RIETI Discussion Paper Series 17-E-012

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RIETI Discussion Paper Series 17-E-012

February 2017

Multilevel Analysis of Free Trade Agreements and Foreign Direct Investment in the Asia Pacific Region

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Abstract

This paper seeks to investigate the linkage between free trade agreements (FTAs) and firms' foreign direct investment (FDI), with a focus on firm size. As small and medium-sized enterprises (SMEs) face relatively higher costs when utilizing FTAs, responses to effective FTAs are expected to vary across firms with different scales. A large-scale database is utilized for making multi-level analyses to this effect. The Poisson regression analysis shows that the intensity to undertake initial FDIs becomes stronger under the existence of an FTA (after controlling for the gravity factors of gross domestic product (GDP) and distance). A multi-level analysis reveals that (1) larger-scale initial FDIs are undertaken in FTA-partner countries; (2) the profit margin of firms established after the coming-into-effect of an FTA tends to be higher; and (3) the profit margin of those firms grouped under the service (non-manufacturing) sector tends to be higher. As for the service sector, the degree of restriction (measured by the Hoekman Index under an FTA) is not statistically significant, while the existence of FTAs is significant. Thus, a sunk cost associated with undertaking FDIs, which is deemed to be rather neutral to the degree of investment regulation, could be a critical factor in the conduct of FDIs. As a policy implication, reduction of such sunk costs (e.g., through information sharing of best practices among potential investors) could be an indispensable policy focus for making FTAs effective in terms of content.

Keywords: Foreign direct investment, Free trade agreement, Profitability, Sunk cost
JEL Classification: C11, F21, F23

* Professor, Faculty of Law, Politics and Economics, Chiba University. This study is conducted as a part of the Project "A Study of Free Trade Agreements"undertaken at Research Institute of Economy, Trade and Industry (RIETI). I would like to thank participants at seminars organized by RIETI. Research assistantship from Mr. Richard Liang is cordially acknowledged.

1. Introduction

This paper seeks to investigate the linkage between free trade agreements (FTAs) and business firms' foreign direct investment (FDI), from a new institutional economic perspective and with a focus on the size of firms. As small and medium-sized enterprises (SMEs) face a relatively higher cost when utilizing FTAs, responses to effective FTAs are expected to differ across firms with different scales. A company-level database is utilized for making multi-level analyses to this effect.

The structure of this paper is as follows. Section 2 makes a framework setting for this research. Section 3 makes an analysis of FDI count data using the Poisson regression. Section 4 makes a multi-level analysis of the linkage between FDI and FTA with a focus on profitability and service firms. Section 5 concludes this paper with some policy implications.

2. Framework and data description

2.1. Foreign direct investment and transaction costs reduction through free trade agreement

The existence of a free trade agreement is expected to facilitate foreign direct investment between the two parties (countries), due to the reduction of various investment-related costs associated with the FDI: pre- and post- establishment of business presence in a host country would entail information costs (e.g., searching for ideal business locations) and actual costs of establishing physical commercial presence including payments of necessary fees (e.g., local registration fees, sometimes charged only against foreign companies) as well as material costs, yet the FTA serves as reducing some of these costs, most plausibly information-related costs and payments of fees. These costs might be considered "transaction costs", a new institutional economic perspective (Williamson and Winter, 1993) associated with FDI; and they would be reduced under or after the existence of an FTA. The scale effect of FDI would also be relevant to the FDI behavior by firms. Melitz (2003) makes a theoretical investigation into the aggregate consequence of trade-related resource allocations, in association with firm size. In this paper, firm size would be addressed in connection to FDI.

2.2.Data description

The source of data adopted in this research is the Orbis[1] database, which contains

[1] Bureau Van Dijk provides the database (http://www.bvdinfo.com/en-gb/our-products/company-information/international-products/orbis). The database has been provided by RIETI.

information on 200 million public or private enterprises around the global, especially, 55 million of them within the Asia-Pacific region. Company information includes corporate financial accounts, financial strength indicators, Private equity portfolios, ownership structures and so forth. In this paper, it mainly selected datasets including summarized financial information about cross-border companies based in Japan and whose subsidiaries in ASEAN member states, mostly for the period 2000-2014. For example, there are detailed historical data of totally 290 sampling Japanese share-holding companies in Malaysian dataset, on their locations, corporate financial, industrial code, number of employees, company code and some others. Also, in avoid of a problem of biased selection, data about Japanese affiliates in both of manufacturing and service industries are collected and relative analysis will be conducted in this research.[2]

According to JETRO statistics (2015), there were 5,545 Japanese-affiliated firms surveyed in the Year 2015 and 2,313 valid responses were received, 1,313 of which were large companies and the left 1,000 were small and medium sized enterprises (SMEs). This survey shows that the number of profitable firms was increasing in past few years. In Thailand and the Philippines, profitable firms account for 70% in total. At the meanwhile, 61.4% firms in ASEAN states expected to expand their business in coming years, many of them belong to service sectors, such as companies in insurance, finance, software and communications. In this research, with a large scale of firm samples, it will test relevant data and is expected to get some results to see whether it's a real case.

Japan has a unique FTA timetable with each ASEAN-5 respectively, and Vietnam. In 2003, the Japan-Singapore economic partnership agreement (JSEPA) entered into force. Then, it was JMEPA (Japan-Malaysia economic partnership agreement) which was established in 2007; JTEPA (Japan-Thailand economic partnership agreement) followed in 2008, JIEPA (Japan-Indonesia economic partnership agreement), JPEPA (Japan-Philippines economic partnership agreement) and JVEPA (Japan-Vietnam economic partnership agreement) in 2009. FTA, as an incident factor, is regarded as an effective factor (a dummy variable) pertinent to firm-level performance, i.e., profitability in this research.

3. Poisson regression for the number of initial FDIs and FTA

First, an analysis is made as to the impact of FTA upon the number of initial FDIs. The analysis concerns "with or without" of an FTA. Table 1 lists the year of FTAs in the Asia Pacific regions coming into effect (observed at the end of 2014). As shown, the Asia Pacific region is involved in the flourish of bilateral/plurilateral FTAs. Tables 2 shows the

[2] As for investment in service sectors, Tanaka (2015) made an in-depth analysis of the retail sector's investment behavior. Service firms' investment motivation is addressed by, e.g., Ishido (2015).

investment matrix (unit: number of investments, stock data at the end of 2014, 50% threshold).

Based on Table 1 and Table 2, some regression analyses have been made in order to highlight the impact of FTAs on firms' foreign direct investment behavior. Table 3 shows the results. As shown, after controlling for the GDP (both for the original and destination countries) and distance[3], the FTA dummy is positive and it is statistically significant. The elapsed time since the coming-into-effect of FTAs ("FTA period" in Table 4) also have statistically positive impacts on the number of FDIs. It seems reasonable to say that a wider-scope FTA in the Asia Pacific, in the form of a Free Trade Area of the Asia-Pacific (FTAAP) would have an even larger positive economic impacts on business firms' investment behaviors.

[3] Both GDP and distance data have been taken from publicly available online data sources.

Table 1. Year of coming-into-force of FTAs in the Asia Pacific region (as of end 2014)

	Australia	Brunei	Canada	Chile	China	Hong Kong	Indonesia	Japan	Korea	Malaysia	Mexico	New Zealar	Papua New	Peru	Philippines	Russia	Singapore	Taiwan	Thailand	United State	Vietnam
Australia		2010		2009			2010			2010		1983	1977		2010		2004		2005	2005	2010
Brunei	2010			2006	2005		1992	2009	2010	1992		2006			1992		1992		1992		1996
Canada				1998							1994			2010						1989	
Chile	2009	2006	1998		2007			2008	2004	2012	2000	2006		2009			2006			2004	
China		2005		2007		2003	2005			2005		2009		2010	2005		2005		2005		2005
Hong Kong					2003							2011									
Indonesia	2010	1992			2005			2009	2010	1992		2010			1992		1992		1992		1996
Japan		2009		2008			2009			2007	2005			2012	2009		2003		2008		2009
Korea		2010		2004			2010			2010				2012	2010		2006		2010	2012	2010
Malaysia	2010	1992		2012	2005		1992	2007	2010			2010			1992		1992		1992		1996
Mexico			1994	2000				2005						2012						1994	
New Zealand	1983	2006		2006	2009	2011	2010			2010					2010		2001	2014	2006		2010
Papua New Guinea	1977																				
Peru			2010	2009	2010			2012	2012		2012						2010			2009	
Philippines	2010	1992			2005		1992	2009	2010	1992		2010					1992		1992		1996
Russia																					
Singapore	2004	1992		2006	2005		1992	2003	2006	1992		2001		2010	1992			2014	1992	2004	1996
Taiwan												2014					2014				
Thailand	2005	1992			2005		1992	2008	2010	1992		2006			1992		1992				1996
United States	2005		1989	2004					2012		1994			2009			2004				
Vietnam	2010	1996			2005		1996	2009	2010	1996		2010			1996		1996		1996		

Source: World Trade Organization.

Table 2. Investment matrix (unit: number of investments, stock data at the end of 2014, 50% threshold)

To From	Aust- Ralia	Brunei	Canada	Chile	China	Hong Kong	Indo- nesia	Japan	Korea	Malay- sia	Mexic o	New Zealand	Papua New Guinea	Peru	Phili- ppines	Russia	Singa- pore	Chinese Taipei	Thai- land	USA	Viet- nam	World Total
Aust- ralia	-	6	467	124	470	492	263	143	236	325	75	2,029	1,748	60	89	71	741	24	128	3,259	53	18,876
Brunei	25	-	0	0	11	7	0	0	0	1	0	0	9	0	0	4	0	0	0	1	1	91
Canada	1,286	1	-	159	272	164	29	65	22	57	537	73	61	151	54	175	111	9	23	10,025	12	23,014
Chile	36	0	10	-	16	13	1	6	2	2	50	1	0	204	2	2	2	1	5	65	2	1,426
China	4,055	3	139	27	-	2,574	40	136	39	69	37	51	922	17	16	1,082	285	19	98	862	48	24,288
Hong Kong	2,653	3	88	5	9,217	-	48	146	45	137	19	87	13	20	50	168	381	114	74	603	60	21,604
Indo- Nesia	395	0	8	2	20	34	-	6	1	37	3	3	46	1	0	0	219	0	10	78	9	1,252
Japan	2,074	3	699	85	4,669	1,028	726	-	630	841	403	226	4	40	383	372	1,078	675	1,735	10,652	570	38,879
Korea	300	1	77	9	569	98	69	71	-	35	83	8	197	5	20	224	67	19	49	977	139	4,705
Malay- sia	1,667	37	36	5	554	501	440	44	14	-	12	57	955	2	791	16	975	34	163	202	141	8,321
Mexico	11	0	49	27	12	0	1	1	0	13	-	2	1	29	4	6	3	1	1	891	0	2,343
New Zealand	3,717	0	39	19	83	38	8	13	9	27	25	-	156	6	6	91	26	9	9	413	7	5,941
Papua New Guinea	197	0	1	0	0	0	0	0	0	1	0	1	-	0	0	0	0	0	1	0	0	215
Peru	8	0	3	38	2	0	0	0	0	0	6	0	0	-	0	0	0	0	0	26	0	312
Phili- ppines	132	0	16	2	36	46	15	7	0	15	5	9	343	9	-	0	30	0	6	89	8	1,328
Russia	80	0	35	2	25	21	1	2	3	5	4	0	3	0	1	-	13	0	2	238	1	20,971
Singa- pore	3,357	24	44	9	2,072	618	664	207	93	1,380	42	178	109	8	101	195	-	86	333	808	187	14,057
Chinese Taipei	40	28	40	2	2,229	810	32	161	57	127	27	7	30	4	37	20	148	-	90	948	147	18,426
Thai- land	400	1	7	0	192	94	96	11	0	79	3	12	13	0	28	18	128	7	-	120	114	2,140
USA	8,268	15	11,826	709	5,246	2,464	307	1,896	786	870	4,047	827	83	328	381	2,481	1,888	454	591	-	157	143,735
Viet- nam	159	0	0	0	2	4	0	1	2	1	0	0	0	1	0	42	7	0	0	6	-	613
World Total	53,28 2	185	21,965	23,80 2	3,831, 976	23,47 5	5,146	6,215	83,42 4	6,835	33,815	5,222	6,710	6,92 8	2,204	1,262,0 63	12,597	9,502	5,505	307,60 4	2,513	11,576,5 00

Source: Orbis database.

Table 3. Result of the Poisson regression

Dependent variables: The number of FDI	Model 1	Model 2	Model 3	Model 4
Log of GDP of the original country	0.646***	0.691***	0.651***	0.646***
	(0.002)	(0.002)	(0.002)	(0.002)
Log of GDP of the destination country	0.550***	0.606***	0.563***	0.557***
	(0.002)	(0.002)	(0.002)	(0.002)
Log of distance	-0.553***	-0.476***	-0.184***	-0.173***
	(0.003)	(0.003)	(0.004)	(0.004)
FTA dummy		0.853***		-0.160***
		(0.005)		(0.009)
FTA period			0.0724***	0.0789***
			(0.000)	(0.000)
Constant	2.184***	0.329***	-1.602***	-1.582***
	(0.030)	(0.034)	(0.038)	(0.038)
PseudoR2	0.487	0.531	0.578	0.578
N	418	418	418	418

Standard errors in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.01

Source: Calculated by the author.

4.Multi-level analysis of FTA and size of firms

4.1. Overview of the multi-level modeling[4]

Multi-level model, also known as hierarchical linear model (HLM), is a systematic analysis tool to assess the impact of nesting variables ("the second level") on the individual observations ("the first level"). Many social studies have shown their statistical data featuring a multi-level structure. Data sets are collected at different levels, e.g., observations at the first level are "nested" (categorized separately) within those at another higher level, such that the whole dataset tends to be hierarchical or nesting structured. Regarding data with such a structure, hierarchies are observed conveniently: observations at student level could be treated as the data at the first level ("individual level" or "micro level"), and classes as the second level observations as well as school the third (school level or macro level), given that we have every reason to believe the academic performance by an individual student could be a combined result attributes to personal ability and the learning environment (eg. In the classroom illustration, the lecturer teaching that class, atmosphere of the class are considered as the macro level, or the second level.).

In this way, multilevel analysis provides a way to decompose and ascribe the total individual variations to two parts: variations within groups (differences between individuals) and variations between groups (variations induced by group differences), demonstrates both the cluster effect and individual effect and interactive relationships with each other.

The general form of a two-level multilevel model is as follow:

Level-1 (individual observations):

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + e_{ij}$$

Level-2 (nested by groups):

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Z_j + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}Z_j + u_{1j}$$

Take the students' case as an example again: Y_{ij}, the dependent variable and observation of the academic performance of student i at class j, is the examination score for the individual i. X_{ij} is the ij^{th} observation of explanatory variable in the individual level (or the first level) equation, could be learning ability, IQ, gender and the like. Z_j, at level two, could be variables with a clustered or nested effect, so it could be explained by teaching method and teacher's years of experience. e_{ij} is the individual error term. u_{0j} denotes the difference part in intercept which cannot be explained by level-2 explanatory

[4] This section draws on Luke (2004).

variable, while, u_{1j} denotes the measured error in slopes.

Traditional one-level statistical method only uses aggregate analysis at the individual level of a multilevel featured data, resulting in the problem that both the individual characteristics and cluster effects are ignored and lost. In such cases, analysts may commit the fallacy of the wrong level, which consists of analyzing the data at one level, and formulating conclusions at another level. This is also known as the ecological fallacy, which is interpreting aggregated data at the individual level. As will be shown, the multilevel analysis is a direct method to include indicators for clusters at all levels.[5]

4.2. Variables and interpretations

In the analysis of the firm-level investment performance, profitability is the focus in this research.[6] As a commonly measurement of profitability, profit margin is used as the final dependent variable in this research.[7] Generally, profit margin can be calculated by the following: Profit margin = Net profit / Revenue (Sales). This is a percentage point which indicates how much a dollar in sales accounts for profit earning for a company.

As for the explanatory variables at the first level, return on assets (ROA) is included in the equation, changes across time periods. Financially, ROA evaluates how effectively and efficiently a firm's assets are used. In order to test the profitability of a unit of assets, ROA itself is of great importance to observe. ROA can be transformed and taken as a term closely related[8] with profit margin. Also, lgRevenue, the logarithmic form of 2000-2014 revenue of each surveyed companies into this level to testify its effects on profit margin. Both ROA and revenue data can be obtained from datasets.

In reference of the impacts of the existence of FTA, a dummy variable "FTA_{ij}" is added in the model. By adding this variable, all observations of companies are categorized into two: before FTA (FTA_{ij}=0) and after FTA (FTA_{ij}=1).

The model constructs the proxy variable "$Service_{ij}$" by industrial code in level of industry. According to the NACE Rev.2 Core code table, manufacturers and service providers are distinguished clearly. The performance of service trading firms is another research focus, since the business benefits brought by trade of service attracted many

[5]Furthermore, some requirements such as homogeneity of variance and independence and formal distributions of errors constrained by traditional analysis can be unbounded if multilevel analysis is employed. Thus, it provides a proper solution to those unbalanced data in longitudinal studies.

[6] Productivity, defined as sales / number of employees, cannot be applied due to lack of data in the Orbis.

[7] In the absence of variables required for calculating productivity (such as the number of employees), the focus is placed on the profitability aspect in this research.

[8] However, ROA can change financially, depending on buyers' short-term investment strategies. In this modelling, decomposition of such financial factors from profitability is attempted.

attentions by Japanese investors.

As for the level-2 variable, $Totalassests_j$. All companies are clustered, e.g., into "small, medium and large" by their different level of total assets. Companies have total assets of less than $100,00 will be clustered as a group as small businesses, and those with total assets of larger than $100,000 are large companies, companies having total assets between $10000 and $100,000 are medium sized players. This way, the model could find to what extent the scale of a company accounts for the profitability. In what follows, three group models are first examined, and then more groupings are attempted.

4.3.Model specification and estimation results

First of all, the research starts with a random intercept analysis. In this model, the intercept is allowed to vary across companies with different total assets.

Random intercept model (for group i's company j):

Level 1:

$$Profitmargin_{ij} = \beta_{0j} + \beta_{1j}ROA_{ij} + \beta_{20}FTA_{ij} + \beta_{30}Service_{ij} + \beta_{40}lgRevenue_{ij} + \epsilon_{ij}.$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} + \delta_{oj} \ ; \ \beta_{1j} = \gamma_{10}; \ \beta_{2j} = \gamma_{20}; \ \beta_{3j} = \gamma_{30}; \ \beta_{4j} = \gamma_{40}$$

Mixed:

$$Profitmargin_{ij} = \gamma_{00} + \gamma_{01} + \gamma_{10}ROA_{ij} + \gamma_{20}FTA_{ij} + \gamma_{30}Service_{ij} + \gamma_{40}lgRevenue_{ij} + \delta_{oj} + \epsilon_{ij}$$

According to the outcomes, it is easy to find that variations between assets scale really account for the total variance and also make effects on the explained variable, profit margin.

It is conjectured that the slope at first level equation may change. So, the random slope-intercept model is further analyzed:

Level 1:

$$Profitmargin_{ij} = \beta_{0j} + \beta_{1j}ROA_{ij} + \beta_{2j}FTA_{ij} + \beta_{3j}Service_{ij} + \beta_{4j}lgRevenue_{ij} + \epsilon_{ij}.$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Totalassests_j + \delta_{oj}$$
$$\beta_{1j} = \gamma_{00} + \gamma_{01}Totalassests_j + \delta_{oj}$$
$$\beta_{2j} = \gamma_{00} + \gamma_{01}Totalassests_j + \delta_{oj}$$
$$\beta_{3j} = \gamma_{00} + \gamma_{01}Totalassests_j + \delta_{oj}$$
$$\beta_{4j} = \gamma_{00} + \gamma_{01}Totalassests_j + \delta_{oj}$$

In analyzing the performance of firms using the multi-level modelling, profitability is always the first concern and information on profitability is available in the dataset (Orbis). As a common measurement of profitability, profit margin can be used as the proxy variable in this paper. Generally, profit margin can be calculated as follows: Profit margin = Net profit / Revenue (Sales), a percentage which indicates how much a dollar in sales accounts for profit earning by the company.

For the explanatory variables at the first level, other firm-level variables with fixed effects are considered. For example, return on assets or ROA, defined as Net Profit / Total Assets, evaluates how effectively and efficiently a firm's assets being used. It naturally correlates with the Profitability, and the purpose of including this variable is to *decompose* profitability into various factors, including the existence of FTA and the attribute of being a service firm.

Regarding the impacts of utilization of FTA, a dummy variable "FTA" is adopted. By adding this variable, all observations of companies will be categorized by two: before FTA (FTA=0) and after FTA (FTA=1).

The model constructs the proxy variable "Service" by industrial code: By the NACE Rev.2 Core code (Statistical Classification of Economic Activities in the European Community) adopted in the database, manufacturers and service providers are classified clearly.

As for the random effect part, the level-2, the difference in the level of total assets is considered. All companies are grouped as "small", "medium" or "large" by their different level of total assets. Specifically, companies which have total assets less than $50,000 will be clustered as "small" (group 1) those which have the total assets of between US$50,000 to US$100,000 are considered "medium sized" (group 2), and those companies which have the total assets of equal to or more than US$100,000 is considered "large" (group 3). In this way, the model could find to what extent the scale of a company accounts for the profitability.

4.4.Estimation of the results

The descriptive statistics table are shown in Table 4 (with Japan-Malaysia Economic Partnership Agreement or JMEPA as an example).

Table 4. An example of descriptive statistics used in the multi-level modelling

Variable		*Mean*	*Std. Dev.*	*Min*	*Max*	*Observations*
year	**overall**	2010.5	2.872624	2006	2015	N = 4190
	between		0	2010.5	2010.5	n = 419
	within		2.872624	2006	2015	T = 10
Totalassets	**overall**	70392.28	165547	-5668.78	2033348	N = 3967
	between		150057.9	548.6571	1441376	n = 419
	within		62881.02	-671774	880997	T-bar = 9.46778
Profitmargin	**overall**	5.74465	12.44639	-99.479	100	N = 3908
	between		9.004611	-28.5679	75.48311	n = 419
	within		8.806077	-113.704	95.00153	T-bar = 9.32697
ROA	**overall**	7.201045	12.77961	-95.998	94.271	N = 3937
	between		8.520019	-15.2973	69.243	n = 419
	within		9.63165	-89.2025	86.07449	T-bar = 9.39618
FTA	**overall**	0.691408	0.461967	0	1	N = 4,190
	between		0.06319	0.2	0.8	n = 419
	within		0.457635	-0.10859	1.491408	T = 10
lgRevenue	**overall**	10.25742	1.783147	-0.05733	18.07544	N = 3,935
	between		1.613156	4.849791	15.16874	n = 419
	within		0.730402	3.126229	17.5249	T-bar = 9.39141
Service	**overall**	0.381862	0.485901	0	1	N = 4,190
	between		0.486424	0	1	n = 419
	within		0	0.381862	0.381862	T = 10
Grpid	**overall**	1.847255	0.633708	1	3	N = 4,190
	between		0.63439	1	3	n = 419
	within		0	1.847255	1.847255	T = 10

Notes: profitmargin is profit margin; lgRevenue is log of revenue; Service is the dummy for the service company (defined by NACE Rev.2); ROA is return on asset; FTA is the dummy for the existence of a free trade agreement; Grpid is group identification code.

"Overall" means treating all the observations without grouping. "Between" means across-group calculation results (with group-means being used for calculation). "Within" means inside-group calculation results.

N denotes the total number of observations; n, the total number of companies; T, time period. Missing values are eventually dropped.

Source: Calculation by Richard Liang based on the database Orbis.

The estimation results are shown in Tables 5-16.

1. JIEPA

   The results seem to be satisfactory, every variable tends to make significantly effects on the independent variable. As shown in (1), ROA has a significantly positive relationship with profit margin. A unit up by ROA may lead to approximately 0.825 units increase in profit margin. FTA dummy and Service variables also performed well, indicate that the utilization of FTA has strong effects on profitability of those companies in Indonesia. Regarding the variances part, var (δ_{oj}) is estimated as 74.1, which is considerable large enough to accept that the 2nd level make sense. Further, plus the LR= 18.56 with p-value of 0, we can accept the fitness of an intercept modeling by rejecting it as a unique intercept one.

2. JMEPA

   The results show that service industrials is more profitable, and the usage of FTA scheme will bring an increase in profit margin by 0.99 units. In line with the JIEPA results, the level-2 part has significant meaning and make sense, which we could not ignore. The differences between company total assets account for around 16% of the differences among profit margins.

3. JSEPA

   As usual, ROA positively affects profit margin at 95% confidence level. So does FTA, FTA is running within a range from 0.64 to 4.27 with a 95% confidence band. While, the coefficient of Service is insignificantly negative, running from -2.965 to 1.17, that's to say, the effect of Service on profit margin is not determined in this case, which is highly likely to be a mixed effect.

   The variance at level-2 is reasonable large, and explains about 30% of the total variance.

4. JTEPA

   After observing the outcomes, it is easily to get that FTA make great sense in this case. It reports about 1.3 at 95% confidence level. At the same equation, the outcome of service is 0.32 at 90% confidence level. Moreover, the second level variable provide explanatory power for the variance of total by about 16.3%.

5. JVEPA

   The variables FTA and Service are not significant convincing at 90% confidence level, yet it nonetheless is positive. The second level variable offers very strong explanatory power in the differences between company performance, which is

believed to be 83%.

6. JPEPA

The effect of FTA seems to be positive, but not very significant and strong. Service is still a profit earning industry. The variance of second level is not so large, telling us that the first level variables have provide great explanatory power for the model.

Table5. Results for JIEPA (with FTA as a dummy)

	(1)	(2)	(3)
VARIABLES	Profitmargin	Profitmargin	Profitmargin
ROA	0.826***	0.914***	0.893***
	(0.0785)	(0.0627)	(0.0564)
FTA	6.235**	4.094**	2.884*
	(2.592)	(2.057)	(1.687)
Service	9.348***	5.274**	2.142
	(3.128)	(2.502)	(2.042)
lgRevenue	-2.852**	-6.110***	-1.183
	(1.298)	(1.081)	(0.978)
Totalassets		9.17e-06***	9.94e-05***
		(9.92e-07)	(9.89e-06)
Totalassets_ROA			1.17e-07*
			(6.38e-08)
Totalassets_lgRevenue			-7.04e-06***
			(7.71e-07)
Constant	32.66**	67.71***	10.75
	(16.13)	(13.14)	(11.45)
Observations	139	139	139
Number of groups	3	3	3

Table 6. Results for JIEPA (with FTA period as an independent variable)

	(4)	(5)	(6)
VARIABLES	Profitmargin	Profitmargin	Profitmargin
ROA	0.844***	0.922***	0.897***
	(0.0767)	(0.0619)	(0.0562)
FTAPeriod	2.393***	1.494***	0.826*
	(0.640)	(0.521)	(0.436)
Service	8.645***	5.026**	2.172
	(3.049)	(2.465)	(2.035)
lgRevenue	-2.837**	-5.976***	-1.204
	(1.260)	(1.065)	(0.976)
Totalassets		8.84e-06***	9.72e-05***
		(9.90e-07)	(1.00e-05)
Totalassets_ROA			1.13e-07*
			(6.33e-08)
Totalassets_lgRevenue			-6.87e-06***
			(7.79e-07)
Constant	32.36**	66.35***	11.51
	(15.66)	(12.96)	(11.44)
Observations	139	139	139
Number of groups	3	3	3

Table 7. Results for JMEPA (with FTA as a dummy)

	(1)	(2)	(3)
VARIABLES	Profitmargin	Profitmargin	Profitmargin
ROA	0.577***	0.591***	0.562***
	(0.0129)	(0.0126)	(0.0136)
FTA	0.991***	0.387	0.314
	(0.373)	(0.366)	(0.363)
Service	2.117***	1.767***	1.702***
	(0.332)	(0.328)	(0.326)
lgRevenue	-2.137***	-3.350***	-2.984***
	(0.133)	(0.158)	(0.165)
Totalassets		0.000282	0.000333*
		(0.000196)	(0.000175)
Totalassets_ROA			8.92e-07***
			(1.55e-07)
Totalassets_lgRevenue			-6.89e-06***
			(8.63e-07)
Constant	22.85***	32.77***	28.92***
	(2.835)	(4.061)	(3.471)
Observations	3,749	3,749	3,749
Number of groups	3	3	3

Table 8. Results for JMEPA (with FTA period as an independent variable)

	(4)	(5)	(6)
VARIABLES	Profitmargin	Profitmargin	Profitmargin
ROA	0.578***	0.592***	0.563***
	(0.0129)	(0.0126)	(0.0136)
FTAPeriod	0.264***	0.0716	0.0570
	(0.0734)	(0.0730)	(0.0725)
Service	2.116***	1.773***	1.706***
	(0.332)	(0.328)	(0.326)
lgRevenue	-2.158***	-3.346***	-2.980***
	(0.133)	(0.158)	(0.165)
Totalassets		0.000281	0.000332*
		(0.000195)	(0.000174)
Totalassets_ROA			8.90e-07***
			(1.56e-07)
Totalassets_lgRevenue			-6.89e-06***
			(8.63e-07)
Constant	23.21***	32.87***	28.99***
	(2.833)	(4.051)	(3.462)
Observations	3,749	3,749	3,749
Number of groups	3	3	3

Table 9. Results for JPEPA (with FTA as a dummy)

VARIABLES	(1) Profitmargin	(2) Profitmargin	(3) Profitmargin
ROA	0.755***	0.757***	0.749***
	(0.0302)	(0.0299)	(0.0297)
FTA	0.320	0.183	-0.0143
	(0.726)	(0.721)	(0.704)
Service	4.325***	3.809***	3.267***
	(0.756)	(0.758)	(0.742)
lgRevenue	-1.323***	-1.617***	-1.790***
	(0.246)	(0.253)	(0.243)
Totalassets		1.97e-06***	9.57e-05***
		(4.36e-07)	(1.23e-05)
Totalassets_ROA			1.10e-07
			(1.45e-07)
Totalassets_lgRevenue			-6.30e-06***
			(8.08e-07)
Constant	13.87***	16.58***	17.18***
	(3.325)	(3.244)	(2.792)
Observations	1,211	1,211	1,211
Number of groups	3	3	3

Table 10. Results for JPEPA (with FTA period as an independent variable)

	(4)	(5)	(6)
VARIABLES	Profitmargin	Profitmargin	Profitmargin
ROA	0.755***	0.757***	0.749***
	(0.0302)	(0.0299)	(0.0297)
FTAPeriod	0.0289	-0.0939	-0.114
	(0.259)	(0.259)	(0.252)
Service	4.342***	3.833***	3.281***
	(0.755)	(0.758)	(0.741)
lgRevenue	-1.334***	-1.640***	-1.807***
	(0.246)	(0.254)	(0.244)
Totalassets		1.99e-06***	9.58e-05***
		(4.38e-07)	(1.23e-05)
Totalassets_ROA			1.09e-07
			(1.45e-07)
Totalassets_lgRevenue			-6.30e-06***
			(8.08e-07)
Constant	14.13***	17.02***	17.46***
	(3.295)	(3.223)	(2.764)
Observations	1,211	1,211	1,211
Number of groups	3	3	3

Table 11. Results for JSEPA (with FTA as a dummy)

VARIABLES	(1) Profitmargin	(2) Profitmargin	(3) Profitmargin
ROA	0.732***	0.772***	0.661***
	(0.0462)	(0.0446)	(0.0500)
FTA	2.816***	2.146**	2.244**
	(1.031)	(0.993)	(0.998)
Service	0.499	0.482	0.0735
	(1.117)	(1.074)	(1.074)
lgRevenue	-3.138***	-3.574***	-3.453***
	(0.407)	(0.409)	(0.474)
Totalassets		6.60e-06	2.42e-05**
		(1.50e-05)	(1.03e-05)
Totalassets_ROA			1.97e-06***
			(4.22e-07)
Totalassets_lgRevenue			-6.10e-07
			(7.64e-07)
Constant	42.27***	48.80***	35.90***
	(6.512)	(14.05)	(4.997)
Observations	652	652	652
Number of groups	3	3	3

Table 12. Results for JSEPA (with FTA period as an independent variable)

VARIABLES	(4) Profitmargin	(5) Profitmargin	(6) Profitmargin
ROA	0.737***	0.776***	0.665***
	(0.0460)	(0.0444)	(0.0497)
FTAPeriod	0.659***	0.482**	0.513**
	(0.208)	(0.202)	(0.204)
Service	0.460	0.457	0.0541
	(1.116)	(1.073)	(1.073)
lgRevenue	-3.264***	-3.659***	-3.589***
	(0.413)	(0.414)	(0.483)
Totalassets		6.23e-06	2.21e-05**
		(1.49e-05)	(1.05e-05)
Totalassets_ROA			1.98e-06***
			(4.21e-07)
Totalassets_lgRevenue			-4.70e-07
			(7.69e-07)
Constant	43.45***	50.29***	37.96***
	(6.234)	(13.84)	(5.088)
Observations	652	652	652
Number of groups	3	3	3

Table 13. Results for JTEPA (with FTA as a dummy)

	(1)	(2)	(3)
VARIABLES	Profitmargin	Profitmargin	Profitmargin
Fixed Effects			
ROA	0.669***	0.677***	0.672***
	(0.00683)	(0.00663)	(0.00686)
FTA	1.296***	0.552***	0.519***
	(0.186)	(0.183)	(0.182)
Service	0.327*	0.432**	0.415**
	(0.180)	(0.176)	(0.176)
lgRevenue	-2.152***	-3.908***	-3.700***
	(0.0836)	(0.103)	(0.106)
Totalassets		0.000355	0.000364
		(0.000248)	(0.000235)
Totalassets_ROA			1.52e-07***
			(3.85e-08)
Totalassets_lgRevenue			-2.21e-06***
			(2.79e-07)
Constant	22.52***	38.07***	35.79***
	(2.505)	(4.836)	(4.416)
Random Effects			
Observations	12,081	12,081	12,081
Number of groups	3	3	3

Table 14. Results for JTEPA (with FTA period as an independent variable)

	(4)	(5)	(6)
VARIABLES	Profitmargin	Profitmargin	Profitmargin
ROA	0.668***	0.676***	0.671***
	(0.00682)	(0.00662)	(0.00684)
FTAPeriod	0.325***	0.0975**	0.0929**
	(0.0403)	(0.0401)	(0.0400)
Service	0.323*	0.433**	0.415**
	(0.180)	(0.177)	(0.176)
lgRevenue	-2.185***	-3.901***	-3.693***
	(0.0839)	(0.103)	(0.106)
Totalassets		0.000354	0.000363
		(0.000248)	(0.000234)
Totalassets_ROA			1.53e-07***
			(3.85e-08)
Totalassets_lgRevenue			-2.22e-06***
			(2.79e-07)
Constant	23.12***	38.19***	35.90***
	(2.534)	(4.826)	(4.405)
Observations	12,081	12,081	12,081
Number of groups	3	3	3

Table 15. Results for JVEPA (with FTA as a dummy)

VARIABLES	(1) Profitmargin	(2) Profitmargin	(3) Profitmargin
ROA	0.730***	0.766***	0.564***
	(0.0967)	(0.0848)	(0.0921)
FTA	2.000	-0.974	-0.664
	(2.582)	(2.222)	(1.855)
Service	6.890***	3.475	2.266
	(2.632)	(2.299)	(1.919)
lgRevenue	-7.688***	-7.281***	-3.175**
	(1.514)	(1.231)	(1.267)
Totalassets		0.000119***	0.000923***
		(9.99e-06)	(0.000121)
Totalassets_ROA			4.30e-06***
			(1.05e-06)
Totalassets_lgRevenue			-7.81e-05***
			(1.11e-05)
Constant	80.75***	70.91***	33.77**
	(18.99)	(12.96)	(14.18)
Observations	135	135	135
Number of groups	3	3	3

Table 16. Results for JVEPA (with FTA Period as an independent variable)

	(4)	(5)	(6)
VARIABLES	Profitmargin	Profitmargin	Profitmargin
ROA	0.748***	0.767***	0.574***
	(0.0956)	(0.0847)	(0.0905)
FTAPeriod	1.266**	0.339	0.912**
	(0.623)	(0.540)	(0.449)
Service	6.058**	3.087	1.476
	(2.629)	(2.319)	(1.908)
lgRevenue	-8.513***	-7.696***	-4.086***
	(1.518)	(1.239)	(1.239)
Totalassets		0.000120***	0.000941***
		(9.98e-06)	(0.000120)
Totalassets_ROA			4.30e-06***
			(1.03e-06)
Totalassets_lgRevenue			-8.03e-05***
			(1.10e-05)
Constant	89.04***	74.15***	42.31***
	(19.34)	(13.17)	(14.41)
Observations	135	135	135
Number of groups	3	3	3

As a next step, a different way of handling the second-level design was applied, i.e., grouping observations in terms of the annual average value of total assets within any individuals. Through calculating the annual average assets levels within ten years, we could get an outlook on the general condition of a company's total assets. Different levels of average assets, groups as macro level treatments are generated and all individuals are classified and grouped. Regarding a severe lack of statistics on the number of employees, this part also takes value of total assets as the measurement of a company's size. Another point of using average values to measure level-2 is that it helps the study avoid dealing with small numbers close to zero. Meanwhile, a disadvantage of this method is that the numbers of groups vary from country to country (the larger samples a dataset has, the

more groups generated.), leading to a huge difference of the total number of groups between datasets of some countries.

In making this analysis, the level-2 related variable is produced as *lg_assets*, which is the logarithm version of companies' annul average total assets. To some extent, it can be taken as the company scale variable. Cross-level Interactive effects are embodied by variables *Totalassets_FTA*, *Totalassets_ROA*, *Totalassets_lgRevenue*, *Totalassets_Service*, and *ROA_lgassets*.

From a general perspective, the outcomes demonstrate there is a significant relationship between Profit margin and Total assets, ROA (return of assets) etc. ROA has positive effect and logarithm of revenue is natively related with the profit margin. The coefficients of dummy FTA (*FTA*) are positive in all cases and significant in most cases, which implies the utilization of FTA scheme between Japan and several ASEAN countries could make good impacts to Japanese MNEs' overseas business through the way of liberalization etc., and it's believed the significant level of variable *FTA* could be even increased if there is a data with larger samples for some cases. As expected, the variable *Service* has a positive sign with significance in most equations, which suggests that firms in services sector seems to perform well in our cases, businesses within services sector is a hot spot and which expanded rapidly in ASEAN states recent years. As for outcomes of the varying slope and intercept model, as expected, most of interactive term of ROA (*ROA*) and total assets (*Totalassets*) have a positive and significant coefficient, moreover, most coefficients of interactions between *lgRevenue* and *Totalassets* are small numbers with a minus sign, suggests that there are only minimal effects of this interaction on the dependent variable, and many of interactive terms show us mixed effects on the dependent variable, there should be more adjustments. In addition, the variable total assets (*Totalassets*) has predicted positive and significant coefficient in most cases, indicating that company scale make sense to the margin profit.

For the random effect part, the intra class correlation (icc) is calculated. As reported, in case like JTEPA, the variation of total assets between companies may account for around 45% of the total variations of profit margin. For JMEPA, the cross-level correlation is about 32%, followed by JSEPA (30%), JIEPA (24%), JVEPA (17%) and JPEPA(7%).

The revised model has the following structure.

Random-intercept model (for group i's company j):

Level 1:

$$Profitmargin_{ij} = \beta_{0j} + \beta_{1j}ROA_{ij} + \beta_{2j}FTA_{ij} + \beta_{3j}Service_{ij} + \epsilon_{ij}.$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} lg\_assets_j + \delta_{oj}$$
$$\beta_{1j} = \gamma_{00} + \delta_{oj}$$
$$\beta_{2j} = \gamma_{00} + \delta_{oj}$$
$$\beta_{3j} = \gamma_{00} + \delta_{oj}$$

Full-model:

Level 1:

$$Profitmargin_{ij} = \beta_{0j} + \beta_{1j} ROA_{ij} + \beta_{2j} FTA_{ij} + \beta_{3j} Service_{ij} + \beta_{4j} lg\_assets_{ij} + \epsilon_{ij}.$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} lg\_assets_j + \delta_{oj}$$
$$\beta_{1j} = \gamma_{00} + \gamma_{01} lg\_assets + \delta_{oj}$$
$$\beta_{2j} = \gamma_{00} + \delta_{oj}$$
$$\beta_{3j} = \gamma_{00} + \delta_{oj}$$
$$\beta_{4j} = \gamma_{00} + \delta_{oj}$$

To make the level-two effects more clearly and to avoid the issue of multicollinearity, some updates have been applied. First, drop the Revenue term ($lgRevenue$), because revenue and profit are much related. Second, take the form of logarithm to total assets of each individual company based on their annual average assets by generating the variable lg_assets, and replace it to former variable *Totalassets*.

The descriptive statistics are shown in Table 17 (with JTEPA as an example). The main results of the multilevel analysis (decomposing the profitability of Japanese overseas companies based in ASEAN-6 members during the past decade are presented in the Tables 18-23.

Table 17. descriptive statistics are shown in Table 17 (with JTEPA as an example)

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
year	12,450	2,011	2.872	2,006	2,015
NACERev2. Core code (4digits)	12,440	3,381	1,631	112	9,523
Totalassets	12,229	77,296	327,294	0	9.943e+06
Profitmargin	12,150	6.827	12.60	-98.06	99.22
ROE	12,014	15.46	48.15	-815.6	952.0
ROA	12,197	8.719	12.65	-98.76	98.74
Revenue	12,212	111,853	505,254	0	1.997e+07
FTA	12,440	0.681	0.466	0	1
FTAPeriod	12,440	1.992	2.123	0	6
Service	12,450	0.338	0.473	0	1
Manufact	12,450	0.647	0.478	0	1
lgRevenue	12,208	9.986	1.765	-3.665	16.81
meanassets	12,450	76,574	299,147	74.35	5.254e+06
grpid	12,450	1.775	0.669	1	3
Totalassets_FTA	12,219	60,725	311,496	0	9.943e+06
Totalassets_ROA	12,165	751,069	4.201e+06	-1.426e+07	2.215e+08
Totalassets_lgRevenue	12,208	988,669	4.636e+06	-7,368	1.302e+08
Totalassets_Service	12,229	37,022	304,105	0	9.943e+06
Totalassets_FTAPeriod	12,219	200,825	1.300e+06	0	5.188e+07
lg_assets	12,450	9.812	1.586	4.309	15.47
groupid (based on annual average total assets)	12,450	623	359.4	1	1,245
ROA_lgassets	12,197	87.32	123.9	-1,037	1,089

Table 18. Result of the multilevel regression for JIEPA (grouping observations in terms of the annual average value of total assets)

Dependent variable: Profit margin	(1)	(2)	(3)
VARIABLES	Model 1	Model 2	Model 3
ROA	0.744***	0.736***	2.986***
	(0.0694)	(0.0672)	(0.772)
FTA	2.954*	3.012*	2.778*
	(1.613)	(1.602)	(1.520)
Service	6.485	-20.53**	-19.26**
	(13.45)	(9.129)	(7.908)
lgassets		14.12***	14.18***
		(3.009)	(2.606)
ROA_lgassets			-0.216***
			(0.0740)
Constant	-1.677	-152.4***	-151.5***
	(9.518)	(32.38)	(28.01)
var (_cons)	351.09	82.88	59.48
var (lgassets)		7.21E-15	5.22E-16
var (Residual)	27.11	26.82	24.08
Observations	57	57	57
Number of groups	8	8	8
LR test	53.83	50.16	29.98
P-val	0.00	0.00	3.09e-07

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 19. Result of the multilevel regression for JMEPA (grouping observations in terms of the annual average value of total assets)

Dependent variable: Profit margin	(1)	(2)	(3)
VARIABLES	Model 1	Model 2	Model 3
ROA	0.538***	0.537***	0.345***
	(0.0129)	(0.0129)	(0.0833)
FTA	0.555*	0.554*	0.572*
	(0.295)	(0.295)	(0.294)
Service	2.439***	2.545***	2.527***
	(0.732)	(0.730)	(0.732)
lgassets		0.501**	0.346
		(0.246)	(0.256)
ROA_lgassets			0.0202**
			(0.00867)
Constant	0.466	-4.601*	-3.129
	(0.513)	(2.543)	(2.627)
var (_cons)	46.54	46.03	46.32
var (lgassets)		2.60E-11	1.94E-11
var (Residual)	56.36	56.36	56.23
Observations	3,749	3,749	3,749
Number of groups	419	419	419
LR test	1297	1283	1289
P-val	0.00	0.00	0.00

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 20. Result of the multilevel regression for JPEPA (grouping observations in terms of the annual average value of total assets)

Dependent variable: Profit margin	(1)	(2)	(3)
VARIABLES	Model 1	Model 2	Model 3
ROA	0.740***	0.741***	0.758***
	(0.0167)	(0.0166)	(0.0863)
FTA	0.740*	0.780*	0.775*
	(0.437)	(0.438)	(0.439)
Service	2.230*	3.201**	3.193**
	(1.266)	(1.367)	(1.368)
lgassets		0.701*	0.710*
		(0.388)	(0.390)
ROA_lgassets			-0.00190
			(0.00940)
Constant	-0.565	-7.583*	-7.655*
	(0.894)	(3.978)	(3.996)
var (_cons)	96.87	95.37	95.47
var (lgassets)		3.51E-10	6.52E-07
var (Residual)	39.57	39.59	39.58
Observations	1,533	1,533	1,533
Number of groups	272	272	272
LR test	858.1	840.7	827.4
P-val	0.00	0.00	0.00

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 21. Result of the multilevel regression for JSEPA (grouping observations in terms of the annual average value of total assets)

Dependent variable: Profit margin	(1)	(2)	(3)
VARIABLES	Model 1	Model 2	Model 3
ROA	0.713***	0.728***	-1.034***
	(0.0403)	(0.0395)	(0.321)
FTA	0.961	0.686	0.771
	(0.734)	(0.732)	(0.714)
Service	1.485	0.765	0.691
	(2.520)	(2.099)	(2.063)
lgassets		3.542***	3.131***
		(0.766)	(0.756)
ROA_lgassets			0.171***
			(0.0309)
Constant	1.424	-34.44***	-29.86***
	(2.320)	(7.995)	(7.902)
var (_cons)	88.23	3.04E-08	1.53E-17
var (lgassets)		0.562	0.545
var (Residual)	54.81	54.49	51.88
Observations	635	635	635
Number of groups	97	97	97
LR test	325.4	296.4	292.9
P-val	0	0	0

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 22. Result of the multilevel regression for JTEPA (grouping observations in terms of the annual average value of total assets)

Dependent variable: Profit margin	(1)	(2)	(3)
VARIABLES	Model 1	Model 2	Model 3
ROA	0.594***	0.593***	0.489***
	(0.00639)	(0.00640)	(0.0352)
FTA	0.339**	0.338**	0.346**
	(0.144)	(0.144)	(0.144)
Service	0.731*	0.869**	0.898**
	(0.416)	(0.417)	(0.417)
lgassets		0.380***	0.278**
		(0.124)	(0.129)
ROA_lgassets			0.0111***
			(0.00369)
Constant	1.119***	-2.652**	-1.720
	(0.269)	(1.262)	(1.299)
var (_cons)	42.81	42.45	42.5
var (lgassets)		2.24E-08	2.96E-08
var (Residual)	51.02	51.02	50.97
Observations	12,081	12,081	12,081
Number of groups	1,244	1,244	1,244
LR test	4136	4103	4111
P-val	0.00	0.00	0.00

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 23. Result of the multilevel regression for JVEPA (grouping observations in terms of the annual average value of total assets)

Dependent variable: Profit margin	(1)	(2)	(3)
VARIABLES	Model 1	Model 2	Model 3
ROA	0.897***	0.898***	1.953***
	(0.0440)	(0.0441)	(0.486)
FTA	0.356	0.290	0.870
	(2.224)	(2.229)	(2.239)
Service	0.876	1.001	1.136
	(1.734)	(1.758)	(1.733)
lgassets		-0.276	0.419
		(0.650)	(0.715)
ROA_lgassets			-0.103**
			(0.0472)
Constant	-3.026	-0.227	-7.812
	(2.290)	(6.971)	(7.714)
var (_cons)	42.25	42.15	40.53
var (lgassets)		2.28E-10	2.19E-11
var (Residual)	61.72	61.73	61.48
Observations	474	474	474
Number of groups	110	110	110
LR test	72.49	72.35	69.83
P-val	0.00	0.00	0.00

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The fitness of model has improved overall and some new results have come out. The Tables show that the significant level of dummy *FTA* was increased in most of the six cases. JIEPA, JMEPA, JTEPA and JPEPA seems to be very effective. JSEPA and JVEPA also show positive sign for *FTA*, although not so significantly. Under this revised analysis, the variable *Service* has a positive sigh overall and significant in most cases, only in the case of JIEPA, does it display an opposite negative effect. The result seems to indicate that the slowly liberalization of services sector in Indonesia may have negative effects on related performance of firms within such industries. The indicator of size, lg_assets always has a positive effect on the profit margin, in line with the expectation.

The result implies that the larger the business is, the more possibility for the firm to increase the profitability. And the interactive term *ROA_lgassets* shows the similar results.

As for the service sector, the degree of restriction can be measured by the "Hoekman Index" under an FTA (Ishido, 2015). The variable was included for a similar multi-level analysis (not reported in this paper), yet it was not statistically significant (while the existence of FTA dummy is significant for some FTAs, as shown in the above results).

5. Conclusions and policy implications

This paper addresses business firms' investment behaviors from an institutional perspective, and the roles of firm-level heterogeneity, more specifically size and service / non-service distinction, are examined. The Poisson regression analysis shows that the intensity to undertake initial FDI becomes stronger under the existence of an FTA (after controlling for the "gravity factors" of GDP and distance). A multi-level analysis reveals that (1) larger-scale initial FDIs are undertaken in FTA-partner countries; (2) the profit margin of firms established after coming-into-effect of an FTA tends to be higher; and (3) the profit margin of those firms grouped under the service (non-manufacturing) sector tends to be higher.

As for the FDI by service sector firms, the degree of restriction (measured by the "Hoekman Index" under an FTA) is not statistically significant, while the existence of FTA is significant. Thus, a "sunk cost" associated with undertaking FDI, which is deemed to be rather neutral to the degree of investment regulation, could be a critical factor in the conduct of FDI.[9] Put differently, the announcement effect seems to be rather dominant in the FDI decision making.

As a policy implication, reduction of such a sunk cost (e.g., through information sharing of best-practices among potential investors) could be an indispensable policy focus for making FTA effective in terms of its content.

A useful direction for future research would be to further examine the scale effect by sub-sectors (in both service and non-service industries).

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[9] Also, a dummy for linear trend was introduced; yet without a statistically significant result.

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