Impacts of common rules of origin on FTA utilization

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Abstract

This paper examines empirically the impacts of sharing rules of origin (RoOs) with other ASEAN+1 free trade agreements (FTAs) on ASEAN-Korea FTA/ASEAN-China FTA utilization in Thai exports in 2011. Our careful empirical analysis suggests that the harmonization of RoOs across FTAs play some role in reducing the costs yielded through the spaghetti bowl phenomenon. In particular, the harmonization to "change-in-tariff classification (CTC) or real value-added content (RVC)" will play a relatively positive role in not seriously discouraging firms' use of multiple FTA schemes. On the other hand, the harmonization to CTC or CTC&RVC hinders firms from using those schemes.

Keywords: Free trade agreement, rules of origin, spaghetti bowl phenomenon
JEL classification: F10; F13; F15

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Impacts of Common Rules of Origin on FTA Utilization

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Abstract: This paper examines empirically the impacts of sharing rules of origin (RoOs) with other ASEAN+1 free trade agreements (FTAs) on ASEAN-Korea FTA/ASEAN-China FTA utilization in Thai exports in 2011. Our careful empirical analysis suggests that the harmonization of RoOs across FTAs play some role in reducing the costs yielded through the spaghetti bowl phenomenon. In particular, the harmonization to "change-in-tariff classification (CTC) or real value-added content (RVC)" will play a relatively positive role in not seriously discouraging firms' use of multiple FTA schemes. On the other hand, the harmonization to CTC or CTC&RVC hinders firms from using those schemes.

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1. Introduction

Against the background of the explosive increase of free trade agreements (FTAs), there is a rising concern regarding the so-called "spaghetti bowl phenomenon". Although several definitions of this phenomenon have been proposed, its essence is the rise of costs for the use of FTA schemes under a larger number of FTA schemes.[1] Such

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[1] For a more precise concept of the spaghetti bowl phenomenon, see Bhagwati (1995) and Bhagwati et al. (1998).

a concern emerges also in East Asia. In particular, ASEAN countries have multilateral FTAs with six countries including Australia, China, India, Japan, Korea, and New Zealand. These ASEAN+1 FTAs are the Australia-New Zealand-ASEAN FTA (AANZFTA), ASEAN-China FTA (ACFTA), ASEAN-India FTA (AIFTA), ASEAN-Japan Comprehensive Economic Partnership (AJCEP), and ASEAN-Korea FTA (AKFTA). AANZFTA, ACFTA, AIFTA, AJCEP, and AKFTA entered into force in 2010, 2004, 2010, 2008, and 2007, respectively. There are also many bilateral FTAs by ASEAN countries. This situation is called a "noodle bowl" in Baldwin (2008), i.e., a situation more complicated than a "spaghetti bowl".

The crucial sources for the rise in costs for FTA use through such a phenomenon are various kinds of differences across FTAs. Those include differences in FTA preferential products, FTA preferential rates, rules of origin (RoOs), and necessary documents for certificates of origin (CoOs). For example, the share of eligible products out of all products is widely different across ASEAN+1 FTAs. Even if a product is eligible for all those FTAs, the preferential rates might still be different because the years of entry into force are different and most of the preferential products reduce the tariff rates gradually, i.e., staging elimination. The general RoOs are "Change in Heading (CH) or Real Value-added Content (RVC)" in AANZFTA, AJCEP, and AKFTA, "RVC" in ACFTA, and "Change in Subheading and RVC" in AIFTA. In using multiple ASEAN+1 FTAs, firms must check these differences, which may result in substantial costs for firms.

This paper focuses on the differences in RoOs across FTAs. Specifically, our question in this paper is whether or not it is possible to avoid a rise in compliance costs if RoOs are harmonized across FTAs.[2] We examine FTA utilization in exporting from Thailand to Korea or China in 2011. That is, sample FTA schemes are restricted to ACFTA and AKFTA. Then, we examine whether or not the FTA utilization is higher when ACFTA/AKFTA shares RoOs with some other ASEAN+1 FTAs including AANZFTA, AIFTA, and AJCEP. If such commonality of RoOs raises FTA utilization, the harmonization of RoOs across FTA schemes will contribute to reducing the costs for simultaneously complying with RoOs in multiple FTA schemes.

The potential impacts of RoOs harmonization on FTA utilization are mixed and might be different among RoOs. Suppose that a firm in Thailand exports its product to China and Korea and that RoOs for this product are "Change in Tariff Classification (CTC)" in both ACFTA and AKFTA (here we do not consider more detailed CTC rules

[2] Other (more) effective tools would be the introduction of de minimis rules or extended accumulation rules, which are not examined in this paper.

such as CH). This firm uses significant inputs from the U.S. Under this example, if the firm can comply with CTC in ACFTA, it must be also able to do so in AKFTA because compliance with CTC in ACFTA means a substantial transformation of U.S. inputs, which also can meet CTC in AKFTA. In other words, compliance with CTC in two FTA schemes is possible. However, if compliance in ACFTA becomes possible by using significant inputs from China, it may be difficult to comply with CTC in AKFTA because inputs from China are non-originating inputs for AKFTA. A similar story applies to the case of RVC. Compliance with RVC in ACFTA implies that a significant portion of inputs comes from member countries including China and Thailand. In the case of using a significant portion of inputs from members other than China (i.e., inputs from ASEAN countries), compliance with RVC in AKFTA is possible because inputs from ASEAN countries are also originating inputs for AKFTA. However, in the case of using a significant portion of inputs from China, it is difficult to comply with RVC in AKFTA because inputs from China are non-originating inputs for AKFTA.

"CTC or RVC" is one of the candidates of RoOs that enables relatively easy simultaneous compliance in multiple FTA schemes. Suppose that both ACFTA and AKFTA adopt "CTC or RVC" for the product in the above example. If a significant portion of inputs come from China, the firm will be able to comply particularly with "RVC" in ACFTA. Even in this case, if such inputs from China are substantially transformed, the firm can comply with "CTC" in AKFTA. Namely, the harmonization of RoOs to "CTC or RVC" may enable firms to comply easily with RoOs in those FTAs, at least compared with "CTC" and "RVC". However, it is obvious that, even in this case, if the inputs from China are not substantially transformed, the firm cannot comply with "CTC or RVC" in AKFTA. In sum, the impacts of RoOs harmonization will differ by firm (i.e., firm's procurement patterns) and RoOs (e.g., CTC or RVC). In this paper, we evaluate the *average* impacts according to RoOs.

This paper is related to some existing studies. First, it is close to Hayakawa (2013) in terms of empirically studying the spaghetti bowl phenomenon. In using multiple FTA schemes, firms will need to use more local inputs because local inputs can meet RoOs in any FTA. Based on this hypothesis, Hayakawa (2013) found for Japanese affiliates in ASEAN that users of more than two FTA schemes have around 6% higher local input share. Furthermore, users of more than six FTA schemes have around 20%-30% higher local input share. As a result, he concludes that some amount of benefits from such FTA use is offset by the change in procurement sources because the original pattern of procurement should be optimal. In sum, Hayakawa (2013) shows the existence of "costs" for the spaghetti bowl phenomenon. On the other hand, our paper

shows how we could avoid or minimize such costs.

Second, this paper also belongs to the literature analyzing the determinants on FTA utilization. Bureau et al. (2007) examine utilization of the Generalized System of Preferences (GSP) granted by the European Union (EU) and the United States (US) to developing countries in the agri-goods sector, while Cadot et al. (2006) focus on the trade of the EU and the US with their preferential trading partners. Francois et al. (2006) and Manchin (2006) examine the preferential trade relations of the EU and non-least-developed African, Caribbean, and Pacific (ACP) countries under the Cotonou Agreement, while Hakobyan (2010) examines US GSP utilization by 143 GSP-eligible countries. Keck and Lendle (2012) analyze utilization of both unilateral and bilateral preferences by not only the EU and US but also Australia and Canada. These studies consistently found that FTA utilization is higher in the products with the larger tariff margin and the less restrictive RoOs. In addition to these elements, we examine the role of RoOs commonality on FTA utilization.

The rest of this paper is organized as follows. The next section presents basic information on ASEAN+1 FTAs. After specifying our empirical framework to examine the impacts of common RoOs on FTA utilization in Section 3, we report our estimation results in Section 4. Last, Section 5 concludes this paper.

2. Basic Information on ASEAN+1 FTAs

This section takes a brief overview of ASEAN+1 FTAs. Table 1 reports RoOs at the harmonized system (HS) six-digit level by ASEAN+1 FTAs in 2011. These RoOs are the ones applied in exporting from Thailand to each plus-one partner. The information on RoOs is drawn from the legal texts of each ASEAN+1 FTA. The RoOs in the case of AANZFTA are the ones for exporting to Australia. All ASEAN+1 FTAs except for AIFTA set product-specific RoOs in addition to the above-mentioned general RoOs. RoOs are set at the HS six-digit level. There are some types of RoOs including change-in-chapter (CC), CH, CS, RVC, technical requirement/specific process (TECH), and wholly-obtained rule (WO). CC, CH, and CS are collectively called CTC. “FREE” indicates that all products in an HS six-digit code have zero most favoured nation (MFN) rates. “NO” indicates that all products in an HS six-digit code are ineligible for FTA schemes, i.e., are not preferential products. Some RoOs are combinations of simple RoOs including CTC/RVC, CTC&RVC, and so on.

=== Table 1 ===

In Table 1, there are five noteworthy points. First, firms in Thailand can enjoy zero MFN rates in exporting half of all products to Australia and Japan. Second, India and Korea designate a relatively large number of products as ineligible products. This is because the tariff reduction for most of the products starts from 2014 in the case of AIFTA and the tariff reduction for the products placed on sensitive- and highly-sensitive lists starts from 2012 in the case of AKFTA. Third, in the case of AJCEP, a relatively large number can be found not only in its general rule, CH/RVC, but also in CC-related RoOs including CC and CC&TECH. Fourth, purely CTC&RVC rules, which are known to be very restrictive, are found only in AIFTA (CS&RVC) and AKFTA (CH&RVC). Last, AANZFTA and AJCEP set a relatively wide variety of RoOs depending on products. While such RoOs might be business-friendly if they are set according to the specificity of products, such a variety leads to yielding costs for firms because firms need to check RoOs for their products.

Next, we take a closer look at differences in RoOs across ASEAN+1 FTAs. In particular, we shed light on those of RoOs in ACFTA/AKFTA in comparison with RoOs in the others. Table 2 shows RoOs' matrix showing ACFTA and other ASEAN+1 FTAs. For simplicity, we use the rough RoOs like CTC, not strict RoOs such as CC, CH, and CS. In the case of AANZFTA, a large number of observations can be seen in the combination of RVC in ACFTA and CTC/RVC in AANZFTA. However, most of the products eligible for ACFTA have zero MFN rates when exporting to Australia. Since AIFTA does not set product specific RoOs, most of the products eligible for ACFTA have CTC&RVC in AIFTA. As in the case of AJCEP, most of the products eligible for ACFTA have zero MFN rates when exporting to Japan. However, a relatively large number of observations can be found in not only the combination of RVC in ACFTA and CTC/RVC in AJCEP but also the combination of RVC in ACFTA and CTC in AJCEP and that of RVC/TECH in ACFTA and CTC&TECH in AJCEP. In the case of AKFTA, most of the products eligible for ACFTA have the combination of RVC in ACFTA and CTC/RVC in AKFTA.

=== Table 2 ===

Table 3 reports the RoOs matrix showing AKFTA and other ASEAN+1 FTAs. In the case of AANZFTA, a large number of observations can be seen in the combination of CTC/RVC in both AANZFTA and AKFTA, in addition to the combination of CTC/RVC in AKFTA and FREE in AANZFTA. Again, most of the products eligible for

AKFTA have CTC&RVC in AIFTA. In the case of AJCEP, a large number of observations can be seen in the combination of CTC/RVC in both AJCEP and AKFTA, in addition to the combination of CTC/RVC in AKFTA and FREE in AJCEP. Thus, we can say that AKFTA shares RoOs with AANZFTA and AJCEP in many products.

=== Table 3 ===

Table 4 shows the distribution of preferential margin, i.e., the difference between MFN rates and preferential rates, in 2011 by ASEAN+1 FTAs. The data on MFN rates and preferential rates in 2011 are obtained from the database of World Integrated Trade Solution (WITS).[3] In AANZFTA, AIFTA, and AJCEP, most of the preferential products have small margins like the margin of (0%, 5%]. Particularly in the cases of AANZFTA and AIFTA, 98% and 91% of eligible products have a margin of (0%, 5%], respectively. Such a share is 56% in the case of AJCEP, but the share of eligible products with a margin of (5%, 10%] is also relatively high, at 38%. In the case of ACFTA, relatively high shares can be seen in the eligible products with margins of (5%, 10%] and (10%, 50%]. AKFTA has the highest share of products with a margin of (5%, 10%]. In sum, we may say that ACFTA and AKFTA have relatively large tariff margins.

=== Table 4 ===

Table 5 shows FTA utilization rates in Thai exports to Australia, China, India, Japan, and Korea under ASEAN+1 FTA schemes. "Total", "In Eligible", and "Under FTA" mean total exports, exports of eligible products under all tariff schemes, and exports of eligible products under FTA schemes, respectively. Columns (IV) and (V) report "Total" divided by "In Eligible" and "Under FTA", respectively. The rates in column (V) are usually called "FTA utilization rates". The data on total exports and exports for eligible products are obtained from World Trade Atlas as imports of the partner countries. The data on exports under FTA schemes are from the Bureau of Trade Preference Development, Department of Foreign Trade, Ministry of Commerce, Kingdom of Thailand. Put differently, our FTA utilization data are based on the CoOs rather than customs.[4]

[3] http://wits.worldbank.org/WITS/

[4] Thus, in our measure of utilization rates, the numerator and denominator are FOB basis and CIF basis, respectively. This inconsistency may yield some biases in the measurement. It is easily possible to compute the denominator also by employing FOB basis data, i.e., Thai data on exports. Then, since the tariff-line classification in each partner country is different from that in Thailand, we

=== Table 5 ===

There are some noteworthy points in Table 5. Thailand has both bilateral and multilateral FTAs with Australia, India, and Japan, so that FTA utilization rates are rather low in the cases of AANZFTA (1%), AIFTA (23%), and AJCEP (1%). In other words, firms in Thailand tend to use bilateral FTA schemes in exporting to these countries maybe due to those earlier years of entry into force and thus the larger tariff margin. The relatively high rates in AIFTA among these three FTAs are because only the early-harvest program has entered into force in the Thailand-India FTA. ASEAN-China and ASEAN-Korea FTAs have relatively high utilization rates, which are respectively 54% and 48%. However, exports under the ACFTA and AKFTA schemes occupy only 21% and 17% of total exports to China and Korea, respectively.

3. Empirical Framework

This section specifies our empirical framework for examining the impacts of common RoOs on FTA utilization. In the empirical analysis, we focus on Thai exports to China and Korea. Thailand is a member of not only ACFTA and AKFTA but also AANZFTA, AIFTA, and AJCEP. However, it has both bilateral and multilateral FTA schemes with Australia, India, Japan, and New Zealand. In this case, firms' decisions on FTA use will be qualitatively different; firms will choose their tariff scheme from among MFN rates, bilateral FTA rates, and multilateral FTA rates rather than simply from between MFN rates and FTA rates. Since our aim is not to examine such complicated decisions on tariff schemes, we simply focus on trading pairs in which only a single FTA scheme is available, i.e., China and Korea.

Our analysis is conducted for Thai exports in 2011 at the HS six-digit level. The usual specifications in the previous studies, which are listed in the introductory section, are as follow.

$$\text{Utilization}_{ic} = \alpha\ \text{Margin}_{ic} + \gamma\ \ln \text{Monthly Exports}_{ic} + \mathbf{D}_{ic}\,\boldsymbol{\beta} + u_c + \varepsilon_{ic},$$

are forced to use Thai data on exports at the HS six-digit level. However, since preferential eligibility is defined at the tariff-line level in partner countries, the use of HS six-digit level data in Thailand implies the inclusion of trade values for not only eligible products but also ineligible products, leading to biases in the denominator. In short, the use of Thai data and partners' data results in containing CIF/FOB differences and trade values for ineligible products, respectively. Our decision on the use of partners' data in computing the denominator of FTA utilization rates was made because we believe that the biases from the inclusion of trade values for ineligible products are much more serious than those from CIF/FOB differences.

where Utilization$_{ic}$ is FTA utilization rates in exporting product *i* to country *c*. Margin$_{ic}$ denotes preference margin in exporting product *i* to country *c*. We aggregate tariffs at the tariff-line level up to those at the HS six-digit level by taking the simple average. Monthly Exports$_{ic}$ is the average of monthly exports of product *i* to country *c* in 2011. This variable controls for the role of firm-level transaction sizes in FTA utilization.[5] Most of the previous studies (e.g., Hakobyan, 2012) use the product-country-level annual trade values. Obviously, such values are too large as a proxy for firm-level transaction sizes. Therefore, Keck and Lendle (2012) employ the product-customs district-level monthly trade data and call these data "pseudo-transaction-level" trade values. Due to data availability, this paper uses the product-country-level monthly trade values, which meet a medium level of accuracy as a proxy for firm-level transaction sizes between product-country-level annual trade values and pseudo-transaction-level trade values. $\mathbf{D}_{ic}$ is a vector of dummy variables indicating RoOs in exporting product *i* to country *c*. We employ the rough RoOs, i.e., CTC rather than CC, CH, or CS. An importer dummy variable (u_c), i.e., an FTA scheme dummy, is also included.

In order to examine the impacts of common RoOs, we extend the above equation. Specifically, we introduce a vector of dummy variables, Common $(\mathbf{X})_{ic}$, as shown in the following.

$$\text{Utilization}_{ic} = \alpha\ \text{Margin}_{ic} + \gamma\ \ln \text{Monthly Exports}_{ic} + \text{Common}\ (\mathbf{X})_{ic}\ \boldsymbol{\delta} + \mathbf{D}_{ic}\ \boldsymbol{\beta} + u_c + \varepsilon_{ic},$$

where $\mathbf{X}$ = {CTC, CTC&RVC, CTC/RVC, RVC, WO}. Let *x* be an element of $\mathbf{X}$ and show a type of RoOs. Then, Common $(x)_{ic}$ takes the value one if RoOs in exporting product *i* to country *c* are *x* and any other ASEAN+1 FTAs also adopt *x* for that product. $\boldsymbol{\delta}$ is a vector of coefficients to be estimated. For example, the positively significant coefficient for Common (*x*) implies that the harmonization of RoOs to a type *x* raises FTA utilization rates. We estimate this model by employing a fractional logit estimation technique proposed by Papke and Wooldridge (1996) because our dependent variable lies in the unit interval, i.e., [0, 1].[6] The data sources are the same as in the previous section.

[5] As theoretically demonstrated in Demidova and Krishna (2008), even if the tariff margin is trivial, the more productive firms are more likely to use FTA schemes in exporting because such firms have larger outputs and thus obtain larger tariff savings through the use of FTA schemes.

[6] The fractional logit model ensures that, unlike the ordinary least square method (OLS), the predicted values of the dependent variable are in the unit interval. Also, unlike the log-odds ratio model and the beta regression model, it can naturally define dependent variables for the boundary values 0 and 1. It imposes less restrictive assumptions than the Tobit model (requiring the normality and homoskedasticity of the dependent variables). For more details, see Ramalho et al. (2011).

Before reporting our estimation results, several empirical issues are to be noted. First, due to the use of CoOs data, we are forced to aggregate the tariff margin in arbitral ways. While the customs data report preferential imports at a tariff line-level, the CoOs data on preferential exports are usually available at the HS six-digit level. Thus, in the case of using CoOs data, we need to aggregate the tariff-line level tariff margin to the HS six-digit level tariff margin. As mentioned above, we take the simple average, but in our robustness checks, we try some other ways of aggregation. Second, we should take into account the availability of zero MFN rates in other ASEAN+1 FTAs. Speaking in the extreme, if members of all of the other ASEAN+1 FTAs provide zero MFN rates, while the RoOs commonality dummy becomes automatically zero, firms are free to adjust their inputs to comply with the concerned ASEAN+1 FTA. Our robustness check takes care of such a case to some extent. Third, as pointed out in Hakobyan (2012), the coefficient for Monthly Exports might suffer from endogeneity biases because unobserved shocks may have influence on both average monthly exports and the dependent variable (particularly its denominator). Thus, we use the instrumental variable (IV) method in our robustness checks. Last, our estimates may suffer from sample selection biases because we restrict our sample only to observations with any exports due to the nature of the denominator of our dependent variable. Thus, we use the Heckman model in our robustness checks.[7]

4. Empirical Results

This section reports our estimation results. The baseline results are provided in column (I) in Table 6. To save space, we do not report the estimation results in RoOs dummy variables (available upon request). First, unlike the previous studies, the coefficient for the tariff margin is insignificantly estimated. Second, Monthly Exports is significantly positive, as is consistent with our expectation. Namely, the higher FTA utilization rates are observed in the exports with the larger monthly trade values. Third, the results in RoOs commonality dummy variables are as follow. We can see negatively significant impacts of sharing "CTC", "CTC&RVC", or "WO". The commonality in "CTC/RVC" and "RVC" has insignificant impacts. These results imply that the harmonization to CTC/RVC plays to some extent a good role in terms of not

[7] Our aim here is different from Manchin (2006), which employs the Heckman estimation technique in order to include zero utilization rates into an estimation sample. Namely, while ours is to tackle zero issues for the denominator of utilization rates, Manchin (2006) uses the Heckman to tackle zero issues for the numerator of utilization rates. Also, we naturally include zero utilization rates because we do not take a log of utilization rates as in the previous studies except for Manchin (2006).

discouraging firms' use of FTA schemes. On the other hand, the harmonization to CTC, CTC&RVC, or WO hinders firms from using those schemes.

=== Table 6 ===

Next, we conduct several robustness checks on our above baseline results. First, we explore the reasons for the insignificant coefficient for Margin. To do that, we change the method of aggregation. Columns (II) and (III) take minimum rates and maximum rates among tariff rates at the tariff-line level within the same HS six-digit code, respectively. However, the results are qualitatively unchanged. In particular, the coefficients for Margin are still insignificant. Column (IV) introduces a dummy taking the value one for tariff margins above 17% and zero otherwise. "17%" is obtained from the estimation of the Threshold Regression model (see Francois et al., 2006). While the results in other variables are unchanged, the new dummy has a significantly positive coefficient. The latter result implies that the costs for the use of FTA schemes in exporting from Thailand are 17% on a tariff-equivalent basis. This estimate is rather high compared with the estimates in the previous studies. For example, Francois et al. (2006) found in Cotonou preferences that such costs range between 4% and 4.5%.

Second, we include dummy variables of strict RoOs (e.g., CC, CH, or CS) rather than those of rough RoOs (i.e., CTC). However, for simplicity and avoiding many combinations of RoOs commonality, we restrict the use of RoOs commonality dummy variables to those constructed based on rough RoOs. Also, we use the variable of tariff margin based on the simple average. The results are reported in column (V) and are totally unchanged. In particular, sharing "CTC", "CTC&RVC", or "WO" has negative impacts on FTA utilization but sharing "CTC/RVC" or "RVC" does not.

Third, we take care of the availability of zero MFN rates in other ASEAN+1 FTAs. If firms can use zero MFN rates in exporting to members of other ASEAN+1 FTAs, they are relatively free to adjust their inputs in trying to export to a concerned country under FTA schemes. In order to control for this case, we introduce the variable $Free_{ic}$, which is the number of plus-one countries (excluding country *c*) that have zero MFN rates for product *i*. The results are reported in column (VI). The new variable has a significantly negative coefficient. This is a puzzling result, but it may indicate that since firms also can enjoy zero tariff rates in exporting to other countries, they may not want to change their optimal procurement sources in order to keep their international competitiveness. The results for other variables are unchanged.

Fourth, we account for endogenity in our variable of Monthly Exports by

employing the IV method. Following Hakobyan (2012), we use the average of monthly exports of product *i* to the rest of the world (Exports to the ROW) as an instrument variable. The results are reported in Table 7. In the first stage regression, the coefficients for Exports to the ROW are estimated to be significantly positive. The results in the second stage regression are basically unchanged. The noteworthy differences are that the coefficient for Margin is significant in the case of maximum rates and that the coefficients for Common (WO) are insignificant.

=== Table 7 ===

Last, we account for the possible sample selection biases. The source for such biases is that Utilization is definable only in the case of positive exports. Using the average of monthly exports of product *i* to the rest of the world, i.e., Exports to the ROW, as an excluded variable, we estimate the Heckman sample selection model, of which estimation results are reported in Table 8. In the selection equation, the coefficients for Exports to the ROW are estimated to be significantly positive. The coefficients for the inverse of Mills ratio are also estimated to be significant, indicating the necessity of controlling for the sample selection mechanism. The results in the outcome equation are basically unchanged and are qualitatively similar to those in Table 7, except for Margin(Max).[8]

=== Table 8 ===

5. Concluding Remarks

This paper examines empirically the impacts of commonality of RoOs with other ASEAN+1 FTAs on AKFTA/ACFTA utilization in Thai exports in 2011. Specifically, we explore whether or not the ACFTA/AKFTA utilization is higher when ACFTA/AKFTA shares RoOs with some other ASEAN+1 FTAs including AANZFTA,

[8] We also conduct some more robustness checks. First, in some cases, different de jure criteria might have the same de facto meaning. For example, the RoO criteria for fish are RVC under ACFTA, CC under AJCEP, and WO under both AANZFTA and AKFTA. Although these de jure criteria are different, the real practice is merely that the fish eligible for the preferences are to be raised or caught in the country since no one can turn other animals into fish. However, it is technically difficult to take into account this issue for all products. Thus, as one robustness check, we simply drop unprocessed agricultural products, namely products categorized in HS Sections 1 and 2, and obtain similar results. Second, as shown in Table 1, the variation of RoOs is small in the case of ACFTA. We dropped the sample of exporting to China but got qualitatively similar results. One noteworthy difference is that Common (RVC) has significantly positive coefficients.

AIFTA, and AJCEP. Our careful empirical analysis reveals that sharing “CTC” or “CTC&RVC” with other ASEAN+1 FTAs lowers the utilization of ACFTA/AKFTA. On the other hand, we found that sharing “RVC” or “CTC/RVC” with other FTAs does not discourage firms from using FTA schemes. These results suggest that the harmonization of RoOs across FTAs into “RVC” or “CTC/RVC” play some role in reducing the costs yielded through the spaghetti bowl phenomenon. On the other hand, harmonization to CTC, CTC&RVC, or WO hinders firms from using those schemes.

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Table 1. RoOs by ASEAN+1 FTA

	AANZFTA	ACFTA	AIFTA	AJCEP	AKFTA
CC	122	1		508	2
CC&RVC					2
CC&TECH	27			363	
CC/(RVC&TECH)	65				
CC/RVC	308	7		15	446
CC/RVC/TECH	14				
CC/TECH	12			43	
CH	111			81	1
CH&RVC					4
CH&TECH				84	
CH/(CS&RVC)/RVC	96				
CH/(RVC&TECH)	6				
CH/RVC	1,292	114		958	3,074
CH/RVC/TECH					21
CH/TECH	78			180	
CS				2	
CS&RVC			4,191		
CS/RVC	345			8	61
RVC	49	3,959		25	53
RVC/TECH		392			
TECH/WO	6				
WO	28	8		1	298
FREE	2,320	322	137	2,578	729
NO	173	249	724	206	361
Total	5,052	5,052	5,052	5,052	5,052

Source: Authors' classification based on legal texts pertaining to each FTA.

Table 2. RoOs Matrix Showing ACFTA and Other ASEAN+1 FTAs

	ACFTA						
	CTC	CTC/RVC	RVC	RVC/TECH	WO	FREE	NO
AANZFTA							
CTC			145	86			2
CTC&TECH				27			
CTC/(RVC&TECH)		6		65			
CTC/RVC	1	87	1,646	65		86	156
CTC/RVC/TECH			7	2	1		4
CTC/TECH			90				
RVC			36				13
TECH/WO			6				
WO			27			1	
FREE		26	1,965	17	7	232	73
NO		2	37	130		3	1
AIFTA							
CTC&RVC	1	99	3,363	331	7	202	188
FREE		9	41			81	6
NO		13	555	61	1	39	55
AJCEP							
CTC		53	483		1	10	44
CTC&TECH			136	310			1
CTC/RVC		47	913			12	9
CTC/TECH			146	76			1
RVC			25				
WO				1			
FREE		12	2,083	5	7	299	172
NO	1	9	173			1	22
AKFTA							
CTC		1					2
CTC&RVC			6				
CTC/RVC	1	108	2,939	358		104	71
CTC/RVC/TECH			21				
RVC		3	36		1	1	12
WO			281	1	1	6	9
FREE		9	400		6	192	122
NO			276	33		19	33

Source: Authors' classification based on legal texts on each FTA

Table 3. RoOs Matrix Showing AKFTA and Other ASEAN+1 FTAs

	AKFTA							
	CTC	CTC&RVC	CTC/RVC	CTC/RVC/TECH	RVC	WO	FREE	NO
AANZFTA								
CTC			194	11		1		27
CTC&TECH			27					
CTC/(RVC&TECH)	1		68					2
CTC/RVC		3	1521		10	11	382	114
CTC/RVC/TECH		2	9		1			2
CTC/TECH			88	2				
RVC			28		18		2	1
TECH/WO						6		
WO			14			6	1	7
FREE	2	1	1480	8	22	274	336	197
NO			152		2		8	11
AIFTA								
CTC&RVC	1	5	3,264	21	22	201	460	217
FREE			44			4	82	7
NO	2	1	273		31	93	187	137
AJCEP								
CTC	1	2	285		17	161	1	124
CTC&TECH			411	3				33
CTC/RVC			922				16	43
CTC/TECH			203	18				2
RVC			21		4			
WO						1		
FREE	1	3	1678		30	96	711	59
NO	1	1	61		2	40	1	100

Source: Authors' classification based on legal texts on each FTA

Table 4. Distribution of Preferential Margin by ASEAN+1 FTA

	0% < Margin ≤ 5%		5% < Margin ≤ 10%		10% < Margin ≤ 50%		Margin > 50%		Total
	Number	Share	Number	Share	Number	Share	Number	Share	
AANZFTA	2,921	98%	67	2%	0	0%	0	0%	2,988
ACFTA	1,342	20%	3,186	47%	2,199	33%	3	0.04%	6,730
AIFTA	9,023	91%	885	9%	12	0%	12	0.1%	9,932
AJCEP	2,260	56%	1,518	38%	226	6%	0	0%	4,004
AKFTA	1,157	13%	6,987	76%	1,044	11%	10	0.1%	9,198

Source: World Integrated Trade Solution (WITS)

Notes: In this table, we classify each product at the tariff-line level. Naturally, this table does not include products with zero MFN rates and those not eligible for FTA schemes.

Table 5. FTA Utilization Rates by ASEAN+1 FTA

	Total (I)	In Eligible (II)	Under FTA (III)	(IV) = (III)/(I)	(V) = (III)/(II)
AANZFTA	10,539	6,622	77	1%	1%
ACFTA	39,040	15,044	8,135	21%	54%
AIFTA	5,068	4,116	957	19%	23%
AJCEP	24,522	5,866	40	0.2%	1%
AKFTA	5,353	1,891	903	17%	48%

Sources: Regarding total exports and exports for eligible products, we use the data on partners' imports, which are obtained from World Trade Atlas. The data on exports under FTA schemes are from the Bureau of Trade Preference Development, Department of Foreign Trade, Ministry of Commerce, Kingdom of Thailand.

Note: "Total", "In Eligible", and "Under FTA" indicate total exports, exports of eligible products under all tariff schemes, and exports under FTA schemes, respectively.

Table 6. Fractional Logit Model

	(I)	(II)	(III)	(IV)	(V)	(VI)
Margin (Mean)	0.026				0.027	0.021
	[0.024]				[0.025]	[0.024]
Margin (Min)		0.024				
		[0.025]				
Margin (Max)			0.024			
			[0.019]			
Margin (Threshold)				0.836***		
				[0.124]		
Monthly Exports	0.255***	0.255***	0.254***	0.256***	0.255***	0.255***
	[0.017]	[0.017]	[0.016]	[0.016]	[0.017]	[0.017]
Common (CTC)	-6.043***	-6.033***	-6.014***	-5.804***	-6.054***	-6.209***
	[1.382]	[1.382]	[1.370]	[1.409]	[1.387]	[1.390]
Common (CTC&RVC)	-5.162***	-5.156***	-5.136***	-5.172***	-5.588***	-5.169***
	[1.543]	[1.541]	[1.535]	[1.609]	[1.534]	[1.551]
Common (CTC/RVC)	0.187	0.183	0.184	0.152	0.16	0.125
	[0.123]	[0.123]	[0.122]	[0.120]	[0.143]	[0.126]
Common (RVC)	0.314	0.341	0.279	0.268	0.311	0.257
	[0.244]	[0.239]	[0.251]	[0.230]	[0.245]	[0.242]
Common (WO)	-12.208***	-12.236***	-12.198***	-12.318***	-12.704***	-12.155***
	[0.763]	[0.764]	[0.763]	[0.766]	[0.763]	[0.784]
Free						-0.213***
						[0.057]
RoOs Dummy	Rough	Rough	Rough	Rough	Strict	Rough
Observations	3,965	3,965	3,965	3,965	3,965	3,965
Log pseudolikelihood	-1584	-1584	-1583	-1574	-1583	-1577

Notes: The parentheses are robust standard errors. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. We include the FTA scheme dummy variable, i.e., ACFTA or AKFTA. We include RoOs dummy variables, the results of which are not reported here. Rough RoOs indicate those types shown in Tables 2 and 3. Strict RoOs indicate those types shown in Table 1.

Table 7. IV Estimation

	(I)	(II)	(III)	(IV)	(V)	(VI)
2nd-stage Regression						
Margin (Mean)	0.004				0.004	0.003
	[0.002]				[0.002]	[0.002]
Margin (Min)		0.003				
		[0.002]				
Margin (Max)			0.003*			
			[0.002]			
Margin (Threshold)				0.153***		
				[0.024]		
Monthly Exports	0.078***	0.078***	0.077***	0.078***	0.078***	0.078***
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
Common (CTC)	-1.031***	-1.033***	-1.027***	-0.956***	-1.031***	-1.037***
	[0.255]	[0.256]	[0.253]	[0.287]	[0.256]	[0.256]
Common (CTC&RVC)	-0.837***	-0.839***	-0.834***	-0.801**	-0.929***	-0.835***
	[0.285]	[0.286]	[0.283]	[0.321]	[0.283]	[0.286]
Common (CTC/RVC)	-0.011	-0.012	-0.011	-0.016	-0.034	-0.015
	[0.020]	[0.020]	[0.020]	[0.020]	[0.024]	[0.020]
Common (RVC)	0.046	0.049	0.042	0.035	0.045	0.043
	[0.043]	[0.043]	[0.044]	[0.042]	[0.043]	[0.043]
Common (WO)	-0.151	-0.154	-0.151	-0.166	-0.147	-0.148
	[0.181]	[0.182]	[0.181]	[0.190]	[0.182]	[0.183]
Free						-0.011
						[0.008]
1st-stage Regression						
Exports to the ROW	0.482***	0.481***	0.483***	0.481***	0.483***	0.482***
	[0.024]	[0.024]	[0.024]	[0.024]	[0.024]	[0.024]
RoOs Dummy	Rough	Rough	Rough	Rough	Strict	Rough
Observations	3,965	3,965	3,965	3,965	3,965	3,965
1st-stage R-squared	0.2479	0.2479	0.2478	0.2480	0.2510	0.2512

Notes: The parentheses are robust standard errors. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. We include the FTA scheme dummy variable, i.e., ACFTA or AKFTA. We report the coefficients for only instruments, i.e., Exports to the ROW, in the case of the first-stage regression. We include RoOs dummy variables, the results of which are not reported here. Rough RoOs indicate those types shown in Tables 2 and 3. Strict RoOs indicates those types shown in Table 1.

Table 8. Heckman Estimation

	(I)	(II)	(III)	(IV)	(V)	(VI)
Outcome Equation						
Margin (Mean)	0.002				0.002	0.002
	[0.002]				[0.002]	[0.002]
Margin (Min)		0.002				
		[0.002]				
Margin (Max)			0.002			
			[0.002]			
Margin (Threshold)				0.120***		
				[0.021]		
Monthly Exports	0.026***	0.026***	0.026***	0.026***	0.026***	0.025***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Common (CTC)	-0.713***	-0.713***	-0.712***	-0.657***	-0.713***	-0.727***
	[0.098]	[0.098]	[0.097]	[0.125]	[0.098]	[0.101]
Common (CTC&RVC)	-0.522***	-0.522***	-0.521***	-0.497**	-0.622***	-0.517***
	[0.191]	[0.191]	[0.191]	[0.217]	[0.200]	[0.192]
Common (CTC/RVC)	0.009	0.009	0.009	0.006	0.002	0.000
	[0.016]	[0.016]	[0.016]	[0.016]	[0.018]	[0.016]
Common (RVC)	0.027	0.028	0.023	0.016	0.026	0.019
	[0.040]	[0.040]	[0.040]	[0.039]	[0.040]	[0.040]
Common (WO)	-0.155	-0.158	-0.153	-0.16	-0.153	-0.147
	[0.112]	[0.112]	[0.112]	[0.112]	[0.112]	[0.117]
Free						-0.025***
						[0.007]
Selection Equation						
Exports to the ROW	0.206***	0.206***	0.206***	0.206***	0.206***	0.206***
	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]
Lambda	-0.143***	-0.143***	-0.143***	-0.142***	-0.143***	-0.142***
	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]	[0.008]
RoOs Dummy	Rough	Rough	Rough	Rough	Strict	Rough
Observations	8,440	8,440	8,440	8,440	8,440	8,440
Chi2 for Wald test (Rho = 0)	343	345	341	341	341	341
Log pseudolikelihood	-5638	-5639	-5638	-5623	-5637	-5632

Notes: The parentheses are robust standard errors. ***, **, and * indicate 1%, 5%, and 10% significance, respectively. We include the FTA scheme dummy variable, i.e., ACFTA or AKFTA. We report the coefficients for only excluded variables, i.e., Exports to the ROW, in the case of the selection equation. We include RoOs dummy variables, the results of which are not reported here. Rough RoOs indicate those types shown in Tables 2 and 3. Strict RoOs indicates those types shown in Table 1.