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Abstract

This paper examines how the private sector responds to export opportunities induced by FTAs, using evidence from the Thai manufacturing sector during the period 2003-08. The core methodology is to undertake an inter-product panel-data econometric analysis to gain a better understanding of FTA utilization across products. Different from previous studies, it makes an explicit distinction between actual and preferential trade in which the latter is measured by the administrative records of FTA implementation. Our findings suggest that the product coverage is limited. Products that have benefited from FTA tariff preferences so far are highly concentrated. Our key finding from the econometric analysis is that as rules of origin (ROO) constraints are binding empirically, the ability to comply with ROO as well as tariff margin does matter in firms' decisions to use FTAs. The estimated cost in compiling ROO is equivalent to a tariff in the range of 2% to 10%. Besides, the FTA impact on exports is conditioned by trade volume during the pre-signing FTA period. The key policy inference is that it is unlikely to be able to promote exports by maximizing the number of FTAs, while ignoring the nature of FTA partners. The nature of the FTA partner does matter in establishing whether the signed FTA would be useful. In addition, for Japan and countries which are enthusiastic about FTAs as a mode for further liberalization, FTA negotiation on tariff cuts schedules must be undertaken in a more comprehensive way in which ROO and trade facilitation issues must be incorporated in the negotiation.

Key words: Free Trade Agreement, Rules of Origin, Thailand, Unbalanced Panel Data Econometric Analysis

JEL classification: F15, F53, O19, O53

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1. Issues

The proliferation of free trade agreements (FTAs) has been one of the most notable phenomena in the world economy over the past 15 years. FTAs have become the dominant form of international cooperation on trade policy for virtually all members of the WTO, with the exception of Mongolia. The number of FTAs notified to the World Trade Organization (WTO) tripled from around 124 in 1994 to 370 by August 2008, more than half of which are currently in force.[1] Interestingly, half of them are in the Asia and Pacific region, the center of global trade dynamism, and engender far-reaching implications, not only for the philosophy and operation of the multilateral trading system, but also for the day-to-day conduct of cross-border trade.

In general, FTAs usually involve liberalising trade among the member countries. However, their actual impact on trade is not as straightforward as we usually expect from multilateral and/or unilateral liberalization. Indeed, an FTA deal could well be considered 'preferential', meaning it will discriminate against nonmember countries, depending on the rules of origins (ROOs)— the rules to prove the origin of good for the purpose of determining eligibility for tariff concessions. Whether ROO are used as a vital commercial policy instruments depends on how they are designed and implemented.[2] Therefore, export opportunities created by a given FTA (henceforth referred to FTA export creation) are essentially an empirical issue.

So far there has not been any systematic analysis of the trade-flow effects of FTAs because of the limited access to administrative records of FTA implementation. Two approaches are used to examine the FTA effects on trade. The first approach is to estimate a gravity model with a binary dummy variable to distinguish FTA member

[1]Further details are available at http://www.wto.org/english/tratop_e/region_e/regfac_e.htm#top.

[2] There are a number of studies arguing that ROO have been used as vital commercial policy instruments to mould ROOs to the benefit of especial interest groups (Vermulst & Waer 1990, Krueger 1999, Bhagwati et al. 1999, Falvey & Reed 2002, Estevadeordal & Suominen 2004, James 2005, and Krishna 2005).

countries from non-members (e.g. Magee, 2003, 2008; Soloaga &Winters, 2001; Bayoumi & Eichengreen, 1995; Athukorala & Yamashita; 2006).[3] This approach ignores the 'conditioning effects'' of ROOs by implicitly assuming that tariff concessions offered by FTAs are readily available to the exporters. In other words, this approach does not make a distinction between actual and preferential trade where the latter reflects transactions recorded in administrative records of FTA implementation. Such an assumption is rather restrictive.[4] The few available studies of the actual utilization of FTA concessions suggest that the actual utilization rates differ considerably among FTAs (JETRO, 2003; Augier et al., 2005).[5] Whether or not tariff concessions are readily available to private firms depends on how restrictive the ROOs are. In addition, firms' decisions to apply for tariff concessions depend on the existing margin between general (most-favored-nation) and preferential tariff rates (henceforth referred to as the tariff margin) and the costs incurred in applying for the concessions. Hence, the magnitude of FTA export creation based on actual trade data is overstated and misleading.

The second approach utilizes survey data at the firm level. For example, Takahashi & Urata (2009) used a survey conducted jointly by the Research Institute of Economy, Trade and Industry (REITI) and the Japan Chamber of Commerce and Industry (JCCI). Another example is Wignaraja et al. (2010) based on a survey of firms in Thailand. The main shortcoming of this approach is that the sample size is rather limited. Particularly, the sample size in Takahashi & Urata (2009) is 1,688 firms, whereas that in Wignaraja et al. (2010) is 221 firms. Findings based on such limited sample size are likely to be affected by sample selection bias.

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[3] Ando (2007) is another study using the gravity model. Instead of using a dummy variable, patterns of the model's residual before and after signing FTAs are examined to assess the impact of FTAs on trade.

[4] See Soloaga & Winters (2001) and Baier & Bergstrand (2007) and the works cited therein.

[5] For example, JETRO (2003) finds the preference margins (the ratio between preferential to actual trade) among ASEAN members in 2002 are quite low at 11.2 and 4.1 %, respectively, for Thailand and Malaysia. This finding is consistent with that of Augier et al. (2005) for FTA between EU and southern Mediterranean countries and three central and eastern European countries (i.e. Czech Republic, Poland, and Hungary).

Against this backdrop, this paper sets out to examine the response of exporters to tariff concessions offered under the signed PTAs with a view to informing the debate on how to design ROOs and administrative procedures for enhancing the trade-creation effects of FTAs. Estimates of the use of trade preferences and their actual utilization rates are provided using the administrative records of all FTA whose tariff reduction covers more than 80 per cent of product lines and have been in effect at least a year. Besides FTAs covered in the analysis include both North-South and South-South FTAs. In order to indicate the response of the private sector to FTA export creation, FTA utilization (FTAU), the ratio between the administrative records and actual trade, is calculated. The calculated FTAU is further used as the dependent variable in an inter-product (unbalanced) panel data econometric analysis in order to gain a better understanding of the patterns of FTAU across products. All manufacturing products are covered in this study so that sample selection bias is mitigated to a large extent. This paper can be regarded as the extended version of Kohpaiboon (2009)[6] which is an inter-product cross-sectional analysis and emphasizes the effect of the ASEAN Free Trade Area.

Thailand is suitable as a case study of this subject for two reasons. Firstly, administrative records for FTA implementation of Thai exporters are available for the period 2003-08. This allows us to undertake a systematic analysis of FTA utilization by Thai exporters. Secondly, Thai exporters have the potential to utilize tariff concessions offered by FTA because the Thai manufacturing sector is relatively broad based, compared to neighbouring countries.

The organization of this paper is as follows: Section 2 presents an analytical model of FTAs that helps delineate the key factors influencing decisions to apply for FTA tariff concessions. Beginning with a brief history of policy shift from unilateral to bilateral FTAs, Section 3 illustrates trends and patterns in the administrative records of FTA implementation. Discussion of the empirical model is in Section 4. Data used for the

[6] The paper was firstly presented in East Asian Economic Association (EAEA) 11, Manila, 2008.

study's econometric analysis is outlined in Section 5. Section 6 presents results of the econometric analysis. Conclusions and policy inferences are in the final section (Section 7).

2. Analytical Model

Free trade agreements (FTAs) are a form of economic integration in which two or more countries (referred to as member countries) offer each other duty free access while maintaining their own external tariffs. Since FTAs usually offer zero import tariffs, they can promote trade among member countries.[7] Not all the increased trade among members improves overall welfare because of its discriminatory nature in favor of member countries. On many occasions, FTAs might divert trade away from more efficient non-member countries to less efficient member ones (i.e. trade diversion). In such circumstances, prices of goods offered to consumers will be lower, but by less than the foregone tariff revenues, thereby negatively affecting social welfare.

Nevertheless, the zero tariff trade offered in FTAs does not necessarily materialize in practice. It depends on a number of factors. In this study, the partial equilibrium model developed in Cadot *et al.* (2002) is used with some modifications to identify the potential determinants of the rate of FTA utilization. Specifically, we modify the original model to include industry-specific characteristics to influence this decision used in our empirical analysis. Suppose that a final product (*F*), is produced by labor (*L)* and an intermediate product (*I*) according to the following technology expressed in equation 1. Total intermediates are composed of two types, one is produced by member countries (*M)* and the other by non-member countries, denoted by the superscript, *M* and *N*.

$$F = Min\left\{ \frac{L}{a_L}, \frac{\left(I^M + I^N\right)}{a_I} \right\} \tag{1}$$

[7] This happens regardless of the nature of increased trade, i.e. trade creation or trade diversion.

where a_L and a_I are the input-output coefficient of labor and intermediate goods, respectively.

In equation 1, I_M and I_N are assumed to be physically perfect substitutes. We assume that the latter's price is equal to the world price $\left(P_I^N = P_I^W\right)$ but lower than that of the former ($\left(P_I^W < P_I^M\right)$.

Let us assume that there are three countries, Countries A, B, and the rest of the world. Country A is a producer and exporter of product *F* and Country B is the importer with a tariff rate of t_F So, consumers in Country B will pay $P_F^W\left(1+t_F\right)$. If Countries A and B form a FTA, goods produced in one of the two countries can be exported to the other at preferential (reduced) tariff rates $\left(t_F^{FTA}\right)$ provided that they satisfy ROO. Assuming that RoO under the FTA between Countries A and B is in a regional value content form in which goods will be eligible if, and only if, intermediate inputs sourced from member countries (local content of the products) reach the agreed level. That is,

$$I_M \geq \alpha\left(I_N + I_M\right) : \alpha \in \left(0,1\right) \tag{2}$$

Equation 2 stresses that intermediates sourced from member countries $\left(I_M\right)$ must exceed α *100 per cent of total intermediates used. The higher the value of α, the more restrictive the ROO. When $\alpha = 0$, ROO do not have any restrictive impact and I_N and I_M can be any non-negative number. In contrast, $\alpha = 1$ implies that all intermediates must come from member countries.[8] For simplicity, we assume that Country B does not produce the intermediate product and, thus, does not protect it.

When $P_I^W < P_I^M$ and assuming ROO constraints are binding, the inequality sign in equation 2 turns out to be an equality sign, which is then rearranged into equation 3;

[8] Equation 2 makes sense if and only if I^N equals to zero.

$$I^M = \frac{\alpha}{1-\alpha} I^N \qquad (3)$$

What Equation 3 indicates is, producers of Product *F* in Country *F* need to source local intermediates ($I^M \neq 0$) in order to apply for FTA tariff concessions. Consequently, the average price of the intermediate product incurred by producers of Product *F* in Country A is the weighted average between world price and domestic price with α as a weight (equation 4).

$$\bar{P}_I = \alpha P_I^M + (1-\alpha) P_I^W \qquad (4)$$

Equation 4 shows that the binding ROO constraints act as tariffs on intermediates. If we consider $tq_I^M = \frac{P_I^M - P_I^W}{P_I^W}$, the implicit tariff of intermediates would be αtq_I^M. To illustrate the net impact on the resource pulling effect of FTA, value added in two different scenarios, applying and not applying for FTA tariff concessions, (VA^{FTA}, and VA^W respectively) is compared. That is, firms in country A would apply for FTA tariff concessions when value added in the former is greater than the latter.

$$\begin{aligned} NB^{FTA} &= VA^{FTA} - VA^{WORLD} \\ &= \left(t_F - t_F^{FTA}\right) P_F^W - a_I \alpha tq_I^M P_I^W \end{aligned} \qquad (5)$$

where $VA^{FTA} = P_F^W \left(1 + t_F - t_F^{FTA}\right) - a_I \bar{P}_I$

$VA^{WORLD} = P_F^W - a_I P_I^W$

That is, firms in country A are eligible for FTA tariff concession if, and only if, $NB^{FTA} > 0$. According to equation 5, FTA utilization is related positively to the margin between general (MFN) and preferential tariff rates and negatively to the degree of restrictiveness of ROO.

3. First Look: FTAs in Thailand

3.1 Trade Policy Shift: From Non-discriminatory Liberalization to FTAs

Over the past three decades, Thailand benefited from unilateral tariff reductions and the success of multilateral agreements in the context of General Agreement of Trade and Tariff and the World Trade Organization now (WTO). The former contributed to improve international competitiveness and placed the country to be attractive for export-oriented FDI inflow during the mid 1980s, whereas the latter created a conducive global environment for international trade expansion (Kohpaiboon, 2006; Schott, 2003, 2004, Sally, 2007). This eventually contributed to the export take-off of Thai manufacturing products and economic boom during the late 1980s and the first half of 1990s. It was consistent with the global pattern wherein unilateral and multilateral frameworks accounted for almost 90 per cent of the global tariff reduction over the past three decades (Martin & Ng, 2005).

Since then unilateral non-discriminatory liberalization has slowed down, and political attention and negotiating resources have switched from the WTO to preferential trade agreements (mainly bilateral free trade agreements). From the new millennium onwards, Thailand has been enthusiastic in signing FTAs with countries around the world. Table 1 presents all the FTAs Thailand has been involved in since the 1990s. While there were 18 FTAs on record, only seven were practically in use, namely ASEAN Free Trade Area (AFTA), Thailand-Australia FTA (TAFTA), Thailand-New Zealand FTA (TNFTA), Japan-Thailand Economic Partnership Agreement (JTEPA), ASEAN-China FTA, ASEAN -Japan FTA, and ASEAN-Korea FTA. Interestingly, as revealed in the last column in Table 1, there are four FTAs (AFTA, TAFTA, TNFTA, and JTEPA) where tariff reduction covers more than 80 per cent of product lines before 2009.

Another interesting pattern is that FTAs after 2006 tend to be regional, such as ASEAN-Japan, ASEAN-Korea, ASEAN plus 3, ASEAN plus 6. This was in contrast to those signed before and was due to the fact that FTAs occupied centre stage in Thai trade policy during the government of Prime Minister Thaksin Shinawatra. Thaksin's CEO style and its dominant imprint on government played a pivotal role in negotiating FTAs. As argued in Sally (2007: 1606-7), several major bilateral FTA negotiations were launched during Thaksin's administration and done in a rush without careful preparation and without anticipating the inherent technical as well as political problems. To a certain extent, many of the negotiations turned out to be politically controversial. After the 2006 coup, a new constitution was promulgated in 2007, replacing the interim constitution of 2006. Under the new Constitution, executing international trade agreements is subject to parliamentary approval (Article 190). This slowed down progress of FTAs. For example, the Chairman of the Board of Trade of Thailand claimed that ASEAN-Korea was postponed simply because of Article 190 (Nation, 2007). Hence, since 2006 there has not been any new bilateral FTA initiative.

The final observation from Table 1 concerns the systematic difference between FTAs signed with higher income countries (i.e. Australia, New Zealand, Japan, and Korea) and those signed with developing countries. In the former, the tariff reduction granted by Thailand's FTA partner is likely to have an immediate effect and cover most tariff lines. Negotiation about tariff reduction in the latter is still ongoing. The tariff reduction timetable is rather long, so it is subject to uncertainties regarding possible policy reversal.

3.2 Tariff Cuts under Signed FTAs.

In Table 2, most-favored-nation (MFN) and preferential tariff rates are presented for Thailand's major FTA partners. They are the major economies in ASEAN (Indonesia, Malaysia, the Philippines and Vietnam), Australia and Japan. We exclude Singapore and New Zealand from Table 2.[9] The first inference drawn from Table 2 is that the MFN tariff in Australia and Japan is already low so a margin of tariff preference, i.e. the difference between MFN/applied tariff rate and FTA preferential rate, (henceforth

[9] The exclusion of Singapore from the table is obvious because its tariff rates are virtually zero. New Zealand is not included because Thailand-New Zealand FTA is under a paperless system. This makes how exporters respond to FTA tariff preferences untraceable.

referred to the tariff margin) seems to be very limited. For example, the average applied tariff rates for Australia were 3.4 per cent in 2006. The corresponding figure for Japan was 3.1 per cent. Thus, it is unlikely that the tariff margin is less than 5 per cent. As illustrated in Panel B of Table 2, more than 80 per cent of product lines in both countries have a tariff margin of less than 5%. As indicated in the last row in Table 2, the limited tariff margin is largely because the MFN tariff is already zero instead of exemption from the FTA tariff reduction schedule.

This is in contrast to South-South FTA like AFTA. Generally, the average MFN rate of original ASEAN members was low in absolute term, although still a bit higher than Australia and Japan. It was in the narrow range between 6.2-7.9 per cent, as a result of unilateral tariff reductions driven by commitments in the World Trade Organization (WTO) in the mid 1990s. On average, they offered a preferential tariff rate of 2 per cent for ASEAN members so that the tariff margin was about 4-6 per cent. When the tariff margin across products is concerned, more than 70 per cent of product lines are in the tariff margin category of less than or equal to 5 %. Vietnam seems to be an exception among Thailand’s FTA partners as it exhibits a substantial tariff margin. The MFN rate remains at 16.8 per cent. Interestingly, the tariff cut under AFTA from Vietnam seems to be generous as it was substantial and ahead of the schedule for ASEAN new members. The average preferential tariff under AFTA in 2006 was 2.5 so the average tariff margin was about 14 per cent. In addition, as a consequence of the cascading tariff structure popular among developing countries, including ASEAN members, variations in tariffs across product in Vietnam remain substantial. So that there are about 40 per cent of product lines whose tariff margin is greater than 10%.

3.3 FTA Usage

Official records of exporters’ responses to FTA preferential trade are administered in Thailand by the Bureau of Preferential Trade (BPT), Department of Foreign Trade, Ministry of Commerce. All exporters who want to apply for a FTA preferential tariff must fill in a form in order to provide necessary information related to product originality. If products comply with FTA ROO, official records of certificate of origin (c/o) will be issued. Since issuing c/o certificates takes few days, firms can request for official c/o in advance (i.e. three months). The BPT provided us with access to data on FTA administrative records for the period 2003-present (2008). Original data is available at the six-digit level of the Harmonized System (HS) classification.

Table 3 presents selected indicators of FTA usage, how Thai exporters utilize signed FTAs. The top two rows in Table 3 present a number of items where exporters applied for tariff preferences and their share to total products. These products are classified according to six digit HS. This is to illustrate the scope of product lines that would be beneficial from the signed FTAs. The next two rows report the sum of export value of Top 10 and 20 products as a per cent of the total value of preferential exports in order to illustrate the degree of product value concentration. The last two rows indicate utilization rates, the ratio of administrative records to total exports, of each FTA and its variation coefficient across products.[10]

With regard to product coverage, the number of items where Thai exporters have applied for FTA tariff preferences constituted about one fourth of total product lines. The Malaysia figure provides us an upper limit. There were 1,432 products items for which Thai exporters applied for FTA tariff preferences when selling their products to Malaysia in 2008. It accounted for 27.4 per cent of total product lines at HS six digit classification. On the other hand, the Philippines have the lowest number at about 900 items or 17 per cent of total product line. Vietnam, Japan and Australia are in the middle between Malaysia and the Philippines, respectively (Table 3).

Products traded under signed FTAs have been highly concentrated to only a few items so far. The cumulative export value share of Top 10 product items which applied for FTA tariff preferences was in the wide range between 30-62 per cent of total products traded under the FTAs. The product value concentration was least in the case of Vietnam and highest in the case of Australia. When the cumulative value share of Top 20 product items is used, the degree of product value concentration increased significantly in spite of

[10] The calculation of FTA utilization rate is made at the four digit HS classification.

there being no change in ranking. The range of the share of Top 20 product items narrowed to between 44.9-72 per cent. That is, the dollar value of the top 20 items (out of total 1,364 items) in which Thai exporters applied FTA tariff preferences for the Vietnamese market accounted for 45 per cent of total administrative record values.

The final inference is about the relative importance of official records to total export, FTA utilization rate (*FTAU*). In 2008, *FTAU* ranged between 22.7 per cent (Japan) and 62.5 per cent (Australia). When viewing the low *FTAU* in Japan the fact that 2008 was the first year of JTEPA needs to be taken into consideration given the already low tariff rate. As shown in Figure 1, *FTAU* might to a certain extent increase over time as exporters become accustomed to tariff preferences. For countries whose *FTAU* are in the top-3 (Australia, Indonesia and the Philippines), the high *FTAU* was largely driven by vehicle trade (HS8701-8704). When vehicle trade is excluded, their *FTAU* dropped significantly in the cases of the Philippines and Australia. For Vietnam and Japan, *FTAU* included and excluded vehicle trade seems virtually indifferent. When vehicle trade is excluded, *FTAU* of Vietnam becomes the highest. It is not surprising as Vietnam's tariff margin remains high across several product lines. *FTAU* in Indonesia, which remained high after vehicle trade was excluded, would reflect the imposition of non-tariff barriers (NTBs) on agricultural imports (*bea masuk terbhan*) (Fane & Warr, 2006) so that many Thai agricultural exporters opt to apply AFTA preferential tariffs to the alleviate additional costs incurred by the NTBs.[11]

4. Empirical Model

As discussed in Section 2, $FTAU_i$ is related positively to tariff margins and negatively to the degree of ROO restrictiveness. While the former is directly measured by the difference between general (most-favored-nations) and preferential tariffs, $\left(t_i - t_i^{FTA}\right)$, the latter is proxied by the extent to which goods manufacturers procure raw materials and intermediates locally, i.e. backward linkages index $\left(BLI_i\right)$. BLI_i is constructed based on

[11] For example, official tariff on food crops (rice and corn) is 3 per cent but actual tariff is 8 per cent (Fane & Warr, 2006).

the Leontief inter-industry accounting framework, which provides for the capture of both direct and indirect (inter-sectoral) repercussions in the measurement process. BLI_j shows the total units of output required, directly and indirectly, from all sectors (including the unit of output delivered in response to final demand by the given sector) when the demand for the j^{th} commodity rises by one unit. In general, we expect that the higher the BLI_j, the greater the ability an industry j^{th} possesses in complying with ROO, i.e. the positive expected sign of coefficient corresponding to BLI_j. Nonetheless, the relationship between BLI_j and $FTAU_i$ might be non-linear. For industries with a high local content (i.e. the high value of BLI_j), the role of BLI_j in deciding to use FTAs becomes less important. To address a possible non-linear relationship, the squared term of *BLI* is introduced in the empirical model.

In addition to $t_i - t_i^{FTA}$ and BLI_i, three industry-specific factors are incorporated into the model, based on the fact that compiling with ROO is not costless (e.g. Koshien, 1983; Herin, 1986; Krueger, 1999; James, 2006). This necessitates incurring additional costs which discourage firms from applying for tariff concessions. Such costs include not only administrative fees, but also opportunity costs when firms must set up a group of people in order to deal with all the requirements from government officials (e.g. calculating regional content, reporting sources of imported intermediates and their corresponding prices, matching tariff lines, etc.). All are referred to as the administrative cost. Therefore, it seems sensible to assume that the administrative costs are fixed. In the presence of fixed costs, firms deciding to apply for FTA tariff concessions would be expected.

These three industry-specific factors are foreign presence, the degree of existence of conglomerated firms, the 'historical trade record, and the ratio of parts and components in total trade. Firstly, it is likely that foreign firms behave differently from local ones in a number of aspects, including applying for FTA tariff concessions. Foreign firms, on the one hand, tend to be larger in size, so that it is more likely for them to absorb the administrative costs as opposed to local firms. Thus, a positive relationship between foreign presence and the utilization rate is expected. Nevertheless, as argued in the multinational enterprises and product fragmentation literature (e.g. Jones, 2000; Jones & Kierzkowski, 2001: Athukorala, 2006), efficiency-seeking FDI have become increasingly important in East Asia over the past two decades. More importantly, these multinational enterprises (MNEs) tend to be located in export processing zones in order to receive input tariff exemption. Therefore, foreign firms might not be attracted to FTA tariff concessions. The relationship between foreign presence and FTA utilization could be negative. Hence, the relationship between foreign presence (*FOR*) and *FTAU* is ambiguous.

Foreign presence (FOR_i) is measured by the proportion of the output share of foreign firms to that of the industry as a whole. In some previous empirical studies, employment or the capital share of foreign firms have been accustomed to measure foreign presence. Expressing foreign presence as an employment share tends to underestimate the actual role of foreign affiliates because MNE affiliates tend to be more capital intensive than local, non-affiliated firms. On the other hand, capital share can easily be distorted by the presence of foreign ownership restrictions. Such a restriction was in effect in Thailand during the study period (Kohpaiboon, 2006a). Capital share would not be a good proxy for the foreign presence in a country in a case such as Thailand where there is a foreign ownership restriction. Consequently, output share is the preferred proxy.

Thirdly, the share of conglomerate firms (CON_i) is introduced in the model to capture the firm size effect on *FTAU*. In this study, a conglomerate firm is defined as a firm in which the same ultimate parent has a majority-ownership share. Then their output share to total industry is calculated. The conglomerate firm would be in a better position, as opposed to small and medium firms, in spreading the fixed administrative costs incurred. Therefore, the sign of coefficient corresponding to *CON* is expected to be positive. Thirdly, the initial trade before *FTA* becomes effective (INT_i) is added simply because in the presence of fixed costs involved, sales volume must reach a certain level in order to avoid excessive per-unit fixed costs (economies of scale). Hence, a positive relationship between INT_i and *FTAU* is expected.

Finally, $PC_{i,t}$, the share of parts and components (P&C) trade in the total trade of the industry *i* is introduced in the empirical model. This is due to the fact that one emerging pattern of international trade and investment in Asia is the increasing importance of global production sharing, the breakup of the production processes into geographically separated stages.[12] One consequence of the increasing importance of global production sharing is the rapid expansion of P&C trade across countries. This feature is far more important in East Asia than elsewhere (Athukorala, 2003, 2006: Athukorala & Kohpaiboon, 2009). Since the importance of global production sharing is expected to continue, it is worth examining the extent to which such a rapidly growing product line uses the offered FTA tariff preference. As the whole production process is broken up and located in several locations, domestic content tends to be lower than the final goods trade. This would make more difficult for P&Cs to comply with the rules of origin. Hence, a negative coefficient is expected for $PC_{i,t}$

All in all, the empirical model of determinants of *FTAU* is as follows;

$$FTAU_{i,t} = f\left(t_i - t_i^{FTA}, BLI_{i,t}, BLI_{i,t}^2, FOR_{i,t}, CON_{i,t}, INT_{i,t}, PC_{i,t}\right) \quad (1)$$

where $FTAU_{i,t}$ = FTA utilization (the ratio between the official record of FTA implementation and actual exports) in industry i^{th} at time *t*

$t_i - t_i^{FTA}$ (+) = the margin between general and preferential tariff rates in industry i^{th}

$BLI_{i,t}$ (+) = the degree of backward linkage index of industry i^{th} as a proxy of the ability of products to compile with ROO

[12] In the recent literature on international trade an array of alternative terms have been used to describe this phenomenon, including ‘international production fragmentation’, ‘vertical specialisation’, ‘slicing the value chain’ and ‘outsourcing’.

$BLI_{i,t}^2$ (-) = the squared term of $BLI_{i,t}$

$FOR_{i,t}$ (+/-) = the degree of foreign presence in industry i^{th} at time t proxied by the output share of foreign firms

$CON_{i,t}$ (+) = the degree of conglomeration in industry i^{th} at time t proxied by the output share of conglomerate firms as defined in the text above

$INT_{i,t}$ (+) = the export value averaged the past three years of product i at time t

$PC_{i,t}$ (-) = the ratio of parts and component trade in total trade of product i at time t

(The theoretical expected signs are in parentheses)

5. Data Description

Originally, the administrative records of FTA implementation are at the HS six-digit level of disaggregation. The original data have two main limitations. Firstly, there are a number of c/o records whose HS codes do not match actual trade data, either HS 1996 or 2002 Revisions. For example, the administrative records reported export values of HS 200890, 321010, 350210 from Thailand to Indonesia in 2003 records. Such items do not have trade data collected by Custom Duty. Presumably, such errors occur because private firms had difficulties in specifying product categories in filling out c/o forms at the high level of disaggregation. To overcome this problem, the original data at six-digit levels are aggregated into four digit levels. The second problem is that there are many cases in which *FTAU* exceeds 100 per cent. There are two possible explanations for the excessive *FTAU*. Firstly, it is simply due to errors in the data collection process, referred to as Type I Error. Secondly, since official c/o can be issued in advance (see above), exporters tend to overstate their true demand to more than they actually need in order to gain flexibility in doing business. As a result, it is possible for *FTAU* to exceed 100 per cent (referred to as Type II Error). If it is Type II Error, we would not expect vast differences between c/o records and actual export values. In this study, we arbitrarily use a 120 per cent *FTAU* to identify Type I Error. Specifically if *FTAU* exceeds 120 per cent, it is classified as Type I Error. As a result, there are 1,480 out of 26,858 observations subject to Type I Error. Only observations which are subject to Type I Error are dropped from the sample.

Our data set is an unbalanced panel between 2003 and 2008. For original ASEAN members (Indonesia, Malaysia and the Philippines), the data set is a panel between 2003 and 2008. Data for Vietnam starts in 2006 as the year where tariff reduction took effect. Regarding Australia, the data period is from 2005 to 2008. Since JTEPA was in effect in late 2007, the 2008 data is used only.

Our econometric analysis focuses on manufacturing products which account for around 75% of exports from Thailand to Australia, Indonesia, Japan, Malaysia, the Philippines and Vietnam. The definition of manufacturing products in this study follows the International Standard of Industrial Classification (ISIC) and international concordance is used to match with the HS system (i.e. 25-97 net of other primary products). Agricultural and other primary products are excluded because key determinants of FTAU in these products tend to be different to manufacturing. For example, the ROO constraint is unlikely to be binding. In addition, as argued in Fane & Warr (2007), agricultural exports to Indonesia from Thailand are subject to non-tariff barriers (NTBs).

Backward linkage index $\left(BLI_{i,t}\right)$ is constructed in two years according to the availability of Thailand's input-output table, 2000 and 2005. Hence, $BLI_{i,2000}$ is used for data between 2003 and 2004, whereas $BLI_{i,2005}$ is used for data from 2005 onwards. Note that Thailand's input-output table is a complementary import type where the import content of each transaction is separately identified and allocated to an import matrix so that $BLI_{i,t}$ measures only domestic content. $BLI_{i,t}$ Data of CON_{it} and $FOR_{i,t}$ are obtained from Kohpaiboon & Ramstetter (2008), using data on large corporations from

Business On-Line (2008). Data is available for 1996 and 2006. The former is used as the proxy between 2003 and 2005, whereas the latter is utilized for 2006 onwards. Both $CON_{i,t}$ and $FOR_{i,t}$ are classified according to the International Standard of Industrial Classification (ISIC). Since classifications of $BLI_{i,t}$, $CON_{i,t}$ and $FOR_{i,t}$ are not yet in the HS classification, international concordance is used to be converted into HS classification. Finally $INT_{i,t}$ is the annual export value in the past three years. For example, $INT_{i,2003}$ is the annual export value average between 2000 and 2002.

The P&C list developed in Athukorala & Kohpaiboon (2009) is used to construct $PC_{i,t}$. The list uses parts in the Board Economics Classification (BEC) 42 and 53 as a point of departure. Additional lists of parts are included based on firm interviews in Kohpaiboon (2009). Lists are initially disaggregated at the six-digit HS classification, and then summed up to four digit in order to determine share of P&C in total trade at the four digit HS classification. Table 4 provides a summary of variables used in the econometric analysis (Panel A) and the matrix of correlation coefficients.

6. Results

6.1 Baseline Estimation

Initially, all samples are pooled and estimated using the ordinary least squares (OLS). The country-specific effect is used in this experimental regression analysis. Specifically, a binary dummy variable for Indonesia, Malaysia, the Philippines, Vietnam and Japan is introduced. Australia is selected as a control group. Since the dependent variable, *FTAU*, is censored, i.e. we do not observe values of *FTAU* less than zero (the left censoring) and greater than 100 per cent (the right censoring), OLS estimation would be biased and inconsistent. Hence, random-effect Tobit (weighted maximum likelihood) estimator is used to obtain unbiased, consistent and efficient estimates. In order to provide the robustness check of the estimation result, the corresponding fixed- and random-effect estimators are also reported.

Table 5 provides the estimation results, namely pooled OLS, random-effects, and fixed-effects, and random-effects Tobit estimations. All equations pass the overall statistical significant at the one per cent level. Clearly, the estimation results are insensitive to choices of estimation methods. Nevertheless, because of the nature of censored dependent variables, the following discussion is based on random-effect Tobit model estimation (Column 5.4). All coefficients are statistically significant at the five per cent level or better with theoretical expected signs. The coefficient corresponding to $t_i - t_i^{FTA}$ is significant at the one per cent level, implying that the tariff margin does matter for the private sector in deciding whether or not to apply for FTA tariff concessions. It also implies that applying for such tariff concessions is costly to a certain extent. Otherwise, the positive relationship would not be revealed.

Both coefficients corresponding to $BLI_{i,t}$ and $BLI_{i,t}^2$ are statistically different from zero at the one per cent level, suggesting that the non-monotonic relationship between $BLI_{i,t}$ and $FTAU_{i,t}$. The coefficients corresponding to $BLI_{i,t}$ and $BLI_{i,t}^2$ are positive and negative, respectively. The positive and significant coefficient corresponding to BLI_i indicates that the ROO constraint is binding. All other things being equal, products with greater backward linkages (domestic value added content) tend to register a higher level of $FTAU_{i,t}$. The negative and significant coefficient associated with $BLI_{i,t}^2$ suggests that the positive effect of $BLI_{i,t}$ on $FTAU_{i,t}$ would be diminishing. In industries which rely largely on domestic inputs, the effect of $BLI_{i,t}$ on $FTAU_{i,t}$ becomes less

The statistical significance of $CON_{i,t}$ strengthens the above finding about ROO binding constraint. Since there are administrative costs in compiling ROO, it is local and conglomerated firms that intensively utilize FTA privileges, as opposed to small and medium enterprises (SMEs). The negative coefficient associated with $FOR_{i,t}$ reflects the dominant role of export-oriented foreign firms operating in the Thai manufacturing sector. These firms actively participate in global production networks and their international trade tends to benefit from tariff exemption schemes available in many developing countries. Hence, the need for FTA tariff preference becomes less relevant for their operation.

The coefficient corresponding to $PC_{i,t}$ turns out to be negative and statistically significant as hypothesized. Since the production process is sliced up, value added in each location tends to be lower. Hence, it would be more difficult for parts and components to comply with rules of origin and regional content requirements concerning style in particular as opposed to final goods. It is also not easy for parts and components to comply with change-in-tariff-lines ROO as international trade of parts and components occur at the highly disaggregated level, six digit HS classification. For example, electrical and electronics goods and the related parts and components usually belong to the same tariff codes at the HS-six digit level, which is the normal base for designing this type of ROOs. Hence, it is unlikely to comply with change-in-tariff line ROO (Kohpaiboon 2010: Appendix 2).[13]

Another implication from the observed statistical significance of INT_i is that it is mostly the established exporters who benefit from FTA concessions. This highlights the potential role of FTAs in facilitating instead of creating trade. Products must be traded substantially before (i.e. in the pre- signing FTAs period) to ensure that FTA export creation is considerable. For products that have yet to be traded during the pre-FTA period, the effect of a FTA in creating trade would be limited. Our findings cast doubt on the strategy of using FTAs to open up new markets, as is claimed by policymakers.

Table 6 illustrates the Tobit regression by individual countries as a robustness check to the multi-country regression above. Note that the sample size varies across FTA signatories according to the year they began using FTA. For example, the sample size of original ASEAN members like Indonesia, Malaysia and Thailand is relatively large as

[13] Specifically, electrical appliances assembly plants is Thailand which use imported bare printed circuit board (BPCB) together with other locally procured electronic components (e.g. diode, integrated circuits, semi-conductors) to printed circuit board assembly (PCBA) for export are not eligible to FTA concessions because BPCBs and PCBAs belong to the same HS code 853690 (Kohpaiboon, 2010).

opposed to that of Japan which began to use FTA in November 2007. Clearly, estimates by individual countries provide more or less the same inference about FTA determinants. Tariff margin and pre-FTA trade are the key factors which encourage firms to use FTA tariff privileges. Local and conglomerate firms are more likely to use them, as opposed to foreign firms. Finished products instead of parts and components are the main goods whose producers apply for FTA tariff privileges. Rule of origin is the binding constraint for firms to make use of FTA.

Another interesting pattern emerged from Table 6 is the magnitude of the estimated coefficient corresponding to the tariff margin, which varies significantly across countries. This seems to be related to dollar costs complying with rules of origin, including administrative costs from importing countries. In general, the magnitude would reflect how difficult firms acquire FTA tariff privileges. In a given FTA where the process to obtain tariff privileges is more difficult, all other things being equal, firms must require a larger tariff margin. Hence, the estimated coefficient in this case is expected to be low. The clear pattern is that the estimated coefficient of developed country-FTA counterpart is higher than that of developing countries, like ASEAN members. Among developing country counterparts, coefficients across developing countries are in the narrow range between 0.5 and 1. This finding will be elaborated further in the next sub section.

6.2 Assess Cost of Compiling ROO

As mentioned earlier, compiling ROO incurs dollar costs to exporters and the costs tend to be fixed. If the hypothesis is correct, the role of tariff margins on the private sector's decision to apply for FTA tariff concessions would be relevant in a certain range only. For example, if dollar costs incurred by compiling ROO are equivalent to a 5 per cent tariff margin, the statistical relationship between $FTAU_{i,t}$ and $t_i - t_i^{FTA}$ would be found only in the neighborhood of the 5% tariff margin. For those outside the neighborhood, the tariff margin would not be a crucial factor for a firms' decision to use FTA tariff preferences. 5% can be used as an estimated cost of compiling ROO.

Therefore, to estimate the costs of compiling ROO, a series of experimental runs are conducted. Equation 1 is re-estimated with various sub samples according to tariff margin. Particularly, Equation 1 is estimated by random-effect Tobit estimation in a sample whose tariff margin is greater than X %, where $X \in I^{+}$. The estimated cost of compiling ROO is X^{*}, a positive integral that the statistical significance of $t_i - t_i^{FTA}$ disappears. All are estimated using random-effect Tobit estimation.

All estimating results of the experimental runs are reported in Table 7. Based on our experimental run, the coefficient corresponding to $t_i - t_i^{FTA}$ is statistically significant until $X \leq 4$ per cent. When $X \in [5,8]$, statistical significance is found in the case at $X = 8$. When $X \geq 9$ per cent, the coefficient of $t_i - t_i^{FTA}$ is not different from zero statistically. Our experimental run suggests that the cost of compiling ROO would be a wide range between 5 and 8 per cent.

The statistical significance of $CON_{i,t}$ $FOR_{i,t}$ and $INT_{i,t}$ remains in all sub samples. This finding provides a robustness check on the relative importance of firm-specific factors and pre-FTA trade on deciding to use FTA. In contrast, the coefficient corresponding to $BLI_{i,t}$ turns out to be statistically insignificant when $X \geq 8$ per cent. When the tariff margin exceeds the cost of compiling ROO, firms tend to apply for FTA tariff preference regardless of the extent to which their production relies on domestic inputs.

Interestingly, the series of experimental runs undertaken by individual countries is presented in Table 8. The estimates of the Japanese case are not available because of the relatively small sample size. In general, our finding here is in line with the conclusions above in that costs in complying ROO vary from country to country. Where we diverge from above is that the cost difference seems substantial, ranging from 2 per cent in the case of Australia to 10 per cent for Indonesian exports. For Malaysia and Vietnam, the costs are about 4 per cent, whereas they are slightly higher in the case of Philippines (6 per cent). This suggests that a significant portion of the costs comes from our FTA counterparts. This is likely to occur at the custom procedure. Not surprisingly, such costs are higher for developing country counterparts.

Such insight would be relevant for Japan, which is enthusiastic about FTAs as a mode for further liberalization and the leader among developed countries in negotiating and signing FTAs. Our finding suggests that FTA negotiation on tariff cuts schedules must be undertaken in a more comprehensive way. Particularly, not only rules of origin, but also trade facilitation issue must be incorporated and considered at the negotiation table to ensure that the FTA-induced trade effects can be materialized. Custom procedure should be the policy highlight. This is especially true for developing country FTA counterparts. Technical and financial assistance to improve capabilities on custom procedure would be on the top priority within policy measures to promote the use of FTAs.

7. Conclusions

This paper has examined how the private sector responds to export opportunities induced by FTAs, using evidence from the Thai manufacturing sector during the period 2003-08. The analysis began with examining the trends and patterns in administrative records of FTA implementation, and then inter-product panel-data econometric analysis was undertaken to gain a better understanding FTA utilization across products. The novel feature of the analysis is that it makes an explicit distinction between actual and preferential trade in which the later is measured by the administrative records of FTA implementation. In addition, the cost of compiling ROO is estimated.

Our findings suggest that while FTAs have potential to facilitate trade among members, the product coverage is limited. Products that have benefited from FTA tariff preferences so far are highly concentrated. In 2008 administrative records of the top 20 items out of total (i.e. more than 5000 items) accounted for 45 per cent for Vietnam (lower bound) and 72 per cent for Australia (upper bound). So far the utilization of FTAs is moderate, ranging between 22.7 per cent and 62.5 per cent. This points to a serious problem in using actual trade data (based on customs records) to evaluate the impact of

FTA on trade, as has been common practice in gravity-model based studies. The actual trade taking place under FTAs could well be much less than the recorded trade of a given country because there are costs involved in applying for FTA tariff concessions.

Our (unbalanced) panel data econometric analysis suggests that rules of origin constraints are binding. The estimated cost in compiling ROO is equivalent to a 5 and 8 per cent tariff. Interestingly, such a cost varies significantly across FTA partners suggesting the presence of obstacles on the importing country's part as well. Hence, ability to comply with ROO, as well as tariff margins, does matter in firms' decisions to use FTA. Another interesting finding is the relative importance of pre-signing FTA trade. Our results suggest that it is unlikely for countries to use FTA to open new markets, products yet to be traded before signing FTA. So far it has been predominantly local firms, in particular large local conglomerates, which utilize FTA tariff concessions, compared to foreign firms and small and medium enterprises (SMEs). Companies trading products under global production sharing are less likely to apply for FTA tariff preference because of both dollar costs incurred by ROO imposition and limited tariff margins.

Two policy inferences can be drawn from this paper. Firstly, promoting exports by maximizing the number of FTAs, while ignoring the nature of FTA partners is unlikely to be successful. The nature of a FTA partner does matter, whether or not trade potential supported by a signed FTA could materialize. Our finding suggests that substantial trade before signing FTAs would be a reasonable criterion in selecting FTA counterparts. A FTA alone is unlikely to be used as a tool to open up markets for products yet to be traded. Secondly, for those who have less hope in first-best, world-wide liberalization through World Trade Organization negotiations and advocate FTAs as a mode for further liberalization, policy emphasis to harness the trade-induced effects of signed FTAs should be on reducing costs incurred from the presence of ROO. There is room for inter-government cooperation to mitigate any cumbersome obstacles preventing firms from making use of FTA.

Table 1
FTAs Involved in Thailand from 1990 onwards

FTA	Signed	Effective	Remarks
ASEAN	1990	2006	Tariff cuts were completed for original ASEAN members in 2006.
Australia	Jul-04	Jan-05	Australia Tariff Reduction-83% (2005), 96.1%(2010) and 100% (2015): Thailand Tariff Reduction-49.5% (2005), 93.3 %(2010) and 100% (2025)
New Zealand	Apr-05	Jul-05	New Zealand Tariff Reduction- 79.1 (2005), 88.5% (2010), and 100% (2015); Thailand Tariff Reduction-54.1% (2005), 89.7% (2010) and 100% (2025)
Bahrain	2002		Under Negotiation
India	Oct-03	n.a.	82 items under Early Harvest Program; the rest under negotiation
Pakistan	2004		Under Study
Japan	Apr-07	Nov-07	Japan Tariff Reduction-86.1% (2007) and 91.2 % (2017); Thailand Tariff Reduction-31.1% (2007) and 97.6% (2017)
Peru	Nov-05	Jul-10	Tariff Reduction between Thailand and Peru; 50% (2010) and 70% (2015)
Chile	2006		Under Study
BIMSTEC	Jul-10	2013	Tariff Reduction Program for India, Sri Lanka and Thailand- 10% (2013) and 60% (2016) Tariff Reduction Program for Bangladesh, Bhutan, Nepal and Mynamar-10% (2011) and 60% (2014)
ASEAN-Japan	Apr-08	Jun-08	Japan Tariff Reduction 90% (2008): ASEAN-6 Tariff Reduction 93.8% (2018); Vietnam Tariff Reduction 94% (2025); Myanmar, Lao and Cambodia 93% (2026)
ASEAN-Korea	Feb-09	Jan-10	Korea Tariff Reduction 90% (2010); Thailand Tariff Reduction 83%(2010),l 84%(2012), 89% (2016) and 90% (2017).

(cont.)

Table 1(cont.)

FTA	Signed	Effective	Remarks
ASEAN-India	Aug-09	Jan-10	71% (2013) and 80% (2016) for Thailand, Malaysia, Singapore, Brunei, and India
ASEAN-Australia-New Zealand	Feb-09	Mar-10	Australia Tariff Reduction 96% (2010) and 100% (2020); New Zealand Tariff Reduction 90.1(2012) and 100 %(2020); Thailand Tariff Reduction 89.8%(2015) and 98.8% (2020)
ASEAN-China	Nov-04	Nov-04	10 Year Transition Periods
ASEAN plus 3*	Under Negotiation		Initiated by November 1999 in Manila (Informal Asian Summit 3rd)
ASEAN plus 6**	Under Negotiation		Initiated by August 2006 in AEM-METI and AEM+3 Meeting in Kaula Lumpur
ASEAN-EU	Under Negotiation		Initiated by November 2007 in AEM-EU Meeting in Brunei

Source: Author's compilation from Official Data source available at
http://www.thaifta.com/thaifta/Home/FTAbyCountry/tabid/53/Default.aspx

Table 2
General and AFTA-preferential tariffs of Selected Countries and Distribution of the Margin between General and Preferential Tariff Rates (%)

	Indonesia	Malaysia	Philippines	Vietnam	Australia	Japan
MFN Tariff						
1995	19.4*	13.0*	20	12.8	5.5**	4.1
2006	6.9	7.2	6.2	16.8	3.4	3.1
Preferential Tariffs in 2006	2	2	2.1	2.5	1.1	2.4
Distribution of the margin between general and preferential tariffs (% of total tariff lines)						
$\Delta t = 0$	34.1	59.4	9.5	34.1	85	53.9
$0 < \Delta t \leq 5$	41.9	12.7	70.7	18.3	15	27.8
$5 < \Delta t \leq 10$	15.2	6.8	16.9	6.2	0	15.5
$10 < \Delta t \leq 20$	8.3	15.4	1.7	9.8	0	3
$20 < \Delta t \leq 30$	0.2	4.4	0.7	9.7	0	0
$30 < \Delta t$	0.3	1.2	0.6	21.9	0	0
#tariff lines	5,391	5,222	5,390	5,219	5,218	5,039
# tariff lines subject to 0 %% tariff	558	2,798	126	1,602	2,447	2,499

Notes: * data for 1994; The number in parentheses indicate weighted tariff rates in which 2005 import value is used as the weight.; General tariff rates are MFN rate for all countries, except Thailand where applied rates are used.** 1996

Sources: Data of 1994/95 are from Jongwanich & Kohpaiboon (2007) whereas the others are based on Author's calculation using official documents reported to the ASEAN Secretariat

Table 3
Indicators of FTA Utilization in Thailand 2008

	Indonesia	Malaysia	Philippines	Vietnam	Australia	Japan
Number of items applying for ROO certificates	986	1,432	898	1364	1161	1127
(per cent of total export item)	18.3	27.4	16.7	26.1	22.2	22.4
Product concentration						
Cumulative share of top 10 items (per cent)	43.5	38.4	48.1	30.0	62.3	50.9
Cumulative share of top 20 items (per cent)	55.3	49.9	61.1	44.9	72	62.3
FTA utilization rate (per cent of total export)*	61.5 (58.5)	25.2 (23.5)	46.9 (35.7)	46.6 (46.7)	62.5 (46.2)	22.7 (22.7)
Coefficient of Variation of FTA Utilization rate (per cent)	194	188.3	197.3	171.8	171.1	203

Note: * Number in the parenthesis is the utilization rate excluding CBU vehicles (HS8701-8704).
Source: Author compilation from official record of certificate of origin available at Bureau of Trade Preference Development, Department of Foreign Trade, Ministry of Commerce. International Trade data are from World Trade Atlas database.

Table 4
Variables Description

Panel A: Data Summary

Variable	Obs	Mean	Std.	Min	Max	Nature
$t_i - t_i^{FTA}$	26,754	0.0	0.1	0.0	0.7	Time invariant
$PC_{i,t}$	26,539	0.1	0.2	0.0	0.7	2003-08
$CON_{i,t}$	25,288	0.1	0.2	0.0	0.5	1996, 2006
$FOR_{i,t}$	22,776	0.4	0.2	0.0	0.7	1996, 2006
$INT_{i,t}$	26,858	7.4	8.2	-6.9	20.8	2003-08
$FTAU_{i,t}$	25,647	0.1	0.2	0.0	0.7	2003-08
$BL_{i,t}$	26,324	0.9	0.3	0.1	1.8	2000, 2005

Panel B: Correlation Coefficient Matrix

	$t_i - t_i^{FTA}$	$PC_{i,t}$	$CON_{i,t}$	$FOR_{i,t}$	$INT_{i,t}$	$FTAU_{i,t}$
$PC_{i,t}$	-0.04	1.00				
$CON_{i,t}$	0.08	-0.07	1.00			
$FOR_{i,t}$	-0.03	0.22	-0.21	1.00		
$INT_{i,t}$	0.12	0.16	-0.06	0.07	1.00	
$FTAU_{i,t}$	0.25	-0.02	0.08	-0.08	0.37	1.00
$BL_{i,t}$	0.04	0.14	-0.08	0.10	0.14	0.04

Table 5
Econometric Results with Various Estimation Methods

	5.1 Pooled Cross-Sectional		5.2 Random-effect		5.3 Fixed-effect		5.4 Random-effect. Tobit	
	Coefficient	t-stat	Coefficient	*Z*-stat	Coefficient	Z-stat	Coefficient	Z-stat
Intercept	0.00	-0.39	-0.04***	-3.83	-0.03***	-3.26	-0.03***	-2.73
$t_i - t_i^{FTA}$	0.72***	32.22	0.65***	31.76	0.72***	32.22	0.71***	31.95
$BL_{i,t}$	0.17***	9.05	0.18***	9.91	0.17***	9.05	0.17***	9.10
$BL_{i,t}^2$	-0.10***	-9.78	-0.11***	-10.28	-0.10***	-9.78	-0.10***	-9.81
$CON_{i,t}$	0.09***	9.44	0.09***	9.73	0.09***	9.44	0.09***	9.47
$FOR_{i,t}$	-0.07***	-9.82	-0.07***	-9.83	-0.07***	-9.82	-0.07***	-9.82
$INT_{i,t}$	0.01***	58.07	0.01***	58.24	0.01***	58.07	0.01***	58.14
$PC_{i,t}$	-0.03***	-4.82	-0.04***	-4.92	-0.03***	-4.82	-0.04***	-4.83
Ind	-0.03***	-5.77						
Mal	-0.04***	-7.71						
Phil	-0.03***	-5.5						
Viet	-0.05***	-8.61						
Jap	-0.02***	-2.55						
R^2	0.21		0.203		0.20			
$F-stat$	457.4				767.7			
Log-Likelihood							4184.72	
Wald - χ^2			5377.6				5350.67	
# obs	21097		21097		21097		21097	

Notes: ***,**, and * indicate 1%, 5% and 10% level of statistical significant.
Source: Author's Estimation

Table 6
Random-Effect Tobit Estimation by Countries

	Indonesia		Malaysia		Philippines		Vietnam	
	Coefficient	*Z*-stat	Coefficient	*Z*-stat	Coefficient	*Z*-stat	Coefficient	*Z*-stat
Intercept	-0.02	-0.96	-0.03*	-1.57	-0.03*	-1.67	-0.02	-0.22
$t_i - t_i^{FTA}$	0.57***	8.91	1.02***	25.92	0.91***	9.63	0.46***	13.40
$BL_{i,t}$	0.13***	3.54	0.13***	3.75	0.13****	3.59	0.09	0.56
$BL_{i,t}^2$	-0.07***	-3.42	-0.08***	-4.00	-0.08***	-3.66	-0.06	-0.86
$CON_{i,t}$	0.07***	3.93	0.12***	6.56	0.10***	5.82	0.08***	2.48
$FOR_{i,t}$	-0.07***	-4.40	-0.07***	-4.83	-0.04***	-2.85	-0.05**	-2.14
$INT_{i,t}$	0.01***	29.72	0.01***	20.77	0.01***	28.92	0.01***	19.91
$PC_{i,t}$	-0.01	-0.81	-0.03***	-2.11	-0.11***	-7.89	-0.01	-0.52
Log-likelihood	1011.5		1096.0		1217.61		325.57	
Wald - χ^2	1063.4		1639.4		1145.35		688.37	
#obs	4932		4678		4998		2391	

(Cont.)

Table 6*(Cont.)*

	Australia		Japan	
	Coefficient	*Z*-stat	Coefficient	*Z*-stat
Intercept	-0.14*	-1.80	-0.05	-0.30
$t_i - t_i^{FTA}$	3.22***	18.98	299.23***	11.99
$BL_{i,t}$	0.35***	2.78	0.16	0.62
$BL_{i,t}^2$	-0.19***	-3.77	-0.13*	-1.27
$CON_{i,t}$	0.03*	1.31	0.07	1.36
$FOR_{i,t}$	-0.09***	-4.58	-0.08*	-2.10
$INT_{i,t}$	0.01***	20.57	0.01***	10.81
$PC_{i,t}$	0.06***	3.30	-0.09**	-2.36
Log-likelihood	769.78		150.22	
Wald - χ^2	1410.62		337.18	
#obs	3291		807	

Notes: ***,**, and * indicate 1%, 5% and 10% level of statistical significant.
Source: Author's Estimation

Table 7
Experimental Runs for Cost of Compiling ROO (Pooled Samples)

Criterion	1%		2%		3%		4%		5%	
	Coefficient	Z-stat	Coefficient	Z-stat	Coefficient	Z-stat	Coefficient	Z-stat	Coefficient	Z-stat
Intercept	0.00	-0.02	0.01	0.48	0.00	-0.08	0.02	0.74	0.02	0.50
$t_i - t_i^{FTA}$	**0.35*****	**10.88**	**0.30*****	**8.62**	**0.23*****	**5.96**	**0.20*****	**4.80**	**0.07***	**1.30**
$BL_{i,t}$	0.15***	5.66	0.14***	4.81	0.15***	4.53	0.12***	3.14	0.09**	1.87
$BL_{i,t}^2$	-0.09***	-6.06	-0.08***	-5.06	-0.09***	-4.81	-0.07***	-3.17	-0.04*	-1.64
$CON_{i,t}$	0.06***	4.42	0.05***	4.04	0.06***	4.18	0.05***	3.36	0.08***	3.95
$FOR_{i,t}$	-0.06***	-6.13	-0.06***	-5.72	-0.06***	-5.09	-0.07***	-5.21	-0.05***	-2.84
$INT_{i,t}$	0.01***	50.37	0.01***	48.16	0.02***	44.43	0.02***	42.47	0.02***	33.03
$PC_{i,t}$	-0.04***	-4.23	-0.02**	-2.29	-0.02**	-2.00	-0.02*	-1.66	-0.01	-0.74
Log-likelihood	1361.57		1179.82		688.36		577.69		228.18	
Wald - χ^2	2822.53		2554.83		2111.77		1935.09		1151.28	
#obs	13029.		11738		9556		8479		5014	

(cont.)

Table 7 (cont.)

Criterion	6%		7%		8%		9%		10%		11%	
	Coefficient	Z-stat	Coefficient	Z-stat	Coefficient	Z-stat	Coefficient	Z-stat	Coefficient	Z-stat	Coefficient	Z-stat
Intercept	0.04*	1.35	0.05*	1.65	0.05*	1.43	0.05	1.37	0.03	0.60	0.05	1.00
$t_i - t_i^{FTA}$	**0.05**	**1.03**	**0.06**	**1.07**	**0.08***	**1.42**	**0.03**	**0.42**	**0.06**	**0.85**	**0.07**	**0.94**
$BL_{i,t}$	0.02	0.36	-0.05	-0.97	-0.08*	-1.40	-0.05	-0.78	-0.01	-0.19	-0.05	-0.59
$BL_{i,t}^2$	0.00	0.06	0.05*	1.50	0.07*	2.10	0.05*	1.33	0.02	0.48	0.04	0.94
$CON_{i,t}$	0.08***	3.88	0.09***	4.11	0.08***	3.67	0.09***	3.83	0.03	0.87	0.02	0.67
$FOR_{i,t}$	-0.06***	-3.03	-0.04**	-2.23	-0.03*	-1.68	-0.04*	-1.73	-0.05*	-1.80	-0.06**	-2.02
$INT_{i,t}$	0.02***	32.28	0.02***	31.04	0.02***	29.39	0.02****	28.34	0.02***	24.07	0.02***	23.64
$PC_{i,t}$	-0.02	-0.91	-0.01	-0.40	-0.01	-0.35	0.01	0.31	-0.01	-0.56	-0.02	-0.80
Log-likelihood	231.13		193.64		169.00		155.06		53.32		53.87	231.13
Wald - χ^2	1118.76		1051.68		964.34		885.23		628.02		615.67	
#obs	4804		4452		4085		3705		2582		2482	

Notes: ***,**, and * indicate 1%, 5% and 10% level of statistical significant.

Source: Author's Estimation

Table 8
Experimental Runs for Cost of Compiling ROO (Individual Countries)

Indonesia	Greater than 9%		Greater than 10%		Greater than 11%	
	Coefficient	*Z*-stat	Coefficient	*Z*-stat	Coefficient	*Z*-stat
Intercept	0.08*	1.62	0.08*	1.39	0.06	0.52
$t_i - t_i^{FTA}$	**0.28***	**1.76**	**0.31***	**1.80**	**0.25**	**1.15**
$BL_{i,t}$	-0.29***	-2.98	-0.22**	-2.10	-0.25	-1.06
$BL_{i,t}^2$	0.22***	3.85	0.17***	2.82	0.20	1.42
$CON_{i,t}$	-0.06*	-1.35	-0.01	-0.31	-0.20***	-2.92
$FOR_{i,t}$	0.01	0.34	-0.04	-0.91	0.03	0.37
$INT_{i,t}$	0.01***	13.99	0.01***	12.62	0.01***	8.51
$PC_{i,t}$	0.12***	3.06	0.11**	2.58	0.17**	2.47
Log-likelihood	164.16		128.06		49.89	
Wald - χ^2	399.77		263.95		133.18	
#obs	1156		974		526	

Malaysia	Greater than 3%		Greater than 4 %		Greater than 5 %	
	Coefficient	*Z*-stat	Coefficient	*Z*-stat	Coefficient	*Z*-stat
Intercept	-0.01	-0.19	0.01	0.31	0.03	0.73
$t_i - t_i^{FTA}$	**0.25*****	**3.36**	**0.14***	**1.70**	**0.08**	**0.90**
$BL_{i,t}$	0.15*	1.90	0.13*	1.54	0.09	0.99
$BL_{i,t}^2$	-0.09**	-2.08	-0.08*	-1.71	-0.06	-1.14
$CON_{i,t}$	0.11*	3.23	0.10**	2.71	0.10**	2.83
$FOR_{i,t}$	-0.06**	-2.03	-0.07**	-2.30	-0.07**	-2.18
$INT_{i,t}$	0.02***	18.02	0.02***	18.30	0.02***	18.05
$PC_{i,t}$	-0.06**	-2.05	-0.07**	-2.36	-0.06*	-1.95
Log-likelihood	0.92		-10.87		-9.36	
Wald - χ^2	365.23		348.38		303.58	
#obs	1846		1846		1443	

(Cont.)

Table 8*(Cont.)*

Philippines	Greater than 5%		Greater than 6%		Greater than 7%	
	Coefficient	*Z*-stat	Coefficient	*Z*-stat	Coefficient	*Z*-stat
Intercept	0.04	0.69	0.11*	1.66	0.13*	1.54
$t_i - t_i^{FTA}$	0.51*	1.53	0.57*	1.54	-0.04	-0.09
$BL_{i,t}$	-0.01	-0.10	-0.20*	-1.55	-0.20*	-1.38
$BL_{i,t}^2$	0.01	0.13	0.13*	1.66	0.12*	1.41
$CON_{i,t}$	0.16***	3.45	0.14***	3.02	0.18***	3.41
$FOR_{i,t}$	-0.17***	-3.44	-0.17***	-3.40	-0.11*	-1.94
$INT_{i,t}$	0.02***	14.07	0.02***	13.02	0.02***	11.55
$PC_{i,t}$	0.01	0.28	-0.01	-0.22	-0.03	-0.50
Log-likelihood	76.11		70.11		48.97	
Wald - χ^2	252.74		230.03		181.99	
#obs	921		864		721	

Vietnam	Greater than 3%		Greater than 4%		Greater than 5%	
	Coefficient	*Z*-stat	Coefficient	*Z*-stat	Coefficient	*Z*-stat
Intercept	-0.05	-0.35	-0.08	-0.53	-0.32*	-1.42
$t_i - t_i^{FTA}$	0.17**	2.85	0.15	2.39	0.03	0.43
$BL_{i,t}$	0.16	0.70	0.23	0.94	0.63*	1.77
$BL_{i,t}^2$	-0.10	-1.08	-0.12	-1.28	-0.27**	-1.97
$CON_{i,t}$	0.04	0.86	0.04	0.79	0.06*	1.32
$FOR_{i,t}$	-0.02	-0.50	-0.03	-0.85	-0.02	-0.62
$INT_{i,t}$	0.02***	18.62	0.02***	18.33	0.02***	17.87
$PC_{i,t}$	-0.07*	-2.03	-0.07**	-2.13	-0.09**	-2.43
Log-likelihood	45.78		43.91		36.58	
Wald - χ^2	371.43		363.42		336.36	
#obs	1288		1232		1109	

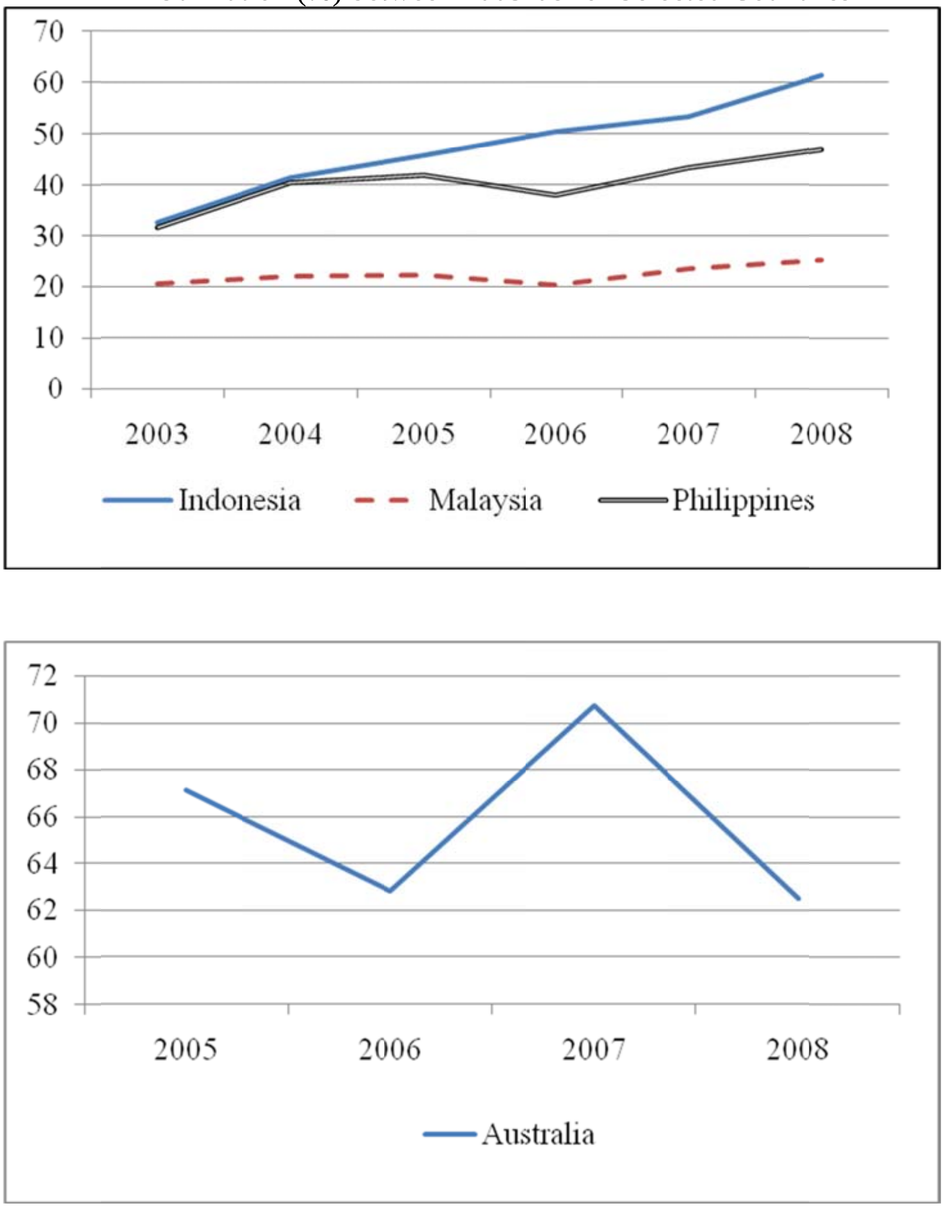
(Cont.)

Table 8*(Cont.)*

Australia	Greater than 1%		Greater than 2%		Greater than 3%	
	Coefficient	*Z*-stat	Coefficient	*Z*-stat	Coefficient	*Z*-stat
Intercept	-0.16	-0.99	-0.29*	-1.64	-0.26*	-1.27
$t_i - t_i^{FTA}$	2.76***	6.25	1.93***	3.48	0.16	0.18
$BL_{i,t}$	0.32	1.22	0.63**	2.17	0.73**	2.19
$BL_{i,t}^2$	-0.19*	-1.85	-0.35**	-2.94	-0.40***	-2.92
$CON_{i,t}$	0.02	0.55	0.02	0.51	0.01	0.25
$FOR_{i,t}$	-0.13***	-4.14	-0.13***	-4.09	-0.16***	-4.34
$INT_{i,t}$	0.02***	21.25	0.02***	21.39	0.02***	19.98
$PC_{i,t}$	0.09***	3.13	0.11***	3.49	0.16***	4.57
Log-likelihood	83.64		43.08		31.68	
Wald - χ^2	584.72		471.50		390.23	
#obs	1856		1382		1149	

Notes: ***,**, and * indicate 1%, 5% and 10% level of statistical significant.
Source: Author's Estimation

Figure 1
FTA Utilization (%) between 2003-08 for Selected Countries



Source: Author's calculation using data sources discussed in text.

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