Heterogeneous Impacts of Free Trade Agreements: The Case of Japan*

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Abstract
This paper investigates the trade creation effects of Japan's free trade agreements (FTAs) using aggregate trade data for the years 1996–2015. We estimate various specifications of a gravity model. Our main finding is that the effects of Japan's FTAs are not clearly observed when the gravity model is specified with three types of fixed effects (i.e., exporter-year fixed effects, importer-year fixed effects, and country-pair fixed effects). In fact, the effects of FTAs vary substantially among trade partners and around half of the FTAs increase Japan's trade values. Our results also suggest that FTAs with small trade partners tend to have large effects on Japan as well as other countries. Recently enforced FTAs, however, increase Japan's import values more rapidly.

1. Introduction

Free trade agreements (FTAs) are currently the dominant form of commercial policy. The pattern of trade policies in the last two decades has been characterized mainly by the proliferation of FTAs. According to the Regional Trade Agreements Information System in the World Trade Organization (WTO), the cumulative number of physical regional trade agreements increased from 24 in 1992 to 286 in 2017.[1]

Japan started to seek trade liberalization through FTAs around 2000 and established the first FTA with Singapore in 2001. Since then, 15 FTAs with 17 countries have been established by August 2018.[2] In addition, Japan recently signed two important multilateral trade

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1 See http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx (last accessed 30 August 2018).

2 See Table 1 for the list of partner countries. More detailed information is available in Ando and Urata (2015). While most of Japan's trade deals are economic partnership agreements, covering a wide range of issues, we use the term FTA throughout the paper for brevity.

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agreements, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership and the economic partnership agreement with the EU. Although East Asian countries including Japan began forming FTA networks only recently, they are catching up with Western countries and are expected to play a vital role against protectionism.

This paper investigates the trade creation effects of Japan's FTAs. We focus on Japan for three reasons. First, despite increasing interest among policymakers, the ex post evaluation of FTAs is extremely limited. No papers apply recently developed methods of analysis to Japan's FTAs. The gravity model, which is commonly used in ex post studies, is developing rapidly in the academic literature and is now estimated differently from the way it was ten years ago. Furthermore, some recent studies show that different FTAs have very different effects, and trade creation effects are not clearly observed in some cases. Even under FTAs, Japan has not eliminated trade barriers for agricultural goods, which are heavily protected by most favored nation (MFN) tariff rates. In addition, MFN tariff rates on manufacturing goods are already low and there is little scope to reduce them further through FTAs. It is therefore unclear whether Japan's FTAs have increased its own trade values. Trade creation is crucial for demonstrating the positive welfare effects of FTAs; if trade creation does not occur, a reconsideration of Japan's trade and commercial policies would be called for.

The second reason is that Japan provides a suitable case study for exploring the heterogeneous effects of FTAs in the context of the surge in regionalism and the proliferation of bilateral trade agreements since the 1990s. European countries trade mainly among themselves and they established trade agreements with each other soon after World War II. The United States also established trade agreements with its major trading partners, Canada and Mexico, around 1990 by signing the Canada–U.S. Free Trade Agreement and the North American Free Trade Agreement (NAFTA). In contrast, Japan, the world's fourth largest exporter and third largest economy, began negotiations of bilateral trade agreements with the countries of ASEAN after 2000.

Finally, Japan's FTA partners vary substantially in terms of economic development, ranging from Cambodia, Laos, and Myanmar to Australia, Singapore, and Switzerland. The differences in the trade creation effects across different FTAs can be attributed to the characteristics of the partner countries.

The objective of this paper is to evaluate Japan's FTAs. To this end, we first estimate the effects of Japan's and other countries' FTAs using a state-of-the-art gravity model.[3] We include three types of fixed effects and estimate using Poisson pseudo maximum

3 In the first stage, we estimate the crude effects of FTAs. Various kinds of related factors such as interactions among other FTAs and the formation of production networks are included.

likelihood (PPML).[4] We estimate the gravity model using various specifications to compare the coefficients for the FTA dummies. In addition, the effects of each of the FTAs are separately identified to take heterogeneity into account. Then the estimated crude effects of individual FTAs are regressed on some variables to explore which FTAs have larger effects. This paper therefore contributes to the literature by examining the determinants of successful FTAs.

The structure of the paper is as follows. We briefly review the literature on the impacts of FTAs in the next section. In Section 3, we describe the source of the data and provide a descriptive analysis. Section 4 discusses the econometric methodology for estimating the gravity model. Results of the estimation are presented in Section 5, followed by conclusions in Section 6.

2. Related literature

FTAs are major instruments for promoting international trade in the 21st century. The ex post effects of FTAs are usually estimated using a gravity model; Baier and Bergstrand (2007) recommend the use of panel data to remove all time-invariant bilateral factors not controlled for in the traditional specification. A similar specification is applied in Magee (2008), although the effects of FTAs weaken when the gravity model is estimated with fixed effects. Cipollina and Salvatici (2010) conduct a meta-analysis and robustly reject the hypothesis that FTAs have no effects. Large effects are also confirmed in Eicher, Henn, and Papageorgiou (2012).

Although the effects of FTAs have been established in many papers, Kohl (2014) notes that the trade creation effects are heterogeneous and only about one-quarter of agreements are actually trade-promoting.[5] Heterogeneity is also studied in Baier, Yotov, and Zylkin (2019) and Baier, Bergstrand, and Clance (2018). Zylkin (2016) examines the heterogeneous effects of FTAs, using the case of NAFTA. The differences between these papers and ours are three-fold. First, we focus on the heterogeneity of directional effects rather than agreement-specific effects or pair-specific effects. This is because Japan's FTAs are bilateral except for the agreements with ASEAN (ASEAN–Japan Comprehensive Economic Partnership, AJCEP), initially applied in December 2008 between Japan and four countries in ASEAN. Second, we compare the coefficients estimated in various specifications to consider what is important for the evaluation. This analysis provides a good benchmark for future studies because our state-of-the-art specification is computationally burdensome. Finally, our

4 The roles of these fixed effects are discussed in Section 4.

5 Among the 166 agreements studied in Kohl (2014), only 44 agreements have a trade-promoting effect.

sample period, 1996–2015, includes recent agreements. Because Kohl (2014) finds that FTAs signed after 1990 have smaller effects, extending the sample period is not a trivial point.

Some papers examine FTAs in Japan or East Asia.[6] Ando and Urata (2011) investigate the impact of the Japan–Mexico economic partnership agreement and find large trade-creation effects for some products. Ando and Urata (2015) conduct a similar analysis for three of Japan's FTAs with Malaysia, Thailand, and Indonesia. Yamanouchi (2017) examines the effects of Japan's FTAs by using the Trade Statistics of Japan published by the Ministry of Finance and Japan Customs. Although the effects of individual FTAs are estimated in these papers, only Japan's trade data are used. The trade values of Japan's FTA partners with third countries are not considered. Vietnam, for example, is undertaking rapid liberalization, including WTO accession in 2007. It is therefore useful to separately identify the effects of Japan's FTAs with Vietnam from the effects of Vietnam's unilateral trade liberalization. Okabe (2015) explores FTAs formed by ASEAN countries and their trade partners, so AJCEP is studied in that paper. She concludes that the impact of AJCEP is unclear. Furthermore, while the effects of each of Japan's FTAs are estimated, a country-pair dummy is not included in the specification.

In this paper, we use world trade data to estimate the effects of Japan's FTAs. We estimate various specifications of a gravity model and place emphasis on the importance of estimating the effects of FTAs using the correct specification. In addition, we discuss the characteristics of the partners with which FTAs are working well.

3. Data

The trade data used in this paper are obtained from UN Comtrade. The sample period extends from 1996 to 2015. We first construct a large data set of 156 countries to interpolate missing trade values. Then the sample to estimate the gravity model is limited to 69 countries.

We include a country in the data set if its import data are available for more than 11 years during the period 1996–2015. All of Japan's FTA partners are then added regardless of data availability. Many countries have some missing import data. We interpolate the missing import values using the export data reported by exporters. Because import values are reported as cost, insurance, and freight, and export values are reported as free on board, the

6 Some papers study the effects of FTAs in East Asia other than for Japan. Yean and Yi (2014), for example, explore the ASEAN–China FTA. Chia (2013, 2015) discusses the prospect of economic integration in the region.

gap must be estimated.[7] We regress import values on a quartic of export values, a quartic of bilateral distance (population weighted), a quartic of log of importer GDP, a quartic of log of importer population, other gravity variables (a contingency dummy, a common colonizer dummy, and a common language dummy), variables related to trade policies (a FTA dummy, a customs union dummy, a partial scope agreement dummy, a common currency dummy, an importer EU dummy, and an importer WTO dummy), and an exporter-year fixed effect. We obtained these variables, other than some trade policy variables, from the CEPII Web site, constructed by Head, Mayer, and Ries (2010) and Head and Mayer (2014).[8] The information on the FTA, customs union, and partial scope agreement dummies is obtained from the Mario Larch Regional Trade Agreements Database from Egger and Larch (2008).[9]

The actual and predicted values have a high correlation coefficient of 0.92, suggesting that the estimation is valid and the missing import values are well approximated by the corresponding export values.

The sample we use in the main analysis is smaller because of computational difficulty. We then select the countries by ranking trade values averaged over 20 years. The sample includes Japan's FTA partners and the countries with a ranking of export or import values higher than 60. Our sample includes 69 countries.[10]

Table 1 shows the evolution of Japan's exports to all countries and FTA partners. The trade flows under FTAs are shaded. Japan's exports to all countries were around US$ 410 billion in 1996. The total export value has increased rapidly over the period 2003–08. Although Japan's total exports collapsed during the 2008–09 global financial crisis, they soon recovered before decreasing slightly. From Table 1, it is difficult to identify the effects of Japan's FTAs because most of them were enforced during the expansion period, although the export values increased after the enforcement. In addition, although export values to developing countries such as Myanmar and Vietnam grew most rapidly, we must account for the impacts of the deepening integration of the world economy.

7 In our data set, the correlation of trade values reported by importers and by exporters is 0.88, but the mean of the logged trade gap (the difference between log of import values and log of export values) is 0.26 and the median is 0.14.

8 The data set is available at Centre d'Etudes Prospectives et d'Informations Internationales (CEPII): www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=8 (last accessed 2 September 2018).

9 The data set is available at www.ewf.uni-bayreuth.de/en/research/RTA-data/index.html (last accessed 2 September 2018).

10 Mongolia is included in the sample as an FTA partner of Japan; however, the FTA was not enforced in the sample period.

Table 1. Evolution of Japan's export values to FTA partners

FTA partner	Export 1996 (million US dollars)	Export value in 1996 = 100																		
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Singapore	23,842	97	71	77	97	67	61	64	80	80	83	90	108	78	102	110	99	85	84	77
Mexico	3,837	116	118	132	168	210	243	197	275	340	398	425	424	297	391	429	460	445	457	452
Malaysia	19,225	90	59	70	89	73	74	74	88	86	90	98	101	80	107	111	104	93	87	71
Chile	950	111	104	66	73	57	56	74	104	133	154	208	338	167	357	308	273	260	248	221
Thailand	20,445	78	49	59	74	67	72	89	109	127	126	146	163	122	185	206	242	200	174	152
Indonesia	8,504	97	50	34	63	55	51	49	71	81	64	76	177	115	199	228	267	226	199	155
Brunei	139	169	72	61	68	51	147	89	100	124	154	127	242	192	176	201	192	150	104	171
Laos	49	80	54	72	70	45	62	54	58	78	90	149	263	297	67	89	147	226	185	148
Myanmar	106	90	84	93	273	367	171	213	191	186	221	359	514	549	206	377	835	1605	1544	1447
Vietnam	1,208	113	120	152	190	180	207	246	294	337	389	512	682	618	746	861	960	957	1064	1174
Philippines	7,578	104	84	86	91	92	104	109	106	111	101	95	93	76	96	92	91	73	73	89
Switzerland	2,112	100	100	108	110	95	83	100	116	111	117	138	183	156	167	221	238	190	188	166
Cambodia	81	104	86	109	72	75	78	96	102	123	159	173	140	146	192	305	294	214	324	520
India	2,186	97	112	116	101	81	97	106	135	168	216	266	356	305	378	513	565	479	455	440
Peru	440	109	121	108	110	97	93	83	81	101	128	178	290	210	311	298	341	326	251	244
Australia	7,859	106	106	110	119	106	115	141	163	175	174	202	229	171	223	236	250	228	196	188
World (156 countries)	410,174	102	94	101	117	103	106	119	142	151	163	180	198	149	188	206	206	189	182	164

Source: *UN Comtrade. Trade values are basically reported by importers, and missing values are interpolated from corresponding export values.*

The evolution of Japan's import values is like that of its export values. As shown in Table 2, total imports almost doubled over the period 2003–08. After the collapse in 2009, import values recovered quickly but then decreased. As for each of the FTA partners, import values have grown more rapidly than export values. For example, imports from Cambodia have increased by 147 times in the last two decades.

Overall, we cannot conclude from this simple analysis that FTAs have had significant effects on Japan's international trade, although trade with some countries increased rapidly after an FTA was enforced. Instead, we turn to explore the contribution of FTAs using a correctly specified gravity model with three types of fixed effects.

4. Estimation method

In this paper, we use the standard gravity framework established by Anderson and van Wincoop (2003), in which the bilateral trade value from country i to country j, $p_{ij}x_{ij}$, takes the form

$$p_{ij}x_{ij} = \frac{Y_i E_j}{Y}\left(\frac{t_{ij}}{\Pi_i P_j}\right)^{1-\sigma}, \tag{1}$$

where Y_i, E_j, Y, t_{ij}, P_j, Π_i, and σ denote the total sales of country i, the total expenditure in country j, the sum of the sales all over the world, bilateral iceberg trade costs from country i to country j, an inward multilateral resistance term, an outward multilateral resistance term, and the elasticity of substitution, respectively.

We estimate the following equation, based on Baier and Bergstrand (2007) and Yotov et al. (2016), corresponding to equation (1):

$$\begin{aligned} Trade_{ijt} = \exp(&\alpha^W FTA^W_{ijt} + \alpha^{JX} FTA^{JX}_{ijt} + \alpha^{JM} FTA^{JM}_{ijt} + \beta_1 CU_{ijt} \\ &+ \beta_2 PSA_{ijt} + \beta_3 CommonCurrency_{ijt} + \delta^B_{ij} + \delta^X_{it} + \delta^M_{jt}) + \varepsilon_{ijt}, \end{aligned} \tag{2}$$

where $Trade_{ijt}$ is the aggregate trade value from country i to country j at year t. FTA^W_{ijt} is a dummy variable and equal to 1 if the trading countries are included together in an FTA and both are not Japan. FTA^{JX}_{ijt} and FTA^{JM}_{ijt} are FTA dummies and equal to 1 if the trading countries are included together in an FTA and the exporter or importer is Japan. The FTA dummies are separated by partners in the estimating equation when we focus on the heterogeneity of FTAs across partners. We interpret positive coefficients for these FTA dummies as evidence of trade creation.[11] CU_{ijt} is equal to 1 if both countries are included

11 The estimated coefficients for the FTA dummies are considered to be average effects over time. Although we do not explicitly consider the phase-in effects in the first stage, it is partially addressed in the second stage.

Table 2. Evolution of Japan's import values to FTA partners

FTA partner	Import 1996 (million US dollars)	Import value in 1996 = 100																		
		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Singapore	7,323	80	64	74	87	73	68	74	85	91	102	96	107	83	111	118	119	101	107	107
Mexico	1,890	85	65	87	126	106	95	94	114	134	149	167	201	148	184	210	233	223	226	251
Malaysia	11,750	96	73	92	123	109	95	107	120	124	131	148	197	142	193	259	279	253	248	182
Chile	2,763	107	86	91	102	88	77	95	151	185	262	295	286	192	280	355	337	290	294	217
Thailand	10,212	93	80	86	103	101	102	116	138	152	165	179	203	156	205	240	231	215	212	200
Indonesia	15,194	96	71	82	107	97	93	108	123	137	158	174	214	143	186	224	212	190	168	130
Brunei	1,392	100	74	75	118	121	109	131	135	164	167	179	326	239	295	409	430	340	288	168
Laos	23	90	85	58	51	29	28	31	34	34	52	51	77	115	161	415	527	458	491	416
Myanmar	103	96	87	98	116	99	106	135	174	198	239	287	306	331	375	573	653	738	837	840
Vietnam	2,018	108	86	97	130	129	125	153	191	225	262	303	450	344	405	572	747	705	764	750
Philippines	4,522	110	98	117	159	141	144	155	182	170	176	193	186	141	175	197	206	204	225	196
Switzerland	3,563	96	84	94	92	92	92	108	135	141	143	146	180	176	190	220	230	204	202	207
Cambodia	7	200	245	526	795	1005	1141	1362	1519	1606	1831	2117	1843	2172	3165	4691	6158	8882	11761	14755
India	2,843	93	76	79	92	78	73	76	91	112	142	146	184	131	200	240	246	248	245	171
Peru	427	127	67	68	82	99	100	101	159	164	309	523	495	389	510	548	656	619	411	290
Australia	14,229	102	91	90	104	101	98	105	136	172	196	219	334	244	316	398	396	358	338	244
World (156 countries)	327,328	98	81	90	110	102	98	112	133	151	169	182	223	162	203	251	261	245	239	182

Source: *UN Comtrade. Trade values are basically reported by importers, and missing values are interpolated from corresponding export values.*

in the same customs union. Similarly, PSA_{ijt} is a partial scope agreement dummy and $CommonCurrency_{ijt}$ is a common currency dummy. δ_{ij}^{B} is a country-pair fixed effect and reflects all time-invariant factors that affect the bilateral trade values, such as distance, language, and the historical relationship between two countries. δ_{it}^{X} is an exporter-year fixed effect and reflects the production capacity of the exporter, outward multilateral resistance, and unilateral trade policies such as WTO accession. Finally, δ_{jt}^{M} is an importer-year fixed effect and reflects the total expenditure of the importer, inward multilateral resistance, and unilateral trade policies such as the reduction of MFN tariff rates. In addition, the combination of these two country-year fixed effects controls for the log of the levels of the bilateral exchange rates. In all estimations, standard errors are clustered by country pair.

Equation (2) is estimated initially by ordinary least squares (OLS). Recently, however, the bias of the OLS estimator has been pointed out. Santos Silva and Tenreyro (2006) show that when a log-linearized model such as the gravity model is estimated by OLS, heteroskedasticity affects both consistency and efficiency. They recommend specifying the conditional variance as proportional to the conditional mean and estimating the log-linearized model by PPML. Our baseline specification is therefore the estimation with three types of fixed effects by PPML.[12] We can deal with the zero trade flows problem by PPML. In addition, the use of PPML is supported by the need to satisfy the adding up constraint (Arvis and Shepherd 2013; Fally 2015).

To explore the role of the country-pair fixed effects, we also estimate the gravity equation as follows:

$$\begin{aligned} Trade_{ijt} = \exp(&\alpha^{W} FTA_{ijt}^{W} + \alpha^{IX} FTA_{ijt}^{IX} + \alpha^{IM} FTA_{ijt}^{IM} + \beta_1 CU_{ijt} + \beta_2 PSA_{ijt} \\ &+ \beta_3 CommonCurrency_{ijt} + \gamma_1 \ln dist_{ij} + \gamma_2 Contiguity_{ij} + \gamma_3 CommonLanguage_{ij} \\ &+ \gamma_4 CommonColonizer_{ij} + \delta_{it}^{X} + \delta_{jt}^{M}) + \varepsilon_{ijt}. \end{aligned} \tag{3}$$

In this specification, log of distance, a contingency dummy, a common language dummy, and a common colonizer dummy are added instead of the country-pair fixed effect. Compared with equation (2), this specification ignores the effects of unobservable factors related to the level of bilateral trade flows. The endogeneity bias of trade policies becomes severe if those factors are closely related to the determinants of trade policies.

We also estimate a panel version of the naïve gravity equation (Head and Mayer 2014). In this specification, country-year fixed effects are dropped as follows:

12 PPML with high-dimensional fixed effects is computationally demanding. In this paper, we use the Stata command *ppml_panel_sg* written by Larch et al. (2017). See their paper for the detailed procedure.

$$\begin{aligned} Trade_{ijt} = \exp(&\alpha^W FTA^W_{ijt} + \alpha^{IX} FTA^{IX}_{ijt} + \alpha^{IM} FTA^{IM}_{ijt} + \beta_1 CU_{ijt} + \beta_2 PSA_{ijt} \\ &+ \beta_3 CommonCurrency_{ijt} + \lambda_1 \ln GDP_{it} + \lambda_2 \ln GDP_{jt} \\ &+ \lambda_3 \ln Population_{it} + \lambda_4 \ln Population_{jt} + \lambda_5 \ln Remoteness_{it} \\ &+ \lambda_6 \ln Remoteness_{jt} + \lambda_7 WTO_{it} + \lambda_8 WTO_{jt} + \delta^B_{ij} + \delta^T_t) + \varepsilon_{ijt}, \end{aligned} \tag{4}$$

where $Remoteness_{it} = \left(\sum_{j \neq i} \frac{GDP_{jt}}{dist_{ij}} \right)^{-1}$ is the inverse of the market potential function and measures the degree of isolation from the rest of the world. $Remoteness_{jt}$ is defined in the same way and it is the inverse of supply potential. Other additional explanatory variables are log of GDP, log of population, a WTO dummy, and a year fixed effect. In this specification, multilateral resistance terms are not included. Although the remoteness indices are used instead, Anderson and van Wincoop (2003) and Head and Mayer (2014) criticize their use because the indices do not have a solid theoretical foundation. Furthermore, the coefficients for the FTA dummies are biased if FTAs enter into force simultaneously with unilateral trade liberalization other than WTO accession.

5. Estimation results

In this section, we provide the estimation results of equations (2)–(4). We first estimate the average treatment effects of all FTAs. Japan's FTAs are then separated from the other FTAs. We further decompose the effects of Japan's FTAs by partner countries. Individual FTAs all over the world are also investigated to explore the determinants of successful FTAs.

5.1 Trade creation effects of all FTAs

Before estimating the effects of Japan's FTAs, we first estimate the effects of all FTAs. We start with the results of the traditional gravity specification (equation [4]) by OLS. As reported in column (1) of Table 3, the coefficients for the FTA dummy and the customs union dummy are both positive and statistically significant. The coefficients for the other gravity variables are also consistent with the standard gravity model estimates in previous studies.

We also estimate equation (3) and report the results in column (2). Although the coefficient for the FTA dummy is significantly positive, it has halved in value. This implies that FTAs are more likely to be signed between country pairs with high ex ante trade values, conditional on gravity variables. This is the opposite result to that of Baier and Bergstrand (2007), but it is qualitatively consistent with Magee (2008). The coefficient for the customs union dummy increases. Overall, the coefficients for the other country-year variables are positive and statistically significant as expected.

Table 3. Estimation results for overall FTAs

Variables	(1) OLS	(2) OLS	(3) OLS	(4) PPML	(5) PPML	(6) PPML	(7) PPML w/o zero
FTA	0.367***	0.202***	0.118***	0.374***	0.104**	−0.00703	−0.00786
	(5.856)	(6.216)	(3.266)	(5.655)	(2.051)	(−0.127)	(−0.142)
CU	0.238**	0.561***	0.292***	0.656***	0.448***	0.0606	0.0535
	(2.363)	(9.950)	(4.390)	(6.536)	(6.739)	(0.786)	(0.688)
PSA	0.0181	0.0768	0.0663	−0.154	0.0993	−0.000895	−0.00176
	(0.231)	(0.989)	(0.837)	(−1.431)	(1.631)	(−0.0207)	(−0.0407)
Common currency	−0.584***	−0.139***	−0.00833	−0.122	0.0302	−0.0386	−0.0396
	(−6.059)	(−4.521)	(−0.209)	(−1.590)	(0.907)	(−1.251)	(−1.284)
ln(Distance)	−1.108***			−0.669***			
	(−27.46)			(−17.48)			
Contiguity	0.612***			0.353**			
	(4.019)			(2.257)			
Common colonizer	0.635***			0.407***			
	(5.358)			(6.170)			
Common language	0.509***			0.122*			
	(6.936)			(1.938)			
Exporter ln(GDP)		0.0710***			0.268***		
		(7.134)			(3.145)		
Importer ln(GDP)		0.218***			0.740***		
		(16.61)			(23.22)		
Exporter ln(Population)		1.448***			0.698***		
		(12.86)			(5.788)		
Importer ln(Population)		0.555***			0.0680		
		(7.393)			(0.611)		
Exporter ln(Remoteness)		0.233**			0.746***		
		(2.035)			(5.415)		
Importer ln(Remoteness)		−0.0708			−0.119		
		(−0.601)			(−0.898)		
Exporter WTO		0.594***			0.366***		
		(12.65)			(5.632)		
Importer WTO		0.465***			0.226***		
		(10.33)			(4.945)		
Observations	91,267	91,262	91,262	93,840	93,760	93,760	91,262
Exporter-year fixed effects	Yes	No	Yes	Yes	No	Yes	Yes
Importer-year fixed effects	Yes	No	Yes	Yes	No	Yes	Yes
Exporter-importer fixed effects	No	Yes	Yes	No	Yes	Yes	Yes

Source: *Author's calculations.*

Note: *Robust t-statistics in parentheses. CU = customs union dummy; FTA = free trade agreement dummy; PSA = partial scope agreement dummy.* ***Statistically significant at the 1 percent level; **statistically significant at the 5 percent level; *statistically significant at the 10 percent level.*

Column (3) of Table 3 shows the estimation results with all three types of fixed effects. Again, although the coefficient for the FTA dummy is positive and statistically significant, it has decreased compared with columns (1) and (2). This result implies that the role of trade policies is overestimated when the gravity model is specified with all three types of fixed effects.

The results of the estimations by PPML are almost the same as those by OLS. As reported in columns (4)–(6), the coefficients for the FTA dummies and the customs union dummies are positive and statistically significant. One notable difference between the results of OLS and PPML is that when three types of fixed effects are included, the coefficients for the FTA

Table 4. Estimation results for Japan's FTAs and others

Variables	(1) OLS	(2) OLS	(3) OLS	(4) PPML	(5) PPML	(6) PPML	(7) PPML w/o zero
Japan's FTA (export)	0.672***	−0.191*	0.178	0.504***	−0.00362	0.0672	0.0667
	(3.636)	(−1.758)	(1.583)	(3.245)	(−0.0249)	(0.781)	(0.775)
Japan's FTA (import)	0.760	−0.0525	0.106	0.423*	0.173**	0.0864	0.0855
	(1.615)	(−0.513)	(0.808)	(1.821)	(2.516)	(1.312)	(1.296)
Other FTA	0.397***	0.154***	0.0517	0.296***	0.0738	−0.0439	−0.0460
	(6.164)	(4.789)	(1.437)	(4.267)	(1.430)	(−0.684)	(−0.716)
Observations	91,267	91,262	91,262	93,840	93,760	93,760	91,262
Exporter-year fixed effects	Yes	No	Yes	Yes	No	Yes	Yes
Importer-year fixed effects	Yes	No	Yes	Yes	No	Yes	Yes
Exporter-importer fixed effects	No	Yes	Yes	No	Yes	Yes	Yes

Source: *Author's calculations.*

Note: *Robust t-statistics in parentheses. OLS = ordinary least squares; PPML = Poisson pseudo maximum likelihood.* ***Statistically significant at the 1 percent level;* **statistically significant at the 5 percent level;* *statistically significant at the 10 percent level.*

dummies and the customs union dummies decrease to almost zero, which means that these trade policies have no trade creation effects on average.

A potential reason for the lack of significant effects is our choice of the sample period. Baier and Bergstrand (2007) and Magee (2008), for example, use the sample periods: 1960–2000 and 1980–98, respectively. The coefficient for the FTA dummy in the present paper reflects the impacts of only recently signed FTAs because the trade creation effects of FTAs enforced before 1996 are absorbed into the country-pair fixed effect. Kohl (2014) points out that FTAs enforced after the 1990s performed poorly.

5.2 Trade creation effects of Japan's FTAs

We next turn to the trade creation effects of Japan's FTAs. Table 4 shows the results of estimation, in which the effects of Japan's FTAs are separated from those of others. Other covariates are included in the estimation, but not reported in the table to save space. As reported in column (1) of Table 4, the coefficients for Japan's FTA dummies are positive and statistically significant for exports and positive and slightly insignificant for imports when the country-year fixed effects are included but the country-pair fixed effects are not. Although the results change when the country-pair fixed effects are included in the regression, the point estimates are still large in the estimation with three types of fixed effects. In addition, this result holds when the gravity model is estimated by PPML. As reported in column (6), the point estimates of the coefficients for Japan's FTA dummies are 0.067 for exports and 0.086 for imports, but they are not statistically significant.

Overall, Japan's FTAs do not appear to have positive effects on trade values when the model is correctly specified. Although the coefficients are statistically insignificant, the point estimates are not small. These results weakly suggest that the effects of Japan's FTAs are heterogeneous.

5.3 Trade creation effects of Japan's individual FTAs

The results of the previous subsection suggest that some of Japan's FTAs are working well, but others are not. To examine this point further, we decompose the effects of Japan's FTAs by partner countries.

Table 5 presents the coefficients for Japan's FTA dummies. We regard column (4), which includes three types of fixed effects and estimates by PPML, as the most reliable result.[13] We also add the results from other studies, Ando and Urata (2015) and Yamanouchi (2017), in columns (5) and (6). Based on column (4), the export values from Japan to Australia, Chile, India, Indonesia, Mexico, Myanmar, Thailand, and Vietnam are positively affected by the FTAs with these countries. The FTA with Myanmar (AJCEP) has the largest effect and it increased Japan's exports to Myanmar by $\exp(0.517) - 1 = 67.7$ percent. This result is surprising because Myanmar's tariff rates were not lowered in the sample period under AJCEP. Therefore, this implies that removing nontariff barriers is crucial for trade creation. In contrast, FTAs with Brunei, Cambodia, Laos, Peru, the Philippines, and Switzerland have no significant effects on Japan's exports. The coefficients for FTAs with Malaysia and Singapore are negative and statistically significant.

Import values, however, increased significantly because of FTAs with Australia, Brunei, Cambodia, Laos, Malaysia, Myanmar, and the Philippines. The coefficients are statistically insignificant for the other FTAs. The largest effect on imports is also observed for the FTA with Myanmar.

We also check the symmetry of the trade creation effects using a joint test of the hypothesis that all pairs of coefficients are equal for exports and imports. The chi-square statistic is 103.1 and the hypothesis is clearly rejected.

Tables 6 and 7 present the matrices of the root mean square differences between the coefficients for the FTA dummies across specifications. Table 6 shows the root mean square differences of the coefficients for Japan's exports to its FTA partners. The coefficients in our baseline specification (column [6]) differ little from those estimated without country-year dummies. The choice of estimator does not matter much. However, the specifications without the country-pair dummies (columns [1] and [4]) show very different coefficients. Table 7 shows the same matrix for Japan's imports. The results are like the case of exports, and misspecification is problematic if the country-pair fixed effects are excluded from the estimation. If the country-pair fixed effects are not included, the trade creation effects of the FTAs are overestimated because of endogeneity.

13 As robustness checks, we also estimate the model (1) without zero trade values, (2) without interpolated values, (3) limiting the sample to impose one-year intervals, and (4) including pair-specific linear trends. The results do not change substantially.

Table 5. Estimation results for Japan's individual FTAs

	(1) OLS		(2) PPML		(3) PPML		(4) PPML		(5) Ando and Urata (2015) OLS		(6) Yamanouchi (2017) PPML	
Variables	**Export**	**Import**	**Export**	**Import**	**Export**	**Import**	**Export**	**Import**	**Export**	**Import**	**Export**	**Import**
FTA (Australia)	0.285**	0.350***	0.312**	1.469***	0.0401	0.139***	0.153**	0.190**				
	(2.202)	(3.352)	(2.415)	(3.658)	(0.896)	(3.442)	(2.135)	(2.008)				
FTA (Brunei)	0.132	0.803***	0.188	2.473***	0.0685	0.557***	0.108	0.627***			−0.0429	0.370***
	(1.495)	(3.597)	(0.951)	(6.187)	(1.600)	(16.12)	(1.119)	(3.025)				
FTA (Cambodia)	0.125	−0.245	−0.491**	−0.0673	0.134***	1.245***	0.0570	0.610***			0.114***	0.413***
	(0.988)	(−1.595)	(−2.226)	(−0.192)	(2.809)	(31.42)	(0.470)	(3.252)				
FTA (Chile)	0.744***	0.132	0.147	1.350***	0.462***	0.369***	0.397***	0.155	0.593***	0.0533	0.595***	0.109**
	(5.023)	(1.228)	(1.094)	(4.393)	(10.85)	(9.481)	(2.728)	(1.603)	(4.556)	(0.578)		
FTA (India)	−0.175	−0.252***	−0.631***	−0.639***	0.469***	0.330***	0.170**	−0.0246				
	(−1.156)	(−3.389)	(−3.347)	(−2.680)	(11.24)	(9.168)	(2.511)	(−0.323)				
FTA (Indonesia)	0.271**	−0.0343	0.585***	0.993***	0.302***	−0.000329	0.265**	−0.0129	−0.106	−0.303***	0.0122	−0.201**
	(2.508)	(−0.458)	(4.385)	(5.322)	(6.463)	(−0.00699)	(2.561)	(−0.213)	(−0.710)	(−2.856)		
FTA (Laos)	0.853***	1.041***	−0.634	−0.730**	−0.180***	1.161***	−0.151	0.594***			0.560***	1.108***
	(5.839)	(5.470)	(−1.192)	(−1.994)	(−3.274)	(22.66)	(−1.097)	(2.650)				
FTA (Malaysia)	−0.520***	0.0652	0.796***	0.711***	−0.452***	0.231***	−0.178**	0.304***	−0.148	−0.0262	−0.220***	−0.0515
	(−3.965)	(0.853)	(6.387)	(3.270)	(−8.978)	(6.386)	(−2.490)	(3.599)	(−1.201)	(−0.301)		
FTA (Mexico)	0.192*	−0.223**	0.361***	−0.799***	0.534***	0.214***	0.428***	0.00810	0.628***	0.264***	0.498***	0.141**
	(1.795)	(−2.340)	(3.012)	(−3.572)	(12.84)	(3.680)	(4.567)	(0.128)	(4.800)	(2.844)		
FTA (Myanmar)	0.864***	0.874***	0.515**	0.211	0.0588	0.530***	0.517***	0.679***				
	(6.553)	(4.820)	(2.334)	(0.547)	(1.074)	(5.468)	(3.776)	(2.734)				
FTA (Peru)	0.148	0.238*	0.0522	0.632**	0.185***	0.341***	0.0251	−0.0108				
	(1.263)	(1.929)	(0.356)	(2.182)	(4.430)	(9.035)	(0.225)	(−0.0902)				
FTA (Philippines)	−0.0955	−0.199**	0.267	0.433*	−0.716***	−0.158***	−0.144	0.199*	−0.216	−0.400***	−0.181***	−0.369***
	(−0.871)	(−2.169)	(1.544)	(1.958)	(−15.71)	(−4.556)	(−1.583)	(1.841)	(−1.464)	(−3.822)		
FTA (Singapore)	−0.316***	−0.113	0.397**	−0.348*	−0.486***	−0.202***	−0.307***	−0.138	−0.0863	−0.118	−0.485***	−0.407***
	(−3.012)	(−1.357)	(2.563)	(−1.705)	(−9.341)	(−4.993)	(−4.272)	(−0.884)	(−0.445)	(−0.857)		
FTA (Switzerland)	0.0576	0.184**	−0.0444	0.471*	0.251***	0.137***	0.0990	−0.00131	0.914***	0.0844	0.391***	0.128**
	(0.544)	(2.246)	(−0.325)	(1.945)	(6.393)	(2.615)	(0.919)	(−0.0139)	(4.704)	(0.612)		
FTA (Thailand)	0.343***	−0.281***	1.203***	0.506***	0.208***	0.295***	0.211***	0.0366	0.0366	−0.0761	0.0664	−0.0248
	(3.687)	(−3.308)	(9.873)	(2.762)	(4.124)	(7.980)	(3.393)	(0.444)	(0.281)	(−0.824)		
FTA (Vietnam)	−0.0664	−0.448***	0.575***	0.598**	0.321***	0.551***	0.209*	−0.153	0.239	0.0845	0.182***	0.175***
	(−0.520)	(−3.978)	(3.814)	(2.436)	(5.802)	(10.54)	(1.856)	(−1.177)	(1.599)	(0.799)		
Observations	91,262		93,840		93,760		93,760		360	360	1,908	1,908
Exporter-year fixed effects	Yes		Yes		No		Yes		Yes	Yes	Yes	Yes
Importer-year fixed effects	Yes		Yes		No		Yes		No	No	No	No
Exporter-importer fixed effects	Yes		No		Yes		Yes		Yes	Yes	Yes	Yes

Source: *Columns (1)–(4) are calculated by the author. Column (5) is taken from Ando and Urata (2015, Table 10). Column (6) is taken from Yamanouchi (2017, Tables 43 and 47).*

Note: *Robust t-statistics in parentheses. OLS = ordinary least squares; PPML = Poisson pseudo maximum likelihood. ***Statistically significant at the 1 percent level; **statistically significant at the 5 percent level; *statistically significant at the 10 percent level.*

Table 6. Matrix of root mean square differences between coefficients for Japan's FTAs (Exports)

Export	(1)	(2)	(3)	(4)	(5)	(6)
(1) OLS, no pair dummies	0.00					
(2) OLS, no country-year dummies	1.20	0.00				
(3) OLS, three types	0.68	0.60	0.00			
(4) PPML, no pair dummies	0.89	0.79	0.66	0.00		
(5) PPML, no country-year dummies	0.97	0.29	0.43	0.65	0.00	
(6) PPML, three types	0.85	0.43	0.32	0.51	0.23	0.00

Source: *Author's calculations.*

Note: *OLS = ordinary least squares; PPML = Poisson pseudo maximum likelihood.*

Table 7. Matrix of root mean square differences between coefficients for Japan's FTAs (Imports)

Import	(1)	(2)	(3)	(4)	(5)	(6)
(1) OLS, no pair dummies	0.00					
(2) OLS, no country-year dummies	1.89	0.00				
(3) OLS, three types	1.62	0.46	0.00			
(4) PPML, no pair dummies	1.29	1.08	0.92	0.00		
(5) PPML, no country-year dummies	1.74	0.44	0.53	0.99	0.00	
(6) PPML, three types	1.69	0.38	0.32	0.89	0.34	0.00

Source: *Author's calculations.*

Note: *OLS = ordinary least squares; PPML = Poisson pseudo maximum likelihood.*

In this subsection, the effects of the individual FTAs are explored. We found that each of Japan's FTAs affects trade values in a different way. Therefore, we conclude that one of the reasons for the absence of the trade creation effects of Japan's FTAs is that aggregation across all trade partners obscures the positive effects. We should note that about half of Japan's FTAs have positive and statistically significant impacts.

5.4 Trade creation effects of each individual FTA

In this subsection, we consider the determinants of the trade creation effects. To this end, we first obtain the coefficients for each individual FTA. We then regress the estimated coefficients on some variables. This two-step estimation is suggested in Baier, Yotov, and Zylkin (2019).

The first stage is estimated by OLS as in Kohl (2014) because of the computational difficulty. As explained in the previous subsection, the differences between coefficients in the two estimates are small. Among the 725 directional flows within active FTAs, 256 (35 percent) of these flows have positive and statistically significant values at the 5 percent level. Mean and median values are 0.113 and 0.105, respectively.[14] Compared with Baier, Yotov, and Zylkin (2019), these values are small and suggest that recent FTAs have weaker effects.

14 301 (42 percent) are insignificant and 168 (23 percent) are negatively significant.

To examine the effects of individual FTAs, we regress the estimated coefficients on some other variables in the second stage. The estimating equation is as follows:

$$\alpha_{ij} = \mu_1 \overline{\delta^X}_i + \mu_2 \overline{\delta^M}_j + \mu_3 \delta^B_{ij} + \mu_4 FTAyears_{ij} + u_{ij}, \quad (5)$$

where $\overline{\delta^X}_i$ and $\overline{\delta^M}_j$ are the means of exporter-year and importer-year fixed effects estimated in the first stage, respectively. These variables measure the size of countries in terms of trade values. δ^B_{ij} is the estimated country-pair fixed effect and a proxy for the strength of trade linkages before the FTAs were established. Intuitively, these three variables are expected to have negative coefficients because there is no room for more trade if a country is already open to trade. The last variable, $FTAyears_{ij}$, equals the number of years for which the country pair has an FTA. The coefficient is expected to be positive if recent FTAs are not effective. The cohort effects of FTAs are not identified from phase-in effects, so the positive coefficient may be a result of phase-in effects.[15]

In another specification, we replace the estimated fixed effects with some gravity variables as follows:

$$\alpha_{ij} = \nu_1 \overline{\ln GDP}_i + \nu_2 \overline{\ln GDP}_j + \nu_3 \ln Distance_{ij} + \nu_4 FTAyears_{ij} + u_{ij}, \quad (6)$$

where the expected signs are the same as for equation (5), except ν_3 because the country-pair fixed effects are smaller for longer distances. Following Baier, Yotov, and Zylkin (2019), we simply use heteroskedasticity-robust standard errors. Furthermore, we include country fixed effects again instead of these variables in some estimations of the second stage.

The estimation results of equation (5) are shown in Table 8. In the first column, the signs of the coefficients are as expected. The FTAs generally increase trade values if the trading countries are smaller and the relationship between the two countries is weak. In addition, the results imply that relatively old FTAs are more effective.

In columns (2)–(5), the interaction terms with Japan's export and import dummies are added to explore the characteristics of Japan's FTAs.[16] Although the results are not stable, the effects of Japan's FTAs are larger when the partner countries are smaller. However, the trade linkages before FTAs are signed are not important. More interestingly, recently enforced FTAs increase Japan's import values. In the case of Japan, agricultural goods

15 Yamanouchi (2017) does not find phase-in effects for Japan's FTAs.

16 We also check the results of regressions estimated using Japan's variables only. Of course, the sample size is so small that the results are only indicative, but the main results are unchanged from Tables 8 and 9.

Table 8. Estimation results for the effects of individual FTAs using estimated fixed effects

	(1)	(2)	(3)	(4)	(5)
Importer-year fixed effect	−0.0529***	−0.0550***	−0.0369		
	(−3.828)	(−3.729)	(−1.519)		
Importer-year fixed effect		−0.0759	−0.0869***		
× Export from Japan		(−1.423)	(−3.583)		
Exporter-year fixed effect	−0.0447*	−0.0437*		−0.0631*	
	(−1.822)	(−1.650)		(−1.868)	
Exporter-year fixed effect		−0.0860		−0.0716**	
× Import to Japan		(−1.331)		(−2.121)	
Country pair fixed effect	−0.128***	−0.139***	−0.160***	−0.163***	−0.178***
	(−4.329)	(−4.531)	(−3.241)	(−4.786)	(−3.366)
Country pair fixed effect		−0.0191	−0.0182	0.137	0.146**
× Export from Japan		(−0.128)	(−0.368)	(1.534)	(2.123)
Country pair fixed effect		0.171**	0.0406	0.161***	0.0637
× Import to Japan		(2.070)	(0.526)	(4.753)	(1.000)
Number of years under FTA	0.0147***	0.0158***	0.0253***	0.0231**	0.0289**
	(2.795)	(2.981)	(3.088)	(2.540)	(2.351)
Number of years under FTA		0.0249	−0.0328***	0.0147	0.00231
× Export from Japan		(1.319)	(−4.009)	(1.095)	(0.153)
Number of years under FTA		0.000187	−0.00323	−0.0536***	−0.0391***
× Import to Japan		(0.0142)	(−0.286)	(−5.884)	(−3.888)
Observations	725	725	723	723	721
Adjusted R-squared	0.070	0.075	0.184	0.155	0.250
Exporter fixed effects	No	No	Yes	No	Yes
Importer fixed effects	No	No	No	Yes	Yes

Source: *Author's calculations.*

Note: *Robust t-statistics in parentheses. OLS = ordinary least squares; PPML = Poisson pseudo maximum likelihood.* ***Statistically significant at the 1 percent level;* **statistically significant at the 5 percent level;* *statistically significant at the 10 percent level.*

are excluded from the negotiations in initial agreements. Protection is likely to be weakened and tariff rates for some products such as beef are lowered in the recent agreements with Australia.[17,18]

In Table 9, we present the estimation results of equation (6). While the main results are unchanged from the previous analyses, we find some notable differences. First, exporter GDP does not explain the effectiveness of an FTA.[19] This implies that some factors related to export values but not to GDP are key determinants of trade creation effects. One potential explanation is the endowment of natural resources. The export values of natural resources are not closely related to tariff rates, so the countries specializing in those resource sectors cannot increase exports via FTAs. Similarly, the coefficients for distance are

17 We cannot see the effects of lowered tariff rates using simple statistics because Japan's import values of agricultural goods from Australia decreased after the FTA entered into force. As explained in Section 3, we cannot make conclusions about the effects of FTAs from the descriptive analysis. In fact, Australia's total exports also decreased in 2015.

18 It is difficult to explain the large effects of Japan's recent FTAs by the differences of contents across Japan's FTAs. Almost all FTAs have chapters on investment and trade in services. Provisions on intellectual property, movement of natural persons, and government procurement are not limited to recent FTAs.

19 Baier, Yotov, and Zylkin (2019) report positive coefficients for both exporter and importer GDP.

Table 9. Estimation results for the effects of individual FTAs using GDP and distance

	(1)	(2)	(3)	(4)	(5)
Importer ln(GDP)	−0.0345**	−0.0350*	−0.0238		
	(−2.047)	(−1.893)	(−0.878)		
Importer ln(GDP)		−0.101**	−0.118***		
× Export from Japan		(−2.263)	(−4.345)		
Exporter ln(GDP)	−0.0251	−0.0261		−0.0307	
	(−0.957)	(−0.905)		(−0.942)	
Exporter ln(GDP)		−0.124**		−0.148***	
× Import to Japan		(−2.427)		(−4.550)	
ln(Distance)	0.0751*	0.0728*	0.105	0.0904	0.174*
	(1.756)	(1.671)	(1.474)	(1.309)	(1.689)
ln(Distance)		0.347**	0.271***	0.0148	0.161
× Export from Japan		(2.439)	(3.799)	(0.743)	(1.573)
ln(Distance)		0.409***	0.0326**	0.144**	−0.151
× Import to Japan		(2.695)	(2.393)	(2.089)	(−1.370)
Number of years under FTA	0.0143***	0.0150***	0.0210**	0.0210**	0.0268**
	(2.621)	(2.694)	(2.420)	(2.544)	(2.107)
Number of years under FTA		−0.0361	−0.0456***	0.000480	0.0109
× Export from Japan		(−1.444)	(−5.261)	(0.0209)	(0.383)
Number of years under FTA		−0.0357	−0.0416***	−0.0617***	−0.0383***
× Import to Japan		(−1.604)	(−3.720)	(−7.478)	(−3.884)
Observations	725	725	723	723	721
Adjusted R-squared	0.010	0.008	0.119	0.067	0.181
Exporter fixed effects	No	No	Yes	No	Yes
Importer fixed effects	No	No	No	Yes	Yes

Source: *Author's calculations.*

Note: *Robust t-statistics in parentheses. OLS = ordinary least squares; PPML = Poisson pseudo maximum likelihood.* ***Statistically significant at the 1 percent level; **statistically significant at the 5 percent level; *statistically significant at the 10 percent level.*

statistically insignificant in some specifications, and therefore the role of distance is less clear than the country-pair fixed effects. However, distance is important for Japan's import under FTAs.

In this subsection, we discussed which types of countries have effective FTAs. In a nutshell, a small ex ante trade value means substantial scope to increase trade via FTAs. Japan's FTA partners are so far mainly located in the Asia–Pacific region and actively transacting with Japan before signing the agreements. Japan can be integrated with the global market through FTAs along with many developing countries.

6. Conclusion

FTAs are one of the major commercial policies of the 21st century, yet Japan's FTAs have not been evaluated adequately. This paper therefore investigates the effects of Japan's FTAs using a recently developed gravity framework and explores the determinants of the effects of FTAs.

Our estimation results do not indicate the presence of trade creation effects for Japan's FTAs on average. Nonetheless, the effects of Japan's FTAs vary substantially across partners and around half of the FTAs increase Japan's trade values. Positive impacts on Japan's

exports are more likely to be observed for small partners. Japan's imports from FTA partners tend to increase when the partner countries are small and distant. More importantly, Japan's recent FTAs have larger effects.

Our results suggest that there is a little scope to increase trade values with some countries. This implies that political resources should be directed toward negotiations with developing countries if the government is aiming to integrate the economy into the global market through FTAs. Large-scaled multilateral trade agreements may not be effective in terms of trade creation, however, even though large amounts of effort are spent on the negotiation. Of course, the impacts on investment and other forms of international cooperation are different and those multilateral agreements may play important roles in regulating world trade systems and supporting new types of globalization. These are issues open for future research.

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