Rules of Origin and Utilization of Free Trade Agreements: An Econometric Analysis*

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1. MOTIVATION, RESEARCH QUESTIONS AND METHODOLOGY

This paper seeks to answer two questions:

- How important are rules of origin (RoO) in determining **the extent of utilization of Free Trade Agreements (FTAs)** by Thai private sector?
- How important are RoO for the general level of **Thailand's trade under FTAs**?

We first motivate ideas behind these questions and clarify some terms. There are several reasons why we are interested in **"FTA utilization."** FTAs are generally perceived as tariff reduction schemes in which member countries have the privilege of paying less than Most Favored Nation (MFN) tariff rates when trading with their FTA partners. However, it is becoming increasingly clear that, although some products are qualified for tariff reduction under FTA schemes (i.e., they are on an FTA-inclusion-list), they are not actually getting those tariff preferences. In actual FTA implementation, exporters (from here on, unless specifically indicated, the term "exporters" also means "importers" and their trades are "exports" and "imports" respectively) with "inclusion-list" products have to go through a rather involved verification process before they actually receive the tariff preferences. The process required to "utilize FTAs" sometimes represents a significant cost to exporters that they decide not to export under that FTA, and thus have to pay full tariff rates. In fact, we found that Thai private sector is under-utilizing FTAs to a significant degree. As of 2010, Thai private sector was "utilizing" FTAs for about 50.3 percent of exports and only 40.7 percent of imports. These figures are quite alarming as they indicate that about half of Thailand's traded goods under FTAs are qualified to receive tariff reductions but they are not receiving the benefits they deserve.

In this regard, **the extent of FTA utilization** here refers to how much (percentage) of Thailand's trade in FTA inclusion-list products is being "utilized" (and thus really gets a tariff reduction according to the schemes of the FTAs under study). Based on our interviews with various firms, there are a number of reasons for the relatively low FTA utilization rate among Thai exporters besides the aforementioned "administrative costs" of utilizing an FTA. For example, the exporters may simply not be aware that their products qualify for tariff reduction or they do not understand the application process. However, we hypothesize that RoO (more on this below) might be an important factor restricting full FTA utilization. Our first attempt in this paper is thus to estimate the importance of RoO in determining the degree of FTA utilization. For a more concrete result, we also explore the influence of RoO on the general level of Thailand's trade under FTAs. The term **trade under FTAs** here refers to trade in goods classified as being on an "FTA-inclusion-list." Thus, it does not include goods "not covered" by FTAs, such as goods in the categories "exclusion list" or "sensitive list." Trade in these latter types of goods is perhaps determined by factors outside FTA schemes and is beyond the scope of this paper. Note also that Thailand's trade with some major trading partners, such as the United States and the European Union, with which Thailand has no FTA, is also not analyzed in the present study.

More specifically, the hypothesis for this paper is that **the stringency of RoO** might exert a significant adverse effect on FTA utilization and trade under FTAs. We suspect that RoO compliance might impose a

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significant cost on the private sector both administratively (e.g., documentation and a lengthy verification process with government officials) and economically (e.g., firms have to set up production processes/accounting systems to comply with the RoO). RoO originate from a benign intention of determining the origin of goods so that there is no trade deflection (when goods are shipped from a non-member country to a member country and re-exported to another member country just to take advantage of tariff preferences between FTA-member countries). In principle, RoO should reflect partner countries' production structures. In practice, however, some RoO are more complicated than necessary. This is without mentioning that RoO are sometimes being (mis)used as a non-tariff barrier to trade. Thus, RoO compliance might impose additional and possibly significant costs on traders wishing to utilize FTAs.

In this paper, an experiment is conducted to see **how important RoO strictness is as a factor that restricts FTA utilization and the overall level of trade under FTAs**. It is especially interesting to put into perspective the "relative" importance of RoO when compared with a more evident factor, such as tariff margins, the difference between MFN tariff rates and tariff rates under FTAs (from here on, the FTA rate). The point here is that the basic premise of an FTA is to cut back tariff barriers among member countries. We thus would expect higher tariff margins to induce the private sector to utilize FTAs more fully, and trade under FTAs should be higher. However, as tariffs under FTAs are tapering down to zero for most FTAs, and other non-tariff measures (including RoO) are becoming more and more important issues in trade, "further reduction in tariff" may no longer be the most important factor in determining to what degree a country would utilize (and benefit from) FTAs. In this paper, we first analyzed the importance of RoO in determining FTA utilization rates and trades under FTAs. We then conducted a policy experiment to compare **the relative importance of RoO and tariff margins** on FTA utilization and trades.

The methodology we used to evaluate the relative importance of RoO is to construct two econometric models capable of explaining FTA utilization rates and trades under FTAs. Both models would explicitly incorporate tariff margins and RoO as explanatory variables. We could then conduct a policy simulation experiment based on the estimated models. In particular, we could get an estimate of how much the utilization rate would increase if we set tariff rates under FTAs to zero for all products (this in fact should be a soon-to-come scenario for most Thai FTAs). Then in another simulation, we could hold the tariff margins constant at present values and explore the effects of "relaxing" RoO. What we found is that "relaxing" RoO, i.e., simplifying RoO, would have stronger positive effects on utilization rates and trades under FTAs when compared with setting all tariffs under FTAs to zero. We have applied this methodology to Thailand's four FTAs, namely ASEAN FTA (AFTA), ASEAN-China FTA (ACFTA), Japan-Thailand Economic Partnership Agreement (JTEPA), and Thailand-Australia FTA (TAFTA). To take into account the different nature of trade between the export and import sides, we estimated the models separately between the export and import sides for each FTA (so in total there are eight cases under study). The data used were Thai cross-sectional trade data for 2010 at Harmonized System (HS) 6-8 digits tariff-lines level.[1]

Section two reviews some basic ideas of RoO, how we define their relative stringency, and how we define RoO relaxation. Section three describes the two econometric models, the first one intended for explaining FTA utilization rates (utilization model) and the second one intended for explaining trades under FTAs (trade model). Section four then presents the results of the estimated models and policy simulation. Section five concludes.

2. REVIEW OF RULES OF ORIGIN AND THEIR RELATIVE STRINGENCY

RoO refer to a set of rules used to determine whether a traded good originates in a certain country. With any kind of trade cooperation between countries, there should be some measures to ensure that the traded goods are actually coming from member countries. Without RoO, countries that are not members of an FTA could benefit from member countries' trade agreements by shipping their products to a member country then re-exporting those products to another member country to enjoy the privileges offered by the agreement; this would be a case of the so-called trade deflection.

RoO take many forms, such as, if a product required a certain amount of imported inputs, there would need to be a sufficient amount of "value added" occurring within the boundary of the country of origin. Another example would be products that need to go through a "substantial transformation process" within that country in order to qualify as that country's goods. In principle, RoO should reflect the production structures of trading partners.

There are two main categories of RoO.[2] The first is "Wholly Obtain" (WO), which indicates that a good must be wholly grown, harvested or extracted from the soil in the territory of the member, or manufactured there from any such products. Examples of products under the WO rule are agricultural commodities, such as fruits and vegetables. The second category of RoO is "Substantial Transformation" (ST), which has three sub-categories: Change in Tariff Classification (CTC), Value-Added (VA), and Specific Process (SP).

CTC requires varying degrees of change in product "types." For example, there are three main groups of CTC: Change in Chapter (CC), Change of Tariff Heading (CTH), and Change of Tariff Subheading (CTSH). CC requires a product to change at a 2-digit HS level, whereas CTH and CTSH require a change at

4-digit and 6-digit levels, respectively. Generally speaking, CC would require "more changes in products" than CTH, and CTH would require more changes than CTSH. For example, a change from HS**03**026100 (fresh/chilled sardines) to HS**16**041311 (preserved sardines in air-tight can) constitutes a CC (note that there is a change in the first two digits which are in boldface type for ease of identification). Further, a change from HS03**02**6100 (fresh/chilled sardines) to HS03**05**3000 (fish fillet; dried/salted/in brine but not smoked) constitutes a change in CTH (note that there is a change in the first four digits). In terms of relative stringency, CC is arguably the most stringent; CTH is the second most stringent and CTSH is the least stringent. It should be noted that an "exceptions (ex)" clause can be added to the CTC rule, such as CCex and CTHex. Such a clause would prohibit the use of non-originating materials from a certain sub-heading, heading, or chapter (thus making the standard CC, CTH, or CTSH rules stricter).

The VA rule specifies the minimum percentage of value that must have been added in the exporting country; for example, VA40 requires that 40 percent of the value added must be of domestic origin.

The SP rule requires that the product undergo certain manufacturing operations in the originating country.

It should be noted that, while there is a natural ordering of RoO stringency from CC to CTH to CTSH, we cannot *apriori* rank the CTC rule with the SP, VA or WO rules in terms of their relative strictness. Table 1 summarizes the main RoO categories studied in the present paper.

In practice, RoO are usually specified in terms of combinations of the main RoO types shown in Table 1; for example, CCorVA40 means that the product requires a transformation according to the CC "or" VA40 rules, whereas CCandVA means that both types of transformation are required. In terms of RoO strictness, adding the word "or" should "relax" RoO since it gives exporters options, while adding the word "and" should make RoO more stringent since it adds requirements that exporters have to follow. Table 2 shows examples of RoO for the Thai FTAs under study.

As mentioned in section 1, the main hypothesis of this paper is that the stringency of RoO exerts significant adverse effects on FTA utilization and trades under FTAs. We have also conducted a policy simulation in which RoO are "relaxed," and estimated an increase in utilization rates and trades. Relaxation of RoO here refers to a change from a more stringent type of RoO to a less stringent type. Figure 1 shows three main types of "RoO relaxation" considered in this paper.

Table 1 Main Rules of Origin Categories

Change of Chapter (CC)	Requires 2-digit changes of the HS code
Change of Chapter with exception (CCex)	Requires 2-digit changes of the HS code, with exceptions
Change of Tariff Heading (CTH)	Requires 4-digit changes of the HS code
Change of Tariff Sub-Heading (CTSH)	Requires 6-digit changes of the HS code
Specific Process (SP)	Requires some process to occur domestically
Value Added (VA)	Requires the minimum percentage value added to be of domestic origin
Wholly Obtained (WO)	Requires products to originate from the "soil" of the originating country

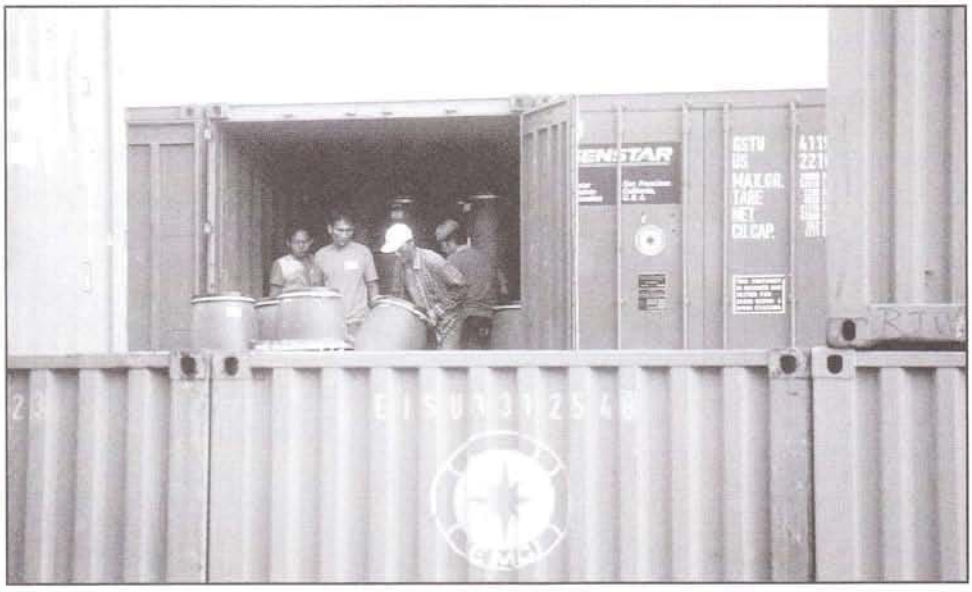
Table 2 Examples of Thai FTAs' Rules of Origin

Free Trade Agreement (FTA)	Rules of Origin (RoO)
JTEPA	CC, CCandP, CCandVA100, CTH, CTHandP, CTHandVA100, CTSHorVA40, VA40, etc.
AFTA	(CCandP)orVAorP,[a] CCorVA, CCorVAorP, CTHorVA, CTHorVAorP, CTSHorVA, VAorP, WO, etc.
TAFTA	CC, CCandVA, CCandVAandP, CTH, CTHandP, CTHandVA, CTSHandP, P, VA, WO, etc.
ACFTA	CCorVA, CTHorVA, VAorP, VA, CC, WO, etc.

[a] Note that (andP) and orP here refer to different processes.

Figure 1 Types of Rules of Origin Relaxation

1. Relaxation by 'RoO category'
   - By changing the main category of RoO, e.g., a change from CC to CTH, or a change from CTH to CTSH.
2. Relaxation by 'making RoO less complicated'
   - By making the rule simpler, e.g., a change from CCandP to CC, or a change from CCex to CC.
3. Relaxation by 'allowing for more options'
   - By giving more options to current RoO, e.g., a change from CC to CCorVA.



3. THE TWO MODELS

This section describes two econometric models: the first one, the "utilization model," attempts to explain FTA utilization rates, and the second one, the "trade model," attempts to explain trades under FTAs.

3.1 Utilization Model

The typical model used in the literature to explain FTA utilization is the Tobit model since it is well designed to handle a feature of the variable that we want to explain, i.e., utilization rates are lumpy at 0 and 100 percent (a significant number of "decisions to utilize" are actually "corner solution" decisions). In the case of Thailand, however, we found that key assumptions of the Tobit model are violated in all the cases under study, causing the estimates to be biased. We thus followed another modeling strategy by using the so-called "two-step" model. The idea is to break the FTA utilization decision into two steps. In the first step, the representative exporter decides whether to "utilize" the FTA under study. This is a zero or one decision, i.e., utilize or not utilize, and we modeled this decision using a Logit model. In the second step, if the exporter decides to utilize the FTA, he or she decides how much of the export values to apply for tariff reductions (utilization "rates"). This is an approximation of reality where, for each HS line (product), there are many exporters, some utilizing the FTA for all their exports but others not utilizing the FTA at all, causing the aggregate utilization rate for the product to range from 0 to 100 percent. We model this latter decision using a standard linear model and estimate it by ordinary least squares (OLS). We found that, by using the two-step model, the assumptions required for Logit and OLS are satisfied, and we are confident in the parameters estimated. Another advantage of breaking the utilization decision into two steps is that, arguably, the decision whether to utilize the FTA might depend on a set of factors which are different from those that determine "how much" to utilize.[3] Finally, in the policy simulation stage, we can then use the "predicted probability of utilization" from the Logit model multiplied by the "predicted utilization rate if utilized" from the OLS model to get the "predicted utilization rate." In the simulation, we can explore interesting policy scenarios, such as comparing a predicted increase in the utilization rate between cutting all tariff lines to zero and relaxing RoO. The model is as follows:

Logit model:

$$D_i = f\left(margin_i, fta\_rate_i, RoO_i, sector_i, stage_i, cumulation_i, (margin_i * RoO_i), (fta_i * RoO_i)\right)$$

OLS model:

$$util_i = \alpha + \beta_1 margin_i + \beta_2 fta\_rate_i + \sum_{p=2}^{P} \gamma_p RoO_{pi} + \sum_{q=2}^{18} \delta_q sector_{qi} + \sum_{r=2}^{5} \theta_r stage_{ri} + \beta_3 cumulation_i + \sum_{s=2}^{S} \omega_s country_{si} + \left(\sum_{p=2}^{P} \tau_p (margin_i \times RoO_{pi})\right) + \left(\sum_{p=2}^{P} \varphi_p (fta_i \times RoO_{pi})\right) + u_i$$

Left-hand-side variables

- D_i is a binary variable we created for the Logit model. D_i has a value of 1 when the utilization rate for product *i* is greater than 0, and 0, otherwise.
- $util_i$ is the utilization rate for product *i.* It is the proportion of product *i* trade that is actually getting tariff preference, i.e., getting utilized. $util_i$ is an explained variable in the second step model (OLS model) so it is always greater than 0 (the second step occurs when an exporter decides to utilize the FTA) and it varies up to 100 percent.

Right-hand-side variables

There are two groups of explanatory variables on the right-hand-side. The first is a set of variables for which we are particularly interested in seeing their effects on the probability of utilizing the FTA (in the case of Logit) and the utilization rate (in the case of OLS). The second group is a set of control variables that we put in to control for product heterogeneity across sectors, stages of production, partner countries, and cumulation (more on this below). We are not particularly interested in the significance of these variables. They are included mainly as controlling factors. Details are as follows:

Interested explanatory variables

- $margin_i$ is the difference between the MFN tariff rate and the FTA tariff rate for product *i*. We suspect that a higher tariff margin for product *i* would induce the private sector to utilize FTAs more fully.
- fta_rate_i is the FTA tariff rate for product *i*. This is the tariff rate that an exporter has to pay after being successful in applying for tariff reduction under the FTA (it could be zero or positive depending on the products). We believe that, although tariff margins for some products might be high, but if the exporters still have to pay a relatively high tariff rate after being qualified for tariff reduction, the incentive to utilize the FTA might be impeded.
- RoO_i comprises a group of dummy variables for RoO, representing different types of RoO. This is the key variable we want to analyze in this study. Generally speaking, stricter RoO should impede utilization more than easier RoO do.
- *interaction terms* are represented by terms in parentheses, such as $(margin_i * RoO_i)$ and $(fta_i * RoO_i)$. These terms capture the hypothesis that, for products in different RoO categories, the marginal effects of margin and FTA rates on utilization might be different, i.e., they allow for changes in the slopes of margin and FTA rates. We believe that products in different RoO categories might be different in both the overall level of utilization (difference in intercept) and the marginal effects of tariff margins and FTA rates on utilization (difference in slopes). We also tested for the joint significance of these interaction terms (and dropped them if not significant) in every case under study.

Other controlled explanatory variables

- $sector_i$ represents the industrial sector in which product *i* belongs. There are 18 sectors in this model: agriculture, autoparts, ceramics, chemicals, electrical equipment, electronics, food, garments, iron, jewelry, leather, machines, plastic, rubber, textiles, vehicles, wood, and others.
- $stage_i$ represents the stages in the production of product *i*. Products in different stages of production, arguably, could have quite different utilization patterns; for example, with increasing production networks among ASEAN countries, products in earlier stages of production might represent higher FTA utilization rates than those in later stages of production. We followed Broad Economic Categories (BEC) in the classification of stages of production. There are five stages of production, namely primary goods, semi-finished goods, parts and components, capital goods and consumption goods (the last two categories are considered final goods).
- $cumulation_i$ allows for possible "diagonal cumulation" for product *i.* Diagonal cumulation is a special clause in FTAs where exporters can source non-originating materials from another member country and still be qualified under the required RoO.
- $countries_i$ captures different trade characteristics between Thailand and different member countries of the FTA under study. Since AFTA is the only FTA under study that has more than one partner country, this variable is used only for the case of AFTA.
- u_i is an error term.

The estimated models have been tested for their assumptions, the problem of endogeneity, and other possible model misspecifications so the results should be reliable.

3.2 Trade Model

This model has the same set of explanatory variables as the utilization model. The explained variable (left-hand-side variable) in this model is $trade_i$, which is the trade value of product *i* under that FTA. The observation for this model also differs from that for the utilization model. We have included products with "zero" margins but with positive utilization rates to allow for other reasons (other than tariff margins) for FTA utilization.

4. ESTIMATION AND SIMULATION RESULTS

The results in this part of the paper are divided into two main sections. In the first section, we discuss in detail the results of some selected cases under study. In the second section, we summarize key findings for all cases under study.

4.1 Detailed Results of Some Selected Cases under Study

Owing to the many cases under study, we chose to present only the following two cases as a sample of results.[4]

- For the utilization model, we present the case of **exports under JTEPA**. We will discuss estimation results from the model and its simulation.
- For the trade model, we present the case of **exports under AFTA** (only for the case of AFTA new member countries or CLMV countries: Cambodia, Lao, Myanmar, and Viet Nam).[5] We will discuss estimation results from the model and its simulation.

4.1.1 Exports to Japan under JTEPA (sample results from the utilization model)

Table 3 presents the estimation results of the utilization model for the case of Thai exports to Japan under JETPA. For the logit model (see the second column), the partial effects of "price variables," such as *margin* and *fta_rate*, are positive and negative as expected with an "almost significant level" at 10 percent. Under JTEPA, RoO are rather complex and there are many RoO categories. Some of these RoO dummies are omitted in order to avoid a collinearity problem. For those RoO dummies that are significant, there is a natural ordering of their partial effects according to our hypothesis of the relative stringency of RoO. Examples are CTHandP and CTHex; they are arguably more stringent than CTH because of the "andP" and "ex" requirements (see details of RoO definitions and ranking in section 2), and their partial effects (on the probability of utilization) are of a smaller magnitude than that for CTH. On the other hand, CTHorP and CTHorVA40 are arguably less strict than CTH, and their partial effects are larger in magnitude.

Similar reasoning applies to the second-step model (see OLS results in the third column). For example, adding "andVA100," "ex," or "exandP" to CC should make the rule stricter, causing the coefficients to be smaller. On the other hand, adding "orVA40" to CC or changing from CC to CTH (or to CTSH) should make the rule easier and inflate their coefficients.

Turning now to the simulation results, Table 4 presents the estimated increase in utilization rates for different "ways" of relaxing RoO. For example, simplifying RoO from CCandP to CC is estimated to increase the utilization rate by 4.96 percent, whereas adding an option, such as "orVA40," to CC is likely to increase the utilization rate by 13.05 percent. It should be noted that, under JTEPA, there are 23 types of RoO, and we have considered "all possible combinations" of RoO that could be considered a relaxation.[6] In this table, we present only those combinations that would cause a "statistically significant increase" in utilization rates.

In terms of policy implications, this table represents a kind of "policy menu," where policy options and their benefits are laid out. Trade negotiators, for example, could "select" from these options the types of RoO relaxation that are likely to increase the utilization rate the most. Of course, in actuality, certain types of RoO relaxation are simply not possible due to their possible conflicts with production structure. Also, in trade negotiations, there are other factors that must also be taken into account besides the benefits in terms of an increase in the utilization rate. Table 4, however, should provide a good preliminary estimate of the benefits of RoO relaxation.

The point we want to highlight here is that the estimated increase in the utilization rate if we set all tariff lines under JTEPA to zero is 2.87 percent (more on this in section 4.2). As Table 4 makes clear, most types of RoO relaxation are likely to increase utilization rates by a much larger order of magnitude. In the case of Thai exports to Japan under JTEPA, Japan's import tariff is almost zero for all lines (more on this also in section 4.2). Further reduction in tariffs is not likely to increase the private sector's utilization rates as much as simplifying RoO would.

4.1.2 Exports to CLMV Countries under AFTA (sample results from the trade model)

Table 5 presents estimation results of the trade model for the case of exports to CLMV countries under AFTA. *margin* has the expected positive sign, whereas *fta_rate* has a wrong sign but is not significant. Coefficients for RoO also have a certain ordering following our expectation, e.g., taking "andP" out of (CCandP)orVAorP should make the RoO more relaxed, and thus a higher coefficient. Similarly, CTSHorVAorP should be less stringent than CTHorVAorP, and its estimated coefficient would therefore be higher.

Table 3 Estimation Results of Utilization Model: the Case of Thai Exports to Japan under JTEPA as of 2010

Explanatory variable	Logit[a] (s.e. in parenthesis)	OLS (s.e. in parenthesis)
Margin	0.0076984 (0.0047212)	0.2795295 (0.557635)
FTA_rate	-0.0080895 (0.0051199)	0.5149224 (0.5816823)
CC	0.3027659 (0.2064535)	**52.36747**** (12.9743)
CCandP	0.1771269 (0.2254588)	**53.95055**** (17.07509)
CCandVA100	0.2426163 (0.2717256)	**39.17605*** (23.54168)
CCex	0.2629367 (0.2103666)	**46.09246**** (14.21673)
CCexandP	0.2090603 (0.225215)	**47.79062**** (16.46908)
CCorVA40	**0.4940038**** (0.2159212)	**58.33638**** (14.57941)
CCorVA40orP	(omitted)	(omitted)
CTH	**0.4308315**** (0.20337)	**58.2194**** (9.992796)
CTHandP	**0.3746599*** (0.2150207)	**56.80907**** (14.52368)
CTHandVA100	(omitted)	**72.08796**** (24.5303)
CTHandVA40	(omitted)	(omitted)
CTHandVA50	(omitted)	**61.18427**** (20.91018)
CTHex	**0.3732656*** (0.2137073)	**61.57618**** (14.27762)
CTHexorVA40	(omitted)	(omitted)
CTHorP	**0.6211625**** (0.2886097)	15.5857 (23.98847)
CTHorVA40	**0.5291472**** (0.2005621)	**65.34446**** (11.72065)
CTHorVA40orP	0.2412531 (0.1913909)	**56.33491**** (4.076484)
CTSH	0.2611305 (0.2124031)	**70.90119**** (9.779934)
CTSHexorVA40	(omitted)	(omitted)
CTSHorVA40	**0.3678431*** (0.2227665)	**77.80588**** (16.15506)
CTSHorVA40orP	0.1351703 (0.1996462)	**66.81125**** (8.363668)
VA40	**0.5370178**** (0.27431)	33.57409 (22.93512)
WO	(omitted)	(omitted)
Cumulation[b]	–	–
Sector[b]	–	–
Stage[b]	–	–
Constant	–	-2.244542 (16.57068)

[a] Since Logit is a non-linear model, the numbers reported are not the directly estimated coefficients. They have been corrected and represent "partial effects," i.e., when an explanatory variable changes by one unit, how much is the change in the probability of utilization.

[b] These variables are simply controlled variables and we do not report their estimated coefficients here.

* Significant at the 10 percent level.

** Significant at the 5 percent level.

Table 4 Simulation Results of Utilization Model: the Case of Thai Exports to Japan under JTEPA as of 2010

Original RoO	New RoO	Estimated increase in utilization rates (percent)
CCexandP	CCex	2.12
CCexandP	CCandP	1.59
CCex	CC	6.36
CCandP	CC	4.96
CC	CCorVa40	13.05
CTHex	CTH	2.08
CTHandP	CTH	5.24
CTH	CTHorVA40	10.40

Table 5 Estimation Results of Trade Model: The Case of Thai Exports to CLMV Countries under AFTA as of 2010

Explanatory variables	OLS (s.e. in parenthesis)
Margin	**11.43779**** (3.7279)
FTA_rate	2.918733 (3.474)
Cambodia	4.221195 (19.2389)
Myanmar	**58.3917**** (18.9545)
Viet Nam	**533.8176**** (65.7840)
(CCandP)orVAorP	**278.8367**** (68.2452)
CCorVAorP	**351.1277**** (75.1905)
CThorVAorP	**333.4856**** (55.5415)
CTSHorVAorP	**379.4824**** (71.8831)
Sectors[a]	–
Stage[a]	–
constant	**-478.513**** (88.2594)

[a] These variables are simply controlled variables and we do not report their estimated coefficients here.

* Significant at the 10 percent level.

** Significant at the 5 percent level.

In terms of simulation results for the trade model, Table 6 reports the estimated increase in exports as a percentage of total export when RoO are relaxed in various ways. For example, when (CCandP)orVAorP is simplified to CCorVAorP, exports are estimated to increase by 0.98 percent of total export. Similarly, when (CCandP)orVAorP is "further" relaxed to CTSHorVA, the estimated increase in trade is 1.36 percent. So it is not only the "types" of RoO that are being relaxed but also "the degree of relaxation" that matters in determining the predicted increase in trade. It should be noted, in particular, that relaxing from CTHorVAorP to CTSHorVA would increase trade by 31.6 percent, a large amount. This seemingly stark result stems from the fact that there are many products to which the CTHorVAorP rule applies under AFTA. Thus, if we can relax this RoO category, the increase in trade would be considerable. To adjust for this, we report in Table 7, an estimated increase in exports on average per product (in millions baht) when RoO are relaxed.

Finally, in a similar way to the case of the utilization model results presented above, the point we want to highlight here is that the estimated increase in exports, if we set all tariff lines under AFTA to zero, would be 21 percent of total exports. This figure is quite large, partly due to the fact that CLMV countries still collect import tariffs from AFTA member countries (including Thailand) at a relatively high rate (more on this in section 4.2). Table 6 suggests that, for certain kinds of RoO relaxation, the estimated increase in trade is higher. To make this point more evident, Tables 8 and 9 show similar simulation results but in the case of Thai exports to "old" members of AFTA (Brunei Darussalam, Indonesia, Malaysia, and the Philippines).[7] It is clear that, if we relax RoO, the predicted increase in trade would be substantial.

Table 6 Estimated Percentage Increase in Exports (as percent of total export) for Various Types of RoO Relaxation: the Case of Thai Exports to CLMV Countries under AFTA as of 2010

New RoO \ Original RoO	(CCandP)orVAorP	CCorVAorP	CThorVAorP
CCorVAorP	0.98		
CThorVAorP	NA[a]	NA[a]	
CTSHorVA	1.36	1.00	31.60

[a] The estimated values are not statistically significant.

Table 7 Estimated Increase in Exports (as a value increase on average per product) for Various Types of RoO Relaxation: the Case of Thai Exports to CLMV Countries under AFTA as of 2010

(unit: millions baht)

New RoO \ Original RoO	(CCandP)orVAorP	CCorVAorP	CThorVAorP
CCorVAorP	2.17		
CThorVAorP	NA[a]	NA[a]	
CTSHorVA	3.02	8.51	1.38

[a] The estimated values are not statistically significant.

Table 8 Estimated Percentage Increase in Exports (as percent of total export) for Various Types of RoO Relaxation: the Case of Thai Exports to Old AFTA Members as of 2010

New RoO \ Original RoO	(CCandP)orVAorP	CCorVAorP	CTHorVAorP
CCorVAorP	2.21		
CTHorVAorP	5.11	1.10	
CTSHorVA	9.89	3.34	41.15

Table 9 Estimated Increase in Exports (as a value increase on average per product) for Various Types of RoO Relaxation: the Case of Thai Exports to Old AFTA Members as of 2010

(unit: millions baht)

New RoO \ Original RoO	(CCandP)orVAorP	CCorVAorP	CTHorVAorP
CCorVAorP	6.51		
CTHorVAorP	15.09	4.30	
CTSHorVA	29.16	13.09	9.24

4.2 Summary of Key Findings

In this section, we summarize key findings from simulation results, highlighting the difference between setting all tariff lines to zero and RoO relaxation. We first consider the results from the utilization model then those from the trade model.

4.2.1 Key Findings from the Utilization Model

Table 10 shows the result of simulating the degree to which the utilization rate would increase if we set tariffs to zero for all products. The current trade-weighted average tariffs for JTEPA of the export and import sides are 1.02 and 3.25 percent, respectively. If we set all tariff lines to zero, the predicted increase in the average utilization rate would be 2.87 and 3.9 percent, respectively. Tariffs for TAFTA and AFTA (for old member countries) are already at zero so we could not conduct the intended simulation. The results for other cases are not reported for reasons indicated in the footnotes.

Table 11 shows predicted increases in utilization rates and tariff savings for various types of RoO relaxation. It also identifies sectors that have many products to which that RoO category applies. Take JTEPA on the export side for example: if we relax RoO by adding VA40 as an alternative (add "orVA40") to CC or CTH, the predicted increase in the utilization rate would be 10-13 percent. This would result in a similar increase in tariff savings (in fact, the savings are for the Japanese importers since they do not have to pay tariffs for exports from Thailand. In turn, however, Thai products would be more price competitive in the Japanese market.) Industries that have many products in the CC and CTH categories are food and wood industries. It should be noted that JTEPA has 23 RoO categories, and we have simulated "all possible kinds of relaxation" to estimate their predicted increase in utilization rates (see details in section 4.1.1 above). The suggested RoO relaxation types in Table 11 are the types that are estimated to increase the utilization rate the most.[8] Results on the import side give similar impressions, where the order of a predicted increase in utilization rates is even more than that for the export side.

The striking observation that emerges from Table 11 is that the order of increase in utilization rates is rather large (10% and higher in most cases). To put these figures into perspective, we mentioned in part 1 that the average utilization rate for all FTAs on the export side is about 50 percent and on the import side about 41 percent. An increase by 10 percent or more could be considered rather large. Perhaps an even more interesting comparison would be between the predicted effects of an increase in utilization rates between RoO relaxation and setting all tariffs to zero (comparing Tables 10 and 11). It is fairly clear that relaxing RoO is likely to have a much larger effect on utilization compared with setting tariffs to zero. We consider this finding intriguing as RoO constitute a factor usually overlooked (perhaps due to its complications) when compared with a more evident factor such as tariff reduction. What we found is that RoO are potentially more important than tariff reduction in terms of increasing the utilization rate, at least in the current trade environment.

Table 10 Summary of the Estimated Increase in FTA Utilization Rates If Tariffs for All Products Are Set to Zero

Exports			
FTA	**Trade-weighted average FTA rate (percent)**	**Proportion of product lines with FTA rate = 0 (percent)**	**Predicted increase in utilization rate (average per product) when FTA rate = 0 (percent)**
JTEPA	1.02	84	2.87
TAFTA	0	0	–
AFTA (old member countries)[a]	0	0	–
ACFTA	0.16	97	–[b]
Imports			
FTA	**Trade-weighted average FTA rate (percent)**	**Proportion of product lines with FTA rate = 0 (percent)**	**Predicted increase in utilization rate (average per product) when FTA rate = 0 (percent)**
JTEPA	3.25	57	3.9
TAFTA	0	0	–
AFTA (old member countries)[a]	0	0	–
ACFTA	0.21	96	–[b]

[a] The case of AFTA (new member countries or CLMV countries) is not reported here because we have no confidence in the results. This is partly due to the unreliability of the data for these countries.

[b] In the case of ACFTA, we found that the proportion of tariff lines with FTA rates greater than zero is relatively small (and the FTA rates for those lines are also very small). This causes the estimates to be biased and we chose not to report the results here.

Table 11 Summary of the Estimated Increase in Utilization Rates for Various Types of RoO Relaxation

Exports						
FTA	**Original RoO**	**New RoO**	**Predicted increase in utilization rate (percent)**	**Tariff savings (millions baht)**		**Related industries**
				Current tariff savings	**Predicted increase in tariff savings (percent of current savings)**	
JTEPA	CC	CCorVA40	13.05	880.8	119.1 (13.52%)	Food
	CTH	CTHorVA40	10.40	262.1	27.0 (10.31%)	Wood
TAFTA	CC	CTH	16.22	341.3	55.4 (16.12%)	Textiles
	CC	CTSH	18.41	341.3	62.8 (18.42%)	Textiles
AFTA (old members)[a]	CTHorVA40	CTSHorVA40	12.32	49,620.6	6,174.0 (12.44%)	Plastic, rubber and autoparts
	CCorVA40	CTHorVA40	6.33	85.5	5.6 (6.49%)	Food
ACFTA[a]	–	–	–	–	–	–
Imports						
FTA	**Original RoO**	**New RoO**	**Predicted increase in utilization rate (percent)**	**Tariff savings (millions baht)**		**Related industries**
				Current tariff savings	**Predicted increase in tariff savings (percent of current savings)**	
JTEPA	CCexandP	CCandP	35.60	6.2	2.3 (36.62%)	Textiles
	CTHandP	CTH	35.40	2.8	0.8 (28%)	Textiles and jewelry
TAFTA	CC	CTH	14.39	1,400	166.4 (11.88%)	Food
	CC	CTSH	24.70	1,400	322.9 (23.06%)	Food
AFTA (old members)[a]	(CCandP)orVA40orP	CCorVA40orP	8.72	241.2	22.2 (9.21%)	Garments
	CCorVA40	CTSHorVA40	0.74	243.1	0.9 (0.39%)	Food
ACFTA[a]	–	–	–	–	–	–

[a] We have no confidence in the results for the case of AFTA (new member countries or CLMV countries) and ACFTA and chose not to present those results here.

4.2.2 Key Findings from the Trade Model

We next consider the simulation results from the trade model. The idea of the simulation is the same but now we want to estimate how much trade would increase comparing the case of cutting all tariff lines to zero and the case of relaxing RoO. Table 12 shows that, except for the case of exporting to AFTA (for new member countries) and importing from Japan under JTEPA, under which there remains some substantial tariff barriers, the benefits from further tariff reductions are probably not much.

From our estimates, cutting tariffs to zero under JTEPA for both the import and export sides would cause a net trade deficit since the increase in imports would outweigh the increase in exports. A similar situation is predicted to happen under ACFTA. However, in the case of ASEAN (for new member countries), the tariffs on the import side are already zero, but those on the export side remain significant. Negotiations for tariff reductions on Thai exports would produce significant increases in Thailand's export values.

Table 13 provides estimates of predicted increases in trade if we relax RoO. The numbers might seem rather large, especially on the export side. As discussed in section 4.1.2, this result is due to the fact that some RoO categories have many products. When those RoO are relaxed, the predicted increase in trade is huge. For this reason, we have also reported in Table 14 the predicted increase in trade on average per product. The predicted increase in trade is still rather large, especially on the export side. However, the key message here is consistent with that of Table 11 (on utilization). Our hypothesis is confirmed that RoO stringency exerts a much higher impact on utilization and trade under FTAs.

Table 12 Summary of the Estimated Increase in Trade If Tariffs for All Products Are Set to Zero

Exports			
FTA	**Trade-weighted average FTA rate (percent)**	**Proportion of tariff lines with FTA rate = 0 (percent)**	**Predicted increase in exports as percent of total export when FTA rate = 0 (actual increase in export values in parenthesis)**
AFTA (old member countries)[a]	0	100	–
AFTA (new member countries)	3.07	37	21% (15.5 billion baht)
ACFTA	0.17	98	4% (7.3 billion baht)
JTEPA	0.37	94	15% (13 billion baht)
TAFTA[b]	–	–	–
Imports			
FTA	**Trade-weighted average FTA rate (percent)**	**Proportion of tariff lines with FTA rate = 0 (percent)**	**Predicted increase in imports as percent of total import when FTA rate = 0 (actual increase in import values in parenthesis)**
AFTA (old and new member countries)[a]	0	100	-
ACFTA	0.19	97	8% (1.05 billion baht)
JTEPA	3.77	59	23% (2.86 billion baht)
TAFTA[a]	0	100	–

[a] These cases already have FTA tariff =0 so the intended simulation cannot be conducted.

[b] We have no confidence in this result and chose not to report it here.

Table 13 Summary of the Estimated Increase in Trade for Various Types of RoO Relaxation (selected only types of RoO relaxation that would increase trade the most)

Exports			
FTA	**Original RoO**	**New RoO**	**Estimated increase in exports as percent of total export if new RoO are implemented (actual increase in export values in parenthesis)**
AFTA (old member countries)	CTHorVAorP	CTSHorVAorP	41.15% (97.8 billion baht)
AFTA (new member countries)	CTHorVAorP	CTSHorVAorP	31.60% (22.9 billion baht)
ACFTA	VA	VA_or[a]	42.87% (78.1 billion baht)
JTEPA	CC	CTH	14.48% (12.9 billion baht)
TAFTA	–	–	–
Imports			
FTA	**Original RoO**	**New RoO**	**Estimated increase in imports as percent of total import if new RoO are implemented (actual increase in import values in parenthesis)**
AFTA	CTHorVAorP	CTSHorVAorP	9.08% (20.4 billion baht)
ACFTA	VA	VAorP	1.88% (2.5 billion baht)
JTEPA	CCorVA	CTHorVA	0.88% (1.1 billion baht)
TAFTA	CTH	CTSH	38.73% (6.5 billion baht)

[a] VA_or here means CCorVA, CTHorVA, or VAorP.

Table 14 Summary of the Estimated Increase in Trade (on average per product) for Various Types of RoO Relaxation (selected only types of RoO relaxation that would increase trade the most)

Exports			
FTA	**Original RoO**	**New RoO**	**Estimated increase in exports on average per product (millions baht)**
AFTA (old member countries)	(CCandP)orVAorP	CTSHorVA	29.15
AFTA (new member countries)	(CCandP)orVAorP	CTSHorVA	3.02
ACFTA	VA	VA_or[a]	16.28
JTEPA	CCandVA	CC	50.44
TAFTA	–	–	–
Imports			
FTA	**Original RoO**	**New RoO**	**Estimated increase in imports on average per product (millions baht)**
AFTA (old and new member countries)	CCorVAorP	CTSHorVA	3.07
ACFTA	VA	VAorP	0.45
JTEPA	CCorVA	CCorVAorP	2.07
TAFTA	CC	CTSH	0.98

[a] VA_or here means CCorVA, CTHorVA, or VAorP.

5. CONCLUSION

This study found that RoO stringency exerts considerable effects on the extent of FTA utilization and trades under FTAs in the case of Thailand. We found that RoO relaxation is predicted to increase the utilization rate and trade under FTAs by a magnitude that is much larger than cutting all tariff lines to zero. This finding is due partly to the fact that tariffs under most Thai FTAs are approaching zero and "further reduction in tariff" might not have as much effect as anticipated. Another interpretation of this finding is that RoO might also represent a significant cost for the private sector (both administratively and economically), not to mention that RoO might be misused as a non-tariff barrier to trade. As a result, relaxing RoO could produce a significant positive effect on trade and utilization. In the full version of this paper (and in parts of this paper), we have provided a "policy menu" showing how much utilization and trade are predicted to increase for each type of RoO relaxation. We want to re-emphasize here that some kinds of RoO relaxation are simply not possible since they are in conflict with the goods' production structure. We believe, however, that some RoO are indeed too complicated and simplification is in order (and possible). In trade negotiations, the policy menu so presented should serve as a preliminary estimate of the benefits from RoO relaxation. Trade negotiators, for example, could "select" from these RoO relaxation options the choice that would increase utilization and trade the most. Certainly, in actual negotiations, other factors would have to be taken into account. Perhaps, at the most general level, this paper suggests that policy makers should put more emphasis on designing appropriate RoO and perhaps less on the tariff reduction scheme in and of itself (at least in the current trade environment where FTA tariffs are already quite low).

ENDNOTES

[1] We would like to thank the Customs Department, Ministry of Finance, Thailand, and the Department of Foreign Trade, Ministry of Commerce, Thailand, for providing the data.

[2] Here we discuss only "product-specific" RoO. There is another type of RoO called a "regime-wide" RoO, which applies to all products. We found the latter type of RoO not significant in most Thai FTAs; therefore, it is not analyzed here.

[3] Although in this paper, due to data limitations, the set of explanatory variables in both the Logit and OLS models is the same.

[4] For more details, interested readers should consult the full report of the TDRI research project mentioned at the beginning of this paper.

[5] This selected case is intentional as the import tariff for "old" AFTA members is zero, whereas that for new member countries is not. This would enable us to conduct an experiment where the import tariff for those countries is set to zero and then compare the results with the case of relaxing RoO.

[6] See details in the full report of the TDRI research project mentioned at the beginning of this paper.

[7] Singapore already has a 100 percent tariff margin (zero FTA rates) for all lines; thus, it is not included in the sample.

[8] Interested readers should consult the full report of the TDRI research project mentioned at the beginning of this paper for detailed results of the predicted increase in utilization rates for all possible RoO relaxation scenarios for all the cases under study.