Production Networks and Utilization of Free Trade Agreements by Japanese Subsidiaries in ASEAN

HAYAKAWA Kazunobu[#, §]

Senior Research Fellow, Development Studies Center, Institute of Developing Economies, Japan

Abstract

This paper examines the effects of the utilization of free trade agreements (FTAs) on international production networks. In order to utilize an FTA, it is necessary to comply with the rules of origin. To that end, companies need to limit, to some degree, procurement sources to suppliers located in the signatory countries of the FTA. In other words, companies may need to replace existing procurement sources located outside the FTA signatory countries with those located inside them. This restriction could result in the localization of companies' international production networks. Therefore, this paper conducts an empirical analysis as to whether the utilization of an FTA leads to a significant increase in the local procurement share, with Japanese companies' subsidiaries located within the ASEAN area used as subjects of the analysis. If the subsidiaries are found to be increasing local procurement excessively, it means that the utilization of an FTA has a negative impact on international production networks.

Keywords: free trade agreement, rules of origin, accumulation
JEL Classification: F15; F53

I. Introduction

As of March 2019, 17 free trade agreements (FTAs) have entered into force in Japan. Most of the FTA partners are countries in the Association of Southeast Asian Nations (ASEAN). Some of the ASEAN countries have both a regional FTA, which is called an ASEAN-Japan Comprehensive Economic Partnership (AJCEP), and bilateral FTAs. In particular, AJCEP aims to promote international production networks among ASEAN countries and Japan. In addition, two mega-FTAs entered into force: the Comprehensive Trans-Pacific Partnership and Japan-European Union Economic Partnership Agreement. Moreover, the negotiation of the Regional Comprehensive Economic Partnership (RCEP) is also underway among 16 Asia and Oceania countries. The RCEP is expected to promote international production networks by including China and India within an FTA network.

In this paper, we empirically investigate how a firms' use of FTAs changes the interna-

[#] Author: Kazunobu Hayakawa; Address: Wakaba 3-2-2, Mihama-ku, Chiba-shi, Chiba, 261-8545, Japan. Tel: 81-43-299-9500; Fax: 81-43-299-9724; E-mail: kazunobu_hayakawa@ide-gsm.org.
[§] I would like to thank Mr. Takeshi Kohira (Policy Research Institute) for his helpful comments.

tional production network. There are various channels through which a firms' use of FTAs affects its trade and international production networks. A typical channel is to enable firms to utilize preferential tariff rates, which are lower than general tariff rates, i.e., most favoured nation (MFN) rates. Such use of lower tariffs will increase trade among FTA member countries. In addition, recent FTAs often include the removal of non-tariff barriers. For example, provisions on competition policy decrease the distortion of trade caused by anti-competition policy, and provisions on dispute settlement reduce the risk of causing international commercial disputes and avoid companies becoming squeezed by trade expansion. Likewise, provisions on intellectual property encourage the export of products using advanced technology and creative technology. In this way, FTAs contribute to the expansion of trade among members through the reduction of both tariff and non-tariff barriers.

On the other hand, there is a channel through which the use of FTA tariff rates destroys the international production network. In order to take advantage of preferential tariff rates, firms need to meet so-called rules of origin (RoOs). These rules are intended to prevent the roundabout of exports from non-FTA members to FTA members under preferential treatment. For example, a regional value content rule requires the share of values added in FTA member countries for the production of export products to be greater than a certain level. Suppose that a Japanese subsidiary in Thailand produces a finished product by inputting materials imported from China and then exporting that product to Japan. In this case, to use the preferential tariff rate of the Japan-Thailand FTA, the RoOs may require this company to decrease the procurement from China and increase that from Thailand or Japan. As a result, although trade expands between Japan and Thailand, the international production network of companies will be localized.

In this paper, by investigating Japanese manufacturing subsidiaries in ASEAN, we empirically examine if their utilization of FTAs has significantly increased local procurement. To this end, we employ the Survey of Japanese-Affiliated Firms in ASEAN, India, and Oceania during 2010-2013, which was conducted by the Japan External Trade Organization (JETRO). We focus on Japanese subsidiaries' exports from ASEAN to Japan. As described later, when analyzing the impact of FTA use on corporate performance, it is necessary to take into account which companies tend to use FTAs. This selection issue is always encountered when analyzing the impact of internationalization by companies, such as the impacts of starting exports and direct investment, as well as using FTAs. In the context of FTA use, Hayakawa (2015) addressed this issue using the matching technique. On the other hand, in this paper, a simpler method is used. With such a simple method, we investigate the impacts of FTA utilization at a more detailed level.

This paper is related to at least three strands of firm-level studies. The first includes studies on the firm-level effects of FTAs, such as those from Hayakawa (2013, 2015) detailed in the next section. However, as mentioned above, we will examine such effects at a more detailed level in this paper. For example, we will explore how those effects are different according to firm size. In addition, while this paper focuses on the effects on procurement behavior, Hayakawa et al. (2019) investigated the effects on trade prices and found that the

(tariff-exclusive) trade price rises when an FTA is used. Second, there are some studies that investigate the procurement behavior of multinational enterprises' (MNEs') overseas subsidiaries. For example, Hanson, Mataloni, and Slaughter (2005) and Kiyota, Matsuura, Urata, and Wei (2008) examined that behavior for U.S. MNEs and Japanese MNEs, respectively. In this paper, we investigate the procurement behavior changes for Japanese subsidiaries in ASEAN driven by FTA tariff rates. Third, while this paper examines the effects of using FTAs, Takahashi and Urata (2010), Hayakawa et al. (2013a), and Hayakawa (2015a) explore the selection issue in FTA utilization. These two issues are complementary.

Our paper is also related to some product-level studies. First, as introduced in the next section, there are several studies that measure the cost of using preference regimes (Francois et al., 2006; Hayakawa, 2011; Cherkashin et al., 2015; Hayakawa et al., 2016). The change of procurement sources to comply with RoOs will raise procurement costs. In this sense, our analysis can be taken as investigating whether FTA utilization raises procurement costs. Second, Cadot et al. (2006) and Hayakawa et al. (2014) examine the selection issue in FTA utilization at a product-level, i.e., what kinds of products are more likely to have higher utilization of preference. Third, similar to this paper, Conconi et al. (2018) shows that compliance with RoOs in final goods reduces the import of intermediate goods from outside the area. We show such a change of procurement sources at a firm-level. Finally, some studies including Augier et al. (2005), Bombarda and Gamberoni (2013), Estevadeordal and Suominen (2008), and Hayakawa (2014) examine the use of cumulation rules in the compliance with RoOs. As discussed later, we also investigate their use.

The rest of this paper is organized as follows. The next section introduces related studies at a more detailed level. The third section presents the empirical framework in this paper and clarifies the differences from the existing studies. In the fourth section, we take an overview of the activities of the Japanese subsidiaries in ASEAN. The fifth section reports the estimation results, and the final section concludes.

II. Literature Review

This section introduces previous studies on the impact of FTA use on firm performance. As mentioned in the introductory section, it is necessary to take the selection issue into account in such an impact analysis. Therefore, we first introduce firm-level studies on the selection issue in FTA utilization. In general, firms need to choose whether to use the FTA tariff rate or the MFN tariff rate when exporting. Although using the FTA tariff rate results in lowering tariff payments, this use requires export products to meet RoOs unless they are *completely* produced in the export country. The RoOs are set on a product-by-product basis and require export products to be *substantially* produced in the export country. The rules include changes in the tariff classification rule, regional value content rule, technical requirement rule, wholly obtained rule, and the combination of these rules.

Further, in order to prove that export products meet the RoOs, firms need to obtain certificates of origin (CoOs) by submitting various documents (e.g., manufacturing process

flow diagram, production orders, product inventory records, and invoices) to the relevant authority. In order to collect and organize such documents, it may be necessary to introduce an electronic management system, set up a department in charge, and arrange staff. Acquisition and management of such CoOs are substantial fixed costs for using the FTA. In fact, several studies have shown that such fixed costs are worth around 3 to 5% on a tariff equivalent rate basis and thousands of US dollars on an absolute basis (Francois et al., 2006; Hayakawa, 2011; Cherkashin et al., 2015; Hayakawa et al., 2016). If the benefit of saving on tariff payments outweighs these costs, companies will use the FTA tariff rate. For example, if the scale of export is large, the amount of tariff payment saved will be large. Thus, it is expected that larger firms are more likely to use the FTA tariff rate for exports.

There are many empirical studies that analyze the determinants of utilization of the preference regimes, including FTAs. The basic determinants are the preferential margin, which is the difference between the MFN tariff rate and the preferential tariff rate, and the restrictiveness of RoOs. The larger the preferential margin, the greater the benefit from the use of FTA regimes. Also, the stricter the RoOs, the more it will be necessary to change the procurement source. Cadot et al. (2006) and Hayakawa et al. (2014) show that the preferential utilization rate is higher as the preferential margin is larger or the RoOs are less strict. In terms of firm characteristics, the relationship between firm size, as measured by employment, and FTA use has been investigated. Takahashi and Urata (2010) use the results of a joint survey of the Research Institute of Economy, Trade, and Industry and the Japan Chamber of Commerce to analyze companies operating in Tokyo, Nagoya, Osaka, Kyoto, and Kobe. In addition, Hayakawa et al. (2013a) and Hayakawa (2015a) analyze Japanese subsidiaries in ASEAN using the same data as this paper. In all the studies, larger firms are shown to use preferential tariff rates in exporting. In short, there are inherent differences between firms that do and do not use FTAs.

Due to this selection effect, the difference in firm performance before and after FTA use includes not only the effect of the FTA use but also the inherent difference of FTA users with non-users. This selection issue yields an endogenous problem and needs to be addressed. Hayakawa (2015) is an example of a study that analyzed the effects of using FTAs while addressing this issue. Using the same data as this paper, he analyzed the impact of FTA use in exporting on the performance of Japanese subsidiaries in ASEAN. The analysis consists of two stages. In the first stage, the probability (propensity) of each subsidiary using the FTA is calculated based on various characteristics of the subsidiary, including employment size. In the second stage, the performance indicators are compared between two kinds of subsidiaries with a similar probability of using FTAs. One is those who actually used FTA regimes in exporting while the other is those who did not. This method is a technique called propensity score matching. As a result, it was found that FTA use did not lead to employment and export expansion, at least in the short term, but that it had significantly increased the share of local procurements out of total procurement.

III. Empirical Framework

In this section, we discuss a framework for analyzing the impact of the use of FTAs on the local procurement share by Japanese subsidiaries in ASEAN. In general, the theoretical framework for overseas subsidiaries' procurement behavior is presented in Hanson, Matalo-ni, and Slaughter (2005). It is theoretically demonstrated that the share of the value procured from each source (e.g., local and home country) depends on the price of intermediate goods from each source, the factor prices (e.g., wages) in the host country, and the total output. This paper also uses this framework as a theoretical basis to analyze the procurement behav-ior of overseas subsidiaries.

We investigate the share of local procurements out of total procurements at a subsidiary level. Specifically, our estimation equation for Japanese subsidiary f located in ASEAN country c in year t is given as follows:

$$Local\ Share_{ft} = \alpha FTA_{ft} + \beta \ln Employment_{ft} + u_f + u_{ct} + \varepsilon_{ft}$$

FTA is a dummy variable that takes the value one if Japanese subsidiary f uses the FTA tariff rates in year t. *Employment* is the number of employees of the subsidiary. The correspon-dence with the theoretical framework is as follows. The total output of the subsidiary will be correlated with the number of employees. The more fundamental subsidiary characteristics are controlled by subsidiary fixed effects, u_f. Country-year fixed effects, u_{ct}, are expected to control for intermediate goods prices and local factor prices. After controlling these basic determinants, we add a dummy variable on FTA utilization, which is our interest variable. Since the dependent variable takes a value between 0 and 1, we estimate by not only the or-dinary least squares (OLS) but also the fractional logit model.

This empirical framework can also be viewed as a difference-in-differences approach. That is, by comparing the group of subsidiaries using FTAs (treatment group) and the group of non-using subsidiaries (comparison group), we examine the change in the performance before and after using the FTA. The time-invariant characteristics between the two groups are captured by the subsidiary fixed effects. A key issue in this framework is that there should not be significant differences in subsidiary characteristics between the two groups at a time prior FTA use, i.e., the FTA use dummy should not correlate with the error term. However, as discussed in the previous section, there are inherent differences between the two groups. Hayakawa (2015) used the propensity score matching method to address this is-sue.

In this paper, we deal with this selection issue by using unique properties in the data. As described later, in the survey used in this paper, each subsidiary is questioned about whether or not the FTA is used. Alternatives for this question include "I am using," "I am not using it now, but I am considering using it," and "I have no intention to use it now or in the future." In the empirical analysis of this paper, we focus on subsidiaries whose response is either the first or second. The subsidiaries that do not intend to use the FTA now or in the future are obviously different from the subsidiaries that either use the FTA or are considering use of

FTAs. However, subsidiaries that are considering using, but are not yet using, should have similar characteristics to the subsidiaries already using. If this assertion is correct, the estimates for the FTA utilization dummy will be consistent by comparing their performance.

Our main data source is the Survey of Japanese-Affiliated Firms in ASEAN, India, and Oceania during 2010-2013 conducted by JETRO. The average response rate of this survey is about 50%. We focus on Japanese manufacturing subsidiaries in ASEAN. For this type of subsidiaries, the survey covers approximately half of the subsidiaries included in the Basic Survey on Overseas Business Activities conducted by the Ministry of Economy, Trade, and Industry (METI). However, in terms of the average number of employees, the surveys by JETRO and METI show almost the same value. We focus on subsidiaries who export to Japan because there are many subsidiaries that export to Japan and thus a sufficient number of observations can be obtained. This restriction also addresses the selection issue between exporting and non-exporting subsidiaries. As mentioned above, we restrict sample subsidiaries only to those who actually use FTAs with Japan and those who do not yet use FTAs but are considering using them.

Table 1. Number of Japanese Subsidiaries in ASEAN in 2013

	Total				
		Exporters to Japan			
			FTA utilization		
			No	Considering	Yes
Cambodia	15	9	6		3
Indonesia	142	64	34	9	21
Laos	13	5	2		3
Malaysia	189	56	34	5	17
Myanmar	3	2	2		
Philippines	99	58	41	6	11
Singapore	60	13	4	1	8
Thailand	481	206	106	36	64
Vietnam	195	104	49	23	32
Total	1,197	517	278	80	159

Source. Survey of Japanese-Affiliated Firms in ASEAN, India, and Oceania (JETRO)

IV. Overview of FTA Utilization and Procurement

In this section, we provide an overview of activities of the Japanese subsidiaries in ASEAN. Table 1 shows the FTA utilization in exporting to Japan in 2013. The total number of Japanese subsidiaries is shown in the first column, indicating that Thailand attracts the largest number of Japanese manufacturing subsidiaries. Thailand is followed by Vietnam, Malaysia, and Indonesia, and so-called CLM countries (i.e., Cambodia, Laos, and Myanmar) only have a few Japanese manufacturers. The same trend can be seen for the number of sub-

sidiaries exporting to Japan, but exporters from Indonesia and Malaysia are small relative to the number of the subsidiaries doing business there. On the other hand, many exporters are found not only in Vietnam but also in the Philippines. These differences seem to be related to the geographical distance from Japan and the market size of the country itself.

As for FTA usage, 30% of ASEAN subsidiaries that export to Japan actually use FTAs and about 15% are considering use of FTAs in the future. Therefore, the majority of subsidiaries are not planning to use FTAs. By country, Thailand has the most subsidiaries actually using FTAs, followed by Vietnam and Indonesia. In these countries, about 30% of the subsidiaries exporting to Japan actually use the FTA. Moreover, there are many subsidiaries in Thailand and Vietnam that are not currently using FTAs but are considering using them. On the other hand, there are no such subsidiaries in the CLM countries.

Table 2. Average Shares of Procurements from Each Source in 2013 (%)

	Local	Japan	ASEAN	China	Other Asia	Oceania	America	Europe	Others
Indonesia	37	32	13	4	5	0.4	1	1	1
Cambodia	12	17	39	24	6	0	0	0	2
Laos	11	19	43	23	4	0	0	1	0
Myanmar	3	43	22	32	0	0	0	0	0
Malaysia	36	24	10	5	6	0.2	0.4	2	2
Philippines	26	38	10	7	7	1	1	2	0.5
Singapore	34	22	14	7	4	0.3	1	0.3	1
Thailand	50	30	4	6	4	0.4	1	1	1
Vietnam	31	36	11	10	6	0.3	1	1	0.2
Total	40	30	9	7	5	0.4	1	1	1

Source. Survey of Japanese-Affiliated Firms in ASEAN, India, and Oceania (JETRO)

Next, Table 2 shows the suppliers breakdown in 2013 (simple average). In ASEAN as a whole, the local procurement share is the highest at 40%, followed by the Japanese procurement share at 30% and procurement from other ASEAN countries at 10%. Therefore, most of the procurement sources for Japanese subsidiaries in ASEAN are either local or Japanese. Both sources originate from FTAs with Japan. Namely, according to the RoOs required when exporting to Japan using FTAs, not only local products but also products procured from Japan are considered to be "originated materials." As analyzed in detail in the next section, a relatively high procurement share of these two may be achieved in order to meet the RoOs of the FTAs with Japan. By country, the high local procurement share in Thailand stand out. As shown in Table 1, this is probably due to the fact that many Japanese subsidiaries have made inroads in Thailand and have formed agglomerations. As a result, it is easy to procure from local Japanese subsidiaries. In fact, in the CLM countries where the number of Japanese subsidiaries entering the market is small, the local procurement share is low, while procurement from Japan, other ASEAN countries and China is large.

By restricting the data to subsidiaries that export to Japan, Table 3 shows the simple av-

erage share of procurements from each source, by FTA usage status in exporting to Japan. The local procurement share is relatively low for subsidiaries that do not plan to use FTAs now or in the future, and it is about 5% lower than subsidiaries that are currently using or plan to use them. On the other hand, in the procurement share from Japan, the opposite trend is observed, in which the highest percentage is subsidiaries that do not use FTAs now and do not plan to in the future. The subsidiaries that plan to use them in the future also show a higher share from Japan than subsidiaries currently in use. There are no noticeable differences in the procurement share from other sources. The procurement share from ASEAN is slightly lower than the subsidiaries currently in use.

Table 3. Average Share of Procurements from Each Source by FTA Usage in Exporting to Japan (2013, %)

	No	Considering	Yes
Local	44	48	49
Japan	34	32	28
ASEAN	8	10	6
China	5	4	4
Other Asia	5	3	5
Oceania	0.1	0	1
America	0.4	1	2
Europe	1	0.3	1
Others	1	1	2

Source. Survey of Japanese-Affiliated Firms in ASEAN, India, and Oceania (JETRO)

V. Estimation Results

This section reports the estimation results. Table 4 shows the estimation results by OLS. The results of the fixed effects are not reported. The "Local" column shows the estimation result using the local procurement share as a dependent variable. The coefficient for the FTA use dummy is significantly positive while the number of employees has an insignificant co-

Table 4. Estimated Results by OLS

	Local	Japan	ASEAN
FTA	0.033**	-0.076***	-0.022*
	[0.017]	[0.027]	[0.012]
ln Employment	0.020	0.051	-0.007
	[0.046]	[0.041]	[0.028]
R-squared	0.8890	0.9182	0.8105
Number of observations	438	438	438

Note. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. In all specifications, we control for subsidiary and country-year fixed effects. The parentheses are robust standard errors.

efficient. Therefore, the local procurement share increased significantly due to the use of FTAs. Specifically, it increased by 3.4 percentage points (= exp (0.033) −1). If suppliers of pre-FTA utilization are optimal, an increase in local procurement raises the procurement costs and partially offsets the benefits of FTA utilization. In addition, an increase in the local procurement share means a decrease in the import procurement share and that the international production network is shrinking.

Next, we also investigate the effects on the procurement share from Japan and other ASEAN countries. In the FTAs by ASEAN, cumulation is permitted in complying with the RoOs. It is a rule in which not only products produced in the exporting country but also those procured from other countries in the same FTA are considered to have originated in the exporting country. Thus, the products imported from Japan are considered to have always originated from FTAs with Japan. When using AJCEP, not only those from Japan but also those from other ASEAN countries are considered. Furthermore, Japan's bilateral FTAs partially permit the accumulation of products produced in other ASEAN countries. In sum, if subsidiaries enjoy this cumulation rule, the procurement share from Japan or other ASEAN countries will rise. The columns "Japan" and "ASEAN" in Table 4 report the estimation results when the dependent variable is the procurement share from Japan and other ASEAN countries, respectively. In all cases, contrary to our expectation above, the coefficients for the FTA utilization dummy are estimated to be significantly negative. In other words, the procurement shares from Japan and other ASEAN countries are not increased, but rather significantly reduced. This result means that the production network with Japan and ASEAN is negatively affected.

Table 5. Estimated Results by Fractional Logit

	Local	Japan	ASEAN
FTA	0.247***	-0.485***	-0.381**
	[0.093]	[0.123]	[0.158]
ln Employment	0.117	0.420*	-0.106
	[0.227]	[0.235]	[0.551]
Pseudo log-likelihood	-141.49	-128.24	-53.55
Number of observations	438	438	438

Note. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. In all specifications, we control for subsidiary and country-year fixed effects. The parentheses are robust standard errors.

The result by fractional logit is shown in Table 5. As Table 4 indicates, the use of FTAs raises the local procurement share and decreases imports from Japan and other ASEAN countries. Calculating the marginal effect, local content is shown to be elevated by about five percentage points. Also, as in Table 4, the coefficient of the number of employees shows significant results only for the procurement rate from Japan. As shown in Table 6, these results are unchanged even if we restrict sample subsidiaries to those that do not use any FTAs other than those with Japan. This restriction is because the subsidiaries that already use oth-

er FTAs are expected to have different characteristics from those that have never used any FTAs. When marginal effects are calculated, it is shown that the local procurement share rises by about 8.9 percentage points on average.

Table 6. Estimated Result by Fractional Logit: Subsidiaries Not Using Other FTAs

	Local	Japan	ASEAN
FTA	0.616***	-0.677***	-0.688*
	[0.206]	[0.231]	[0.354]
ln Employment	-0.585	1.125**	-2.56
	[0.402]	[0.445]	[3.505]
Pseudo log-likelihood	-42.21	-37.99	-10.94
Number of observations	137	137	137

Note. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. In all specifications, we control for subsidiary and country-year fixed effects. The parentheses are robust standard errors.

Next, in order to uncover the source of increased local procurements at a more detailed level, we divide the local procurement share into the procurement shares from indigenous firms, other Japanese subsidiaries, and other foreign-owned subsidiaries. The sum of these three shares corresponds to the local procurement share examined in the previous tables. The estimation results by fractional logit are shown in Table 7. In all cases, the coefficients for FTA utilization dummy are insignificantly estimated. Namely, Japanese subsidiaries do not necessarily increase local procurements from particular types of local firms.

Table 7. Estimated Result by Fractional Logit: Breakdown of Local Procurement

	Indigenous	Japanese	Others
FTA	0.226	0.208	-0.39
	[0.166]	[0.163]	[0.511]
ln Employment	-0.041	-0.345	1.552**
	[0.404]	[0.249]	[0.602]
Pseudo log-likelihood	-90.99	-82.21	-23.18
Number of observations	434	434	434

Note. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. In all specifications, we control for subsidiary and country-year fixed effects. The parentheses are robust standard errors.

These results indicate that, when exporting to Japan, Japanese subsidiaries meet the RoOs by raising local procurements, but not the procurements from other FTA member countries, including Japan. In other words, the cumulative rule is not used on average. In fact, the results of the questionnaire survey also indicate that the cumulation rule is not used often. According to the Survey of Japanese-Affiliated Firms in ASEAN, India, and Oceania (JETRO) of 2014, out of 257 Japanese subsidiaries using FTAs in exporting from ASEAN to Japan, only 16 subsidiaries (6%) enjoy the cumulation rule. Namely, there are still few

Japanese subsidiaries in ASEAN who use the cumulation rule in complying with the RoOs.

There are various reasons for the minimal use of the cumulation rule. First of all, there is a possibility that firms do not recognize the cumulative rule in the first place. Cumulation rules are generally less known than the product-specific RoOs. Therefore, firms may misunderstand that RoOs must be met only by raising local procurements. Second, local suppliers are the only sources originating from multiple FTAs at the same time. For example, the inputs originating from Japan-Thailand FTA are those from Thailand and Japan. Similarly, those in an FTA between ASEAN and China are inputs from Thailand, China, and other ASEAN countries. Only Thailand has an originated status in both of these FTAs. Therefore, when trying to use multiple FTAs at the same time, only local procurement may be increased. Indeed, by using the same data as this paper does, Hayakawa (2013) showed that local content is higher when subsidiaries use a larger number of FTAs at the same time. However, as mentioned above, this possibility has been ruled out by the analysis in Table 6.

Third, when enjoying cumulation rules, firms need to import inputs under the same FTA regime by requesting exporters to obtain the CoOs. For example, when exporting from Thailand to Japan using the Japan-Thailand FTA, in order to cumulate goods procured from Japan, those goods must be imported using the Japan-Thailand FTA. Without this restriction, intermediate goods from other ASEAN countries might always be imported via Singapore, which has a zero MFN tariff rate for almost all items. After all, only firms with strong bargaining power against the exporters of the inputs, such as large companies, will be able to request acquisition of CoOs. In other words, larger companies may be more likely to use cumulation rules.

In order to test this hypothesis, we introduce the interaction term between the FTA use dummy and the employment size. We use the employment size of each subsidiary in the initial year of the sample period to avoid including the effects of using the FTA in size. The estimation results are shown in Table 8. When making a non-linear estimation such as fractional logit, it becomes difficult to interpret the results of the interaction terms. Therefore, we simply employ the OLS method. The coefficients for the interaction term are not estimat-

Table 8. Introduction of Interaction Terms (OLS)

	Indigenous	Japanese	ASEAN
FTA	0.115*	0.011	-0.069
	[0.070]	[0.109]	[0.057]
FTA * ln Employment (Initial)	-0.015	-0.016	0.008
	[0.012]	[0.019]	[0.009]
ln Employment	0.019	0.05	-0.006
	[0.045]	[0.041]	[0.028]
R-squared	0.8892	0.9185	0.8109
Number of observations	438	438	438

Note. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. In all specifications, we control for subsidiary and country-year fixed effects. The parentheses are robust standard errors.

ed significantly in any case. Although not shown here, their coefficients are not significantly estimated even if estimation is performed excluding subsidiaries using other FTAs. Therefore, firm size does not significantly explain the minimal use of the cumulation rules.

VI. Concluding Remarks

In this paper, we empirically examined the effects of the use of FTAs on the procurement behavior by Japanese subsidiaries in ASEAN. The results can be summarized as follows. First, the use of FTAs has significantly increased the local procurement share. This increase not only localizes the international production network but also raises the procurement cost if local procurement is not optimal. Second, procurements from Japan and other ASEAN countries have decreased significantly. This decrease implies that the cumulative provision is not fully utilized. Furthermore, this result does not change even when excluding the subsidiaries that try to use multiple FTAs at the same time. Third, there are no significant differences in these results according to the size of the subsidiaries. Therefore, cumulation rules are not used due to a reason other than the bargaining power of export companies.

How can we mitigate the negative effects on international production networks? First, if the simultaneous use of multiple FTAs is the main reason for the increase of local procurements, we would suggest making the RoOs more flexible, e.g. by changing to a rule of meeting either change-in-tariff classification or regional value content. However, as we found in this paper, simultaneous use is not a critical reason. Then, will this problem be solved in the future when RCEP comes into effect because it expands the cumulation base? Again, our results show that the cumulative provision is not used on average. Therefore, even if RCEP enters into force, firms will still rely only on raising local procurement to meet the RoOs. In short, the relaxation of RoOs and the conclusion of the RCEP alone will not eliminate the negative impact of FTA use on international production networks. After all, it is important that the cumulation rule is used after RCEP comes into effect under more flexible RoOs. In addition, the most basic, but most necessary measure will be to disseminate cumulation rules to the business society, in order to enhance firms' recognition of the cumulation rules.

References

Augier, P., Gasiorek, M., and C.L. Tong (2005), "The Impact of Rules on Origin on Trade Flows", *Economic Policy,* Vol. 20 No. 43, pp. 568-624.

Bombarda, P. and E. Gamberoni (2013), "Firm Heterogeneity, Rules of Origin, and Rules of Cumulation", *International Economic Review,* Vol. 54 No. 1, pp. 307-328.

Cadot, O., Carrere, C., De Melo, J., and B. Tumurchudur (2006), "Product-Specific Rules of Origin in the US and Preferred Trading Arrangements: An Assessment", *World Trade Review,* Vol. 5 No. 2, pp. 199-224.

Cherkashin, I., Demidova, S., Kee, H., and K. Krishna (2015), "Firm Heterogeneity and

Costly Trade: A New Estimation Strategy and Policy Experiments", *Journal of International Economics,* Vo. 96 No. 1, pp. 18-36.

Conconi, P., Garia- Santana, M., Puccio, L., and R. Venturini (2018), "From Final Goods to Inputs: The Effect of Rules of Origin", *American Economic Review,* Vol. 108 No. 8, pp. 2335-2365.

Estevadeordal, A. and K. Suominen (2008), "What are the Effects of Rules of Origin on Trade?", In: Estevadeordal, A. and Suominen, K. (Eds.) *Rules of Origin and International Economic Integration,* pp. 161-219.

Francois, J., Hoekman, B., and M. Manchin (2006), "Preferences Erosion and Multilateral Trade Liberalization", *World Bank Economic Review,* Vol. 20 No. 2, pp. 197-216.

Hanson, G., Mataloni, RJ, and MJ Slaughter (2005), "Vertical Production Networks in Multinational Arms", *Review of Economics and Statistics,* Vol. 87 No. 4, pp. 664-678.

Hayakawa, K. (2011), "Measuring Fixed Costs for Firms' Use of a Free Trade Agreement: Threshold Regression Approach", *Economics Letters*, Vol. 113 No, 3, pp. 301-303.

Hayakawa, K. (2013), "Does the Use of Multiple FT As Forces to Raise Local Input Share?: Evidence of the Spaghetti Bowl Phenomenon", *Economic Modeling,* Vol. 33, pp. 458-461.

Hayakawa, K. (2014), "The Impact of Diagonal Cumulation Rule on FTA Utilization: Evidence from Bilateral and Multilateral FTAs between Japan and Thailand", *Journal of the Japanese and International Economies,* Vol. 32, pp. 1-16.

Hayakawa, K., Kim, H., and H. Lee (2014), "Determinants on Utilization of the Korea-ASEAN Free Trade Agreement: Margin Effect, Scale Effect, and ROO Effect", *World Trade Review,* Vol. 13 No. 3, pp. 499-515.

Hayakawa, K. (2015a), "Impacts of FTA Utilization on Firm Performance", *BE Journal of Economic Analysis and Policy,* Vol. 15 No. 3, pp. 1325-1352.

Hayakawa, K. (2015b), "Does Firm Size Matter in Exporting and Using FTA Schemes?", *Journal of International Trade and Economic Development,* Vol. 24 No. 7, pp. 883-905.

Hayakawa, K., Hiratsuka, D., Shiino, K., and S. Sukegawa (2013), "Who Uses Free Trade Agreements?", *Asian Economic Journal,* Vol. 27 No. 3, pp. 245-2.

Hayakawa, K. and N. Laksanapanyakul. (2017), "Impacts of Common Rules of Origin on FTA Utilization", *International Economics and Economic Policy,* Vol. 14 No. 1, pp. 75-90.

Hayakawa, K., Laksanapanyakul, N., and S. Urata (2016), "Measuring the Costs of FTA Utilization: Evidence from Transaction-Level Import Data of Thailand", *Review of World Economics*, Vol. 152 No. 3, pp. 559–575.

Hayakawa, K., Laksanapanyakul, N., Mukunoki, H., and S. Urata (2019), "Impact on Free Trade Agreement Use on Import Prices", *World Bank Economic Review*, Vol. 33 No. 3, pp. 643–660.

Kiyota, K., Matsuura, T., Urata, S., and Y. Wei (2008), "Reconsidering the Backward Vertical Linkage of Foreign Affiliates: Evidence from Japanese Multinationals", *World De-*

velopment, Vol. 36 No. 8, pp. 1398-1414.
Takahashi, K., and S. Urata. (2010), "On the Use of FTA by Japanese Firms: Further Evidence", *Business and Politics,* Vol. 12 No. 1.