	0.115	-0.001
	(0.058)	(0.166)	(0.133)	(0.100)	(0.058)
Constant	0.765***	0.004	3.018***	-5.154***	3.766***
	(0.112)	(0.435)	(0.529)	(0.602)	(0.778)
Observations	56,256	56,256	58,785	56,250	58,329
Adjusted R^2	0.63	0.65	0.80	0.92	0.98

Note: Standard errors are in parenthesis; *** p<0.01, ** p<0.05, * p<0.1
Source: Author's Estimations

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Panel data estimation of gravity model has been reported in table 1 using different specifications. Column 1 to 5 represents the estimation of equations 2 to 6 respectively. An increase in the value of R^2 can be observed as the number of fixed effects increases. The standard gravity variables are statistically significant with expected signs under pooled OLS estimation. Common border and common official language depict positive and statistically significant coefficient. Population size of both exporter and importer country have negative and statistically significant coefficient. Among the FTA dummy variables, $FTAboth_{ijt}$ provides negative and statistically significant coefficient and $FTAimp_{ijt}$ has positive and statistically significant coefficient. However, $FTAexp_{ijt}$ is insignificant. The coefficients of these dummy variables are likely to be biased as they ignore time-invariant unobserved heterogeneity and multilateral resistance terms (Yang & Martinez;2014).

Next specifications in column 2 and 3, control time fixed effects and estimate using OLS and PPML methods. Along with the standard gravity variables, common border and common official language also shows consistent signs with statistically significant coefficient. However, common official language is insignificant in column 3. The coefficients of population size of exporter and importer country negatively influence bilateral trade flows in column 2. FTA dummy variables show the presence of trade creation effects. However, these estimations can be unreliable as they are not considering the endogeneity bias of FTA variables.

Therefore, we include country pair fixed effects along with time fixed effects in the model and estimate using OLS and PPML methods. The results are provided in column 4 and 5. However, these estimations omit time invariant determinants of trade flows such as distance, common border and common official language. Again, the GDP of exporter and importer countries are positive and highly significant in both the columns. Population size of exporter and importer countries are positive and statistically significant in column 4 whereas in column 5 exporter's population size is negative and statistically significant. Importer's population size in column 5 is insignificant. All the FTA coefficients are insignificant in column 4. However, as far the FTA dummy variables are concerned, we rely on the PPML estimation with time and fixed effects which is reported in column 5. Since PPML method is capable of dealing with zero trade flows and heteroscedasticity, the coefficients will be unbiased.

A positive and statistically significant coefficient of $FTAboth_{ijt}$ is the indication of trade creation effects after the formation of IJCECA. The average treatment effect is 23.3% (exp (0.210)-1*100). $FTAexp_{ijt}$ depicts export diversion effect. This implies decrease in the exports from India and Japan to non-member countries. The decrease in exports to non-member countries constitute 12.9%. The coefficients of $FTAimp_{ijt}$ remain insignificant.

In order to understand the heterogeneous impact of IJCECA on different sectors, especially on agricultural and manufactured trade, we have estimated the gravity model specification in equation 6 and the results are reported in table 2. This estimation applies PPML method with time and country applies fixed effects. We report only the coefficients of FTA dummy variables as they are variables of main interest. Column 1 provides results of agriculture goods. The coefficient of $FTAboth_{ijt}$ is negative and statistically significant at 1% level. This clearly indicates decrease in agriculture trade after IJCECA formation. The other two FTA dummy variables such as $FTAexp_{ijt}$ and $FTAexp_{ijt}$ are statistically insignificant.

Trade creation and trade diversion effects of manufactured goods under IJCECA are reported in column 2. A positive and statistically significant coefficient of $FTAboth_{ijt}$ reveals trade creation effect. This implies increase in bilateral manufactured goods trade between India and Japan after IJCECA than the

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normal levels. The coefficient of $FTAexp_{ijt}$ is negative and statistically significant at 5% level. This establishes export diversion effects after IJCECA formation. $FTAimp_{ijt}$ is insignificant.

Table 2 :Panel data gravity estimations using PPML method with time and country pair fixed effects

	(1)	(2)
	Agricultural goods	Manufactured goods
Variables		
$FTAboth_{ijt}$	-0.112*** (0.041)	0.320*** (0.029)
$FTAexp_{ijt}$	0.134 (0.095)	-0.089** (0.044)
$FTAimp_{ijt}$	-0.061 (0.50)	-0.006 (0.062)
Year Fixed effects	Yes	Yes
Country-pair Fixed effects	Yes	Yes
Observations	57,666	57,643
Adjusted R^2	0.97	0.98

Note: Standard errors are in parenthesis; *** p<0.01, ** p<0.05, * p<0.1
Source: Author's Estimations

Lagged Effects of India-Japan CECA

Table 3 lagged effects of IJCECA

Variables	Total Exports	Agricultural Exports	Manufacture Exports
FTA(t-1)	0.199*** (0.054)	-0.011 (0.044)	0.210*** (0.026)
FTA(t-2)	-0.016 (0.073)	0.152*** (0.050)	-0.045 (0.089)
FTA(t-3)	-0.063 (0.173)	-0.280*** (0.035)	0.078** (0.041)
Constant	4.627 (0.867)	15.716 (1.313)	13.127 (1.378)
Year Fixed effects	Yes	Yes	Yes
Country-pair Fixed effects	Yes	Yes	Yes
Observations	50,939	50,415	50,396
Adjusted R^2	0.98	0.98	0.98

Note: Standard errors are in parenthesis; *** p<0.01, ** p<0.05, * p<0.1

According to Baier & Bergrstrand (2007) FTAs have 'phased-in effects' as the full implementation of an FTA can be delayed. As the complete implementation of India-Japan CEPA took several years, we also

estimate lagged effects of the FTA. Therefore, we have introduced three lagged values of *FTA1ij*t namely, *FTA(t-1) FTA(t-2)* and *FTA(t-3)*. A positive and significant coefficient indicates 'phased-in effects' of India-Japan CEPA.

Column 1, 2 and 3 in Table 3 shows the lagged effects of India- Japan CEPA on total, agricultural and manufacture exports respectively. The coefficient of *FTA(t-1)* in column 1 is positive and significant. This implies the short-term phased in effects at aggregate level. However, the coefficients of *FTA(t-2)* and *FTA(t-3)* are negative and insignificant in column 1. The lagged effects in agricultural trade are long-term. The coefficient of *FTA(t-2)* is positive and significant. Whereas *FTA(t-3)* is negative and significant. The manufacture sector shows both short and long term phased-in effects as the coefficients of *FTA(t-1)* and *FTA(t-2)* are positive and significant. Therefore, this indicates that in the case of total and manufacture exports there is immediate effects and in agriculture sector it is delayed.

Conclusion

This paper examined trade creation and trade diversion effects of India-Japan CEPA at aggregate and disaggregate level. A panel data set of 51 countries including India and Japan has been estimated using gravity model. In order to address the issue of zero trade flows and heteroscedasticity in the data, we use PPML method for the estimation. As the endogeneity of FTA dummy variables is a major econometric problem while examining the trade effects of FTAs, we incorporate country -pair fixed effects along with time fixed effects.

The findings of the study demonstrate trade creation and export trade diversion effects on aggregate trade flows. Sectoral level analysis reveals heterogeneous impact of IJCEPA on agricultural and manufactured goods trade. We observe trade diversion effects in agriculture sector and trade creation effects in manufacture sector. Furthermore, our results demonstrate short term 'phased-in effect' of IJCEPA on total and manufactured trade. Agricultural sector shows long-term 'phased-in effect'. These findings confirm the ability of India's bilateral FTAs to enhance trade volume among the partner countries. However, the heterogenous impact of among the member countries is an important dimension that must be addressed in the empirical examination of FTAs.

References

Alhassan, A., & Payaslioğlu, C. (2023). Trade Diversion and Creation Effect of Free Trade Agreements in ASEAN: Do Institutions Matter? *Journal of the Knowledge Economy*. https://doi.org/10.1007/s13132-023-01108-z

Anderson, J. E. (1979). A Theoretical Foundation for the Gravity Equation. *The American Economic Review,* 59(1), 106-116.

Anderson, J. E., & Wincoop, E. V. (2003). *Gravity with Gravitas: A Solution to the Border Puzzle*. *93*.

Anderson, J. E., and Y. V. Yotov. 2016. Terms of trade and global efficiency effects of free trade agreements, 1990–2002. *Journal of International Economics 99*:279–298. doi: 10.1016/j.jinteco.2015.10.006.

Ando, M., Urata, S., & Yamanouchi, K. (2022). Do Japan's Free Trade Agreements Increase Its International Trade? *Journal of Economic Integration*, *37*(1), 1–29. https://doi.org/10.11130/jei.2022.37.1.1

Baier, S. L., & Bergstrand, J. H. (2007). Do free trade agreements actually increase members' international trade? *Journal of International Economics*, *71*(1), 72–95. https://doi.org/10.1016/j.jinteco.2006.02.005

Baldwin, R., & Taglioni, D. (2006). *Gravity for Dummies and Dummies for Gravity Equations* (No. w12516; p. w12516). National Bureau of Economic Research. https://doi.org/10.3386/w12516

Bergstrand, J. H. (1985). The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence. *The Review of Economics and Statistics*, *67*(3), 474. https://doi.org/10.2307/1925976

Bergstrand, J. H. (1989). The Generalized Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade. *The Review of Economics and Statistics*, *71*(1), 143. https://doi.org/10.2307/1928061

Bharti, S. K., & Nisa, S. (2023). Evaluation of the Impact of Regional Trade Agreements on Indian Exports. *Journal of Asian Economic Integration*, *5*(1), 51–63. https://doi.org/10.1177/26316846221150591

Bhattacharyya, R., & Mandal, A. (2016). India–ASEAN Free Trade Agreement: An ex post evaluation. *Journal of Policy Modeling*, *38*(2), 340–352. https://doi.org/10.1016/j.jpolmod.2016.02.001

Deme, M., & Ndrianasy, E. R. (2017). Trade-creation and trade-diversion effects of regional trade arrangements: Low-income countries. *Applied Economics*, *49*(22), 2188–2202.

Drabik, D. (2007). *Trade Creation and Diversion in the Enlarged EU Market: Evidence for Agricultural Trade in Slovakia*. *9*.

Economic Survey of India (2024). Retrieved from https://www.indiabudget.gov.in/economicsurvey/

Gaurav.K & Bharti.N (2019). Some Common Lessons from Uncommon FTAs. *South Asia Economic Journal*, *1-20*. DOI: 10.1177/1391561418824479

Helpman, E., and P. R. Krugman. 1985. *Market structure and foreign trade*. Cambridge, MA: MIT Press.

Helpman, E., M. Melitz, and Y. Rubinstein. 2008. Estimating trade flows: Trading partners and trading volumes. *Quarterly Journal of Economics 123* (2):441–487. doi: 10.1162/qjec.2008.123.2.441.

Heo, Y., & Doanh, N. K. (2020). Is NAFTA Trade-Creating or Trade-Diverting? A System GMM Approach. *Economic Papers: A Journal of Applied Economics and Policy*, *39*(3), 222–238. https://doi.org/10.1111/1759-3441.12281

Jagdambe, S., & Kannan, E. (2020). Effects of ASEAN-India Free Trade Agreement on agricultural trade: The gravity model approach. *World Development Perspectives*, *19*, 100212. https://doi.org/10.1016/j.wdp.2020.100212

Jayasinghe, S., & Sarker, R. (2008). Effects of Regional Trade Agreements on Trade in Agrifood Products: Evidence from Gravity Modeling Using Disaggregated Data. *Review of Agricultural Economics*, *30*(1), 61–81. https://doi.org/10.1111/j.1467-9353.2007.00392.x

Jošić, H., & Bašić, M. (2021). Trade creation and trade diversion effects from Croatia's CEFTA and EU membership. *Ekonomski Pregled*, *72*(4), 489–521. https://doi.org/10.32910/ep.72.4.1

Khati, P., & Kim, C. (2022). Impact of India's Free Trade Agreement with ASEAN on Its Goods Exports: A Gravity Model Analysis. *Economies*, *11*(1), 8. https://doi.org/10.3390/economies11010008

ISBN code 978-93-83302-74-1

Khurana, R., & Nauriyal, D. K. (2017). ASEAN-India free trade agreement: Evaluating trade creation and trade diversion effects. *Journal of East-West Business*, *23*(3), 283–307.

Kuenzel, D. J., & Sharma, R. R. (2021). Preferential trade agreements and MFN tariffs: Global evidence. *European Economic Review*, *138*, 103850. https://doi.org/10.1016/j.euroecorev.2021.103850

Kumari, M. (2025). A Review of ASEAN-India Free Trade Agreement After a Decade: Evidence from Structural Gravity Model Estimates. *Journal of East-West Business*, 1–29. https://doi.org/10.1080/10669868.2025.2465724

Lambert, D., & McKoy, S. (2009). Trade Creation and Diversion Effects of Preferential Trade Associations on Agricultural and Food Trade. *Journal of Agricultural Economics*, *60*(1), 17–39. https://doi.org/10.1111/j.1477-9552.2008.00184.x

Lateef, M., Tong, G.-J., & Riaz, M.-U. (2018). Exploring the Gravity of Agricultural Trade in China–Pakistan Free Trade Agreement. *The Chinese Economy*, *51*(6), 522–533. https://doi.org/10.1080/10971475.2018.1481008

Mattoo, A., Mulabdic, A., & Ruta, M. (2022). Trade creation and trade diversion in deep agreements. *Canadian Journal of Economics/Revue Canadienne d'économique*, *55*(3), 1598–1637.

Pham, U., Vo, U., Trinh, Q., & Le, H. (2024). Impact of Hong Kong-ASEAN Free Trade Agreement: An assessment from the trade creation and trade diversion perspectives. *Cogent Social Sciences*, *10*(1), 2338501. https://doi.org/10.1080/23311886.2024.2338501

Philippidis, G., Resano-Ezcaray, H., & Sanjuán-López, A. I. (2013). Capturing zero-trade values in gravity equations of trade: An analysis of protectionism in agro-food sectors. *Agricultural Economics*, *44*(2), 141–159. https://doi.org/10.1111/agec.12000

Pöyhönen, P. (1963). A Tentative Model for the Volume of Trade between Countries. *Weltwirtschaftliches Archiv,* 90(1963), 93-100

Rojas Rodríguez, J. R., & Matschke, X. (2023). The CAFTA-DR Free Trade Agreement—Analyzing its effects in a modern gravity framework. *International Economics and Economic Policy*, *20*(1), 27–93. https://doi.org/10.1007/s10368-022-00551-8

Sikdar, C., & Nag, B. (n.d.). *Impact of India-ASEAN Free Trade Agreement: A cross-country analysis using applied general equilibrium modelling*.

Silva, J. M. C. S., & Tenreyro, S. (2006). The Log of Gravity. *The Review of Economics and Statistics*, *88*(4), 641–658. https://doi.org/10.1162/rest.88.4.641

Singh, A. B. (2021). *Rules of Origin and Changes in the Customs Law and Procedures*. *30*.

Sun, L., & Reed, M. R. (2010). Impacts of free trade agreements on agricultural trade creation and trade diversion. *American Journal of Agricultural Economics*, *92*(5), 1351–1363.

Taguchi, H. (n.d.). *Trade Impacts of South Asian Free Trade Agreements: The Case of Sri Lanka*.

Timsina, K. P., & Culas, R. J. (2020). Do Free Trade Agreements Increase Australian Trade: An Application of Poisson Pseudo Maximum Likelihood Estimator? *Journal of East-West Business*, *26*(1), 56–80. https://doi.org/10.1080/10669868.2019.1685056

Tinbergen, J. 1962. *Shaping the world economy: Suggestions for an international economic Policy*. New York, NY: The Twentieth Century Fund.

ISBN code 978-93-83302-74-1

Urata, S., & Okabe, M. (2014a). Trade Creation and Diversion Effects of Regional Trade Agreements: A Product-level Analysis. *The World Economy*, *37*(2), 267–289. https://doi.org/10.1111/twec.12099

Urata, S., & Okabe, M. (2014b). Trade Creation and Diversion Effects of Regional Trade Agreements: A Product-level Analysis. *The World Economy*, *37*(2), 267–289. https://doi.org/10.1111/twec.12099

Veeramani, C., & Saini, G. K. (2011). *Impact of ASEAN-India Preferential Trade Agreement on Plantation Commodities: A Simulation Analysis*. *10*.

Vollrath, T. L., Gehlhar, M. J., & Hallahan, C. B. (2009). Bilateral Import Protection, Free Trade Agreements, and Other Factors Influencing Trade Flows in Agriculture and Clothing. *Journal of Agricultural Economics*, *60*(2), 298–317. https://doi.org/10.1111/j.1477-9552.2008.00186.x

Yang, S., & Martinez-Zarzoso, I. (2014). A panel data analysis of trade creation and trade diversion effects: The case of ASEAN–China Free Trade Area. *China Economic Review*, *29*, 138–151. https://doi.org/10.1016/j.chieco.2014.04.002

Zolin, M. B., & Uprasen, U. (2018). Trade creation and diversion: Effects of EU enlargement on agricultural and food products and selected Asian countries. *Asia Europe Journal*, *16*(4), 351–373. https://doi.org/10.1007/s10308-018-0508-7

ISBN code 978-93-83302-74-1