

# FDI and spillovers on productivity and wage in the business trade and services sector: A case of Thailand

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## ABSTRACT

*Using cross-sectional data from the 2006 Business Trade and Services Survey of Thailand, this paper investigates productivity and wage spillovers from Foreign Direct Investment (FDI) in Thai business trade and services sectors. We examine whether FDI has an impact on the output per worker and the average wages of domestic firms in these sectors and divide our analysis into various aspects. Spillover effects are examined horizontally at the 2-digit industry level by spillover variables, foreign employment share and foreign output share. The results indicate that foreign firms are generally more productive and pay higher average wages than domestically owned firms. For productivity spillovers, we find no clear evidence of FDI spillovers in the whole sample, but find mixed results when analyzing the data conditionally by firm size and form of organization of domestic firms. For wage spillovers, we observe negative horizontal spillovers from FDI in the whole sample, especially in large firms, and find negative spillovers in selected industries. On average, the estimated results yield mixed results for productivity spillovers depending on subsample. On the contrary, the results suggest negative wage spillovers from FDI in the same industry. In general, since FDI can positively or negatively affect the productivity and average wages of domestic firms, our evidence suggests that the overall effect of foreign ownership in Thai business and service industries is not prevalent and we may conclude that there are both advantages and disadvantages regarding FDI spillovers from foreign firms to domestic firms in our analysis. The difficulty in estimating FDI spillover effects in the service-producing industries arise largely because of the lack of complete information and panel data covering these industries in Thailand. This study provides insights for Thai policy makers concerning promotion of the beneficial spillover effects of FDI in these industries.*

**JEL Classification:** F21, F23, L8

**Keywords:** FDI Spillovers, Business Trade and Services, Productivity, Wage, Thailand

## INTRODUCTION

Foreign Direct Investment (FDI) in business trade and services accounts for the bulk of global FDI stocks and flows, and their increase as a share of international investments, a recent trend, is one of their most outstanding features in recent years (UNCTAD, 2004). FDI has given rise to a number of theoretical and empirical studies that have investigated its determinants and its impact on host economies, particularly in developing countries. However, much of FDI literature has focused on FDI in the manufacturing sector and very few studies exist for the

services sector. This creates a critical gap in the literature of FDI, as the role of FDI is increasingly shifting towards services (UNCTAD, 2008). Most economic research has focused on the performance and the impact of Multinational Corporations (MNCs) in the agricultural and industrial sectors of developing and developed countries. In contrast, studies on the services sector have been somewhat limited and have not been explored with the same rigor. The recent rapid growth in the business trade and services sector has prompted a change in research focus. As a result, there is now a growing research interest in the services sector and its increasingly dominant contribution to gross domestic product in many developed economies. The services sector is also becoming an increasingly important contributor to the gross domestic product of emerging economies in Asia such as Malaysia, Singapore, Thailand and Indonesia (Clemes et al., 2003).

Moreover, the increase in the growth of the services sector has also triggered a growth in demand for a variety of manufactured goods such as computers, cell phones, digital scanners and optical linkages, and so forth. The services sector is also a large contributor to income and employment in several countries. According to the International Standard Industrial Classification (ISIC) system, the services sector includes wholesale and retail trade, restaurants and hotels, transport, storage, communications, financial services, insurance, real estate, business services, community services, social services, and government services.

In Thailand, the business trade and services sector is a substantial and a growing component of the Thai economy, accounting for nearly half of the aggregate production and approximately 40 percent of national employment. Although government policies in other emerging economies tend to focus on the growth of manufacturing industries, the service-producing industries in Thailand have been the dominant source of new job creation in recent years (the National Economic and Social Development Board of Thailand - NESDB and World Bank, 2006). Regarding the impact from FDI and MNCs on domestic firms, generally, FDI spillovers are said to take place when the entry and the presence of MNC affiliates lead to efficiency benefits in the host country's local firms (Blomstrom & Kokko, 2002). Spillovers may occur in the foreign affiliates' own industry or in other industries, or among the affiliates' suppliers or customers. In addition, they are assumed to occur through three channels, namely demonstration effects, competition effects, and worker mobility. With regard to this aspect of FDI spillovers, Thailand serves as a particularly interesting case study, given that it first experienced an increasing flow of inward FDI over time. This helps to define Thailand as a driving place to do business, as MNCs tend to concentrate their activities in more dynamic and competitive industries. Second, Thai government authorities have been more active in attracting foreign MNCs in recent years to both the manufacturing and services sectors. Third, to date, there have been few empirical investigations of the potential spillover effects of MNCs on the Thai business trade and services industry. Therefore, it is promising to study these effects and assess the key determinants of FDIs for Thai firms in the business trade and services sectors, so as to provide insights for Thai policy makers regarding the promotion of these benefits, as well as drawing general conclusions for other developing countries.

Since there are very few empirical studies concerning the spillover effect of FDI in the business trade and services sectors, especially for developing countries such as Thailand, this paper attempts to analyze empirically the intra-industry spillover effects (horizontal spillovers) from FDI using firm-level data from the 2006 Business Trade and Services Survey of Thailand. To our knowledge, this study is one of the first studies to explore the Thai case. As stated by Blomstrom and Kokko (2002), the composition of inward FDI has changed in recent years. For example, most FDIs from OECD countries to developing countries shift gradually into services rather than manufacturing. As a result, one could expect FDI to have significant spillover effects

in the services sector. Although Svejnar et al. (2007) recently analyzed spillovers for 17 emerging countries, this area of study remains under-researched from the viewpoint of micro-level analysis. For this reason, this paper seeks to contribute to this emerging body of knowledge by testing the presence and the extent of productivity and wage spillovers from FDI in the business trade and services industries of Thailand. In short, this paper contributes to the existing literature in two ways. Firstly, in our econometric analysis, the impact of foreign presence (by FDI or MNCs) on labor productivity (output per worker) and average wages per worker are examined at the 2-digit ISIC industry level and observed by both foreign output share and foreign employment share. Secondly, we carefully examine the existence and strength of both productivity and wage spillovers under different conditions and firm characteristics, and consider the effects of foreign presence separately in each industry to analyze the spillover effects in detail.

The remainder of this paper is structured as follows: Section 2 reviews the related literature on FDI spillovers, especially in the business trade and service sectors, Section 3 describes the data, and presents the empirical models used and econometric techniques applied. Next, section 4 discusses and explains the empirical results. Lastly, section 5 concludes with suggestions for further research.

### **PAST STUDIES OF FDI IN THE SERVICES SECTOR AND RELATED LITERATURE**

The number of empirical studies assessing the incidence of intra-industry spillovers to domestic firms is growing rapidly; such studies focus mostly on the manufacturing industry. So far, the results have been mixed for both developed and developing countries and evidence on FDI spillovers has not been conclusive. Additionally, econometric evidence on FDI in the services sector is extremely limited for many countries. With the notable exception of FDI and MNCs in financial services, there are limited econometric studies of FDI in the service sector in other aspects, especially for the case of developing countries. A large body of literature has thoroughly investigated the presence of horizontal or vertical spillovers between multinational and domestic firms in manufacturing sectors. Nonetheless, the effect of the entry of MNCs in service sectors has not been investigated with the same emphasis.

In theory, intra-industry spillover benefits from FDI are assumed to occur through three channels. First, there are “demonstration effects”, when foreign firms after entering the market, demonstrate their advanced technologies, and domestic firms may adapt to imitate them afterwards. Second, there are “competition effects” –increase in competition occurs as a result of foreign entry. It forces domestic firms to introduce new technology and increase productivity to remain competitive in the industry. Third, there are “worker mobility effects”, when domestic workers trained by or having worked in MNC affiliates may decide to leave and join an existing domestic firm, or open up a new domestic firm, taking with them some or all of their MNC-specific knowledge (Blomstrom and Kokko, 2002). However, international service transactions are complex to analyze and many developing countries, including Thailand, lack sufficient information on foreign transactions in business trade and services to make analysis possible. In addition, because services are not directly observed to be crossing borders, at best only factors of production may be observed as proxies (Reinsdorf and Slaughter, 2009).

One of the recent studies concerning the impact of FDI on the business trade and services industry can be found in Hamida (2011). This paper discusses the key factors determining FDI intra-industry spillovers and examines the presence and extent of FDI spillovers in Switzerland by testing the spillover effect for the services and construction industry. The main results show that domestic firms with high technological capacities appear to gain

spillover benefits from FDI heightening competition, while mid- and low-technology firms benefit more from demonstration effects. Furthermore, spillovers for high- and mid-technology firms appear to be largely co-determined by the level of their human capital. Only domestic firms, which invested greatly in absorptive capacity gain from spillovers. The basic characteristics of business trade and services that differentiate them from manufactured goods are non-transferability and non-storability. Moreover, other related characteristics of services that deserve to be mentioned are that, they are heterogeneous and flexible in production, and that imperfect competition is highly relevant to them. FDI in services may therefore occur owing to different reasons than FDI in goods, and require separate interpretation (Banga, 2005).

For the Thai case, there has been extremely limited research in the field of FDI spillovers, especially for the case of business trade and services sector. Our study here is one of the first studies, which tries to utilize firm-level data in the business trade and services sector. Generally, there have been many reports regarding the FDI situation in both manufacturing and services sectors in Thailand, however, in terms of empirical analysis; there have been very few studies. As a result, this study provides insights for future studies concerning how to utilize available data and how to promote the beneficial spillover effects of FDI in these industries.

## THE DATA AND EMPIRICAL INVESTIGATION

### Data

The data employed in our econometric analysis come from the National Statistical Office of Thailand (NSO). Cross section data is used sourced from the 2006 Business Trade and Services Survey. The NSO has conducted the Business Trade and Services Survey every 2 years. This is the 22<sup>nd</sup> Business Trade and Services Survey. The main purpose of the survey is to collect the basic business information to be used in implementing business policies and planning development. The survey covers business establishments with at least one person engaged in; wholesale trade, retail trade, hotels and restaurants, recreational and other services activities, located in fixed premises in Bangkok, in either municipal areas or non-municipal areas, forming as sub-district administration organization, throughout the country. The data was collected in 2005, from various establishments located throughout the whole kingdom. In the study of FDI spillovers, panel data analysis is usually more preferred to prevent criticism regarding the possibility of a simultaneity problem. However, we are not able to obtain the survey data in an electronic version for years before 2006 and for survey data after 2006; namely, 2008 and 2010, as the data is not accessible and we could not obtain the details from the survey in electronic version. Because of this data acquisition and data completeness problem, it is impossible for us to create a panel data analysis for the business trade and services sector for the Thai case at the time of the research. Due to data limitation, this is generally one of the most important reasons why there are very few studies concerning FDI in the business trade and services sector in Thailand and other developing countries.

The overview of the data can be summarized as follows. The results of the 2006 Business Trade and Services Survey show that there were in total 1.6 million business establishments in the whole kingdom. Most of them (about 98.2%) were small-scale establishments with 1-15 persons. The major businesses were *retail trade, (except of motor vehicles and motorcycles), and repair of personal and household goods*, (about 48.0%). Persons working in business establishments amounted to 5.9 million. Out of this, about 3.3 million persons were employees each receiving an annual remuneration of about 118,433 Baht. Moreover, the establishments contributed value through receipts, expenditures and value added, of about 8.2 million Baht, 6.5 million baht and 1.8 million Baht respectively. The survey

also incorporated questions concerning problems and obstacles of business establishments, which were about 29.4 percent. Of these, 41.2 percent suffered from a higher production cost, 29.5 percent from economic crisis and 23.0 percent from lower purchasing power. About 29.4 percent of business establishments expressed their opinion on aid needed from the government. Of these, about 46.9 percent needed for oil and goods prices control, 33.9 percent required lower loan rate and 17.9 percent for government regulation improvement. Specifically, Table 1 shows the statistical summary of the key variables of the data used after the cleaning-up phase in our analysis.

**Table 1:** Statistical Summary of the Key Variables

Variable	Unit	Observations	Mean	Std. Dev.	Min	Max
LnYL	(ln) baht	1180	10.123	5.193	0.009	23.652
LnKI	(ln) baht	1011	10.396	3.913	-4.672	23.453
LnMI	(ln) baht	995	8.824	5.604	-8.732	18.210
LnL	(ln) workers	1180	4.647	2.725	0.693	9.770
LnLQ	(ln) workers	1180	0.086	0.238	0.000	3.054
LnAge	(ln) years	1180	2.113	1.329	0.000	4.595
LnHERF	(ln) proportion	1180	-2.226	0.558	-2.862	-0.840
LnAvrRemu	(ln) baht	1180	12.409	1.150	10.732	13.849
FOR	zero-one dummy	1180	0.675	0.468	0.000	1.000
LnEFOR	(ln) proportion	1180	0.231	0.162	0.000	0.383
LnYFOR	(ln) proportion	1180	0.152	0.149	0.000	0.369
Central	zero-one dummy	1180	0.567	0.496	0.000	1.000
MUN	zero-one dummy	1180	0.810	0.392	0.000	1.000
Small	zero-one dummy	1180	0.557	0.497	0.000	1.000
Large	zero-one dummy	1180	0.443	0.497	0.000	1.000
Government	zero-one dummy	672	0.031	0.174	0.000	1.000
FormEcon	zero-one dummy	742	0.295	0.456	0.000	1.000

### The Econometric Models and Variables

As a first step, we have to obtain a measure of the firms' total factor productivity. Following the existing empirical literature, we assume a two factor Cobb-Douglas production function. The effects of FDI intra-industry spillovers for business trade and services sector are modeled within the context of the production function. Therefore, taking logarithms we have:

$$\ln Y_{it} = \alpha_0 + \alpha_1 \ln L_{it} + \alpha_2 \ln K_{it} + \mu_{it}$$

where  $Y_{it}$  is output,  $L_{it}$  is labor, and  $K_{it}$  is capital for firm  $i$  observed at time (year)  $t$ . Moreover,  $\mu_{it}$  represents the (unobserved) productivity level and is either a measurement error or an unobserved productivity shock (idiosyncratic shock).

Following Dimelis and Louri (2004), a simple form of an augmented production function for the business trade and services sector is used as a starting point. For productivity and wage spillovers, to estimate the presence of spillover effects, we follow the methodology of Aitken and Harrison (1999) and estimate the following log linear production function:

FDI productivity spillovers:

$$\ln YL_{ij} = \beta_0 + \beta_1 \ln KI_{ij} + \beta_2 \ln MI_{ij} + \beta_3 \ln L_{ij} + \beta_4 \ln LQ_{ij} + \beta_5 \ln Age_{ij} + \beta_6 HERF_j + \beta_7 Central_{ij} + \beta_8 MUN_{ij} + \beta_9 FOR_{ij} + \varepsilon_{ij} \quad (1)$$

FDI wage spillovers:

$$\ln AvrRemu_{ij} = \beta_0 + \beta_1 \ln KI_{ij} + \beta_2 \ln MI_{ij} + \beta_3 \ln L_{ij} + \beta_4 \ln LQ_{ij} + \beta_5 \ln Age_{ij} + \beta_6 HERF_j + \beta_7 Central_{ij} + \beta_8 MUN_{ij} + \beta_9 FOR_{ij} + \varepsilon_{ij} \quad (2)$$

Here,  $i$  represents firm while  $j$  represents the industry. As for the variables,  $YL$  is output per worker of a firm.  $AvrRemu$  is average wages per worker of a firm.  $KI$  represents capital intensity.  $MI$  represents material input intensity, and  $L$  represents labor inputs.  $LQ$  is labor quality, defined as the share of skilled workers in the total workforce of each firm.  $Age$  represents the period of operating years of a firm.  $FOR$  is the zero-one dummy variable (equal to 1 if a firm reports foreign investment or foreign share holding, and zero otherwise). The Herfindahl ( $HERF$ ) index of industry concentration is constructed using the survey data at the 2-digit ISIC classification.  $Central$  is the central area dummy (equal to 1 if firms are in central area - Bangkok and central region, and zero otherwise).  $MUN$  is the municipal area dummy (equal to 1 if firms are in municipal areas and zero otherwise).

When measuring spillover effects from FDI, the following variables are especially useful and will be used to capture the impact and effects of foreign presence on both productivity and wage spillovers. They are defined as follows:

$EFOR$  = Proxy for foreign presence, defined as the ratio of the *employment* of foreign firms to total employment in each subsector at the 2-digit ISIC

$YFOR$  = Proxy for foreign presence, defined as the ratio of the *output* of foreign firms to total output in each subsector at the 2-digit ISIC

All spillover variables above are constructed from the 2006 Business Trade and Services Survey of Thailand following the definition and methodology described in the literature mentioned earlier. From the model and variables described above, it should be noted that the problems of estimating productivity and wage spillovers in the service-producing industry for the Thai case arise mainly because of the lack of complete survey information covering these industries that could be used to construct more sophisticated research methodology such as panel data analysis. Measures of the economic performance in the business trade and services sector are also underrepresented in the statistical systems of many developing countries, including Thailand. The bias in favor of agriculture and industry has been due in part to difficulties of defining and measuring the intangible output of some service-producing industries. Due to data constraints, we try our best to choose a representative sample observation from the data. Additionally, due to missing information on some key variables, the data was cleaned up by first deleting firms, which had not responded to one or more key questions and which had provided seemingly impossible information such as the negative value added and inputs used and total employment being less than one. The final number of observations can be shown in Table 1. Furthermore, as we can see from Table 2, the sign of the coefficients do not change when we run the robust regression analysis by various estimators. As a result, in our analysis, we will utilize the OLS (Ordinary Least Squares) estimator with robust standard error as a main estimator for the benchmark result.

**Table 2: Robust Regression: Comparison of Robust Estimators**

	Productivity Spillovers (LnYL)					Wage Spillovers (LnAvrRemu)			
	reg	rreg	qreg	mmreg		reg	rreg	qreg	mmreg
LnKI	0.327*** (6.43)	0.206*** (8.16)	0.275*** (11.67)	0.0597** (2.58)	LnKI	0.250*** (6.80)	0.106*** (9.13)	0.178*** (8.55)	0.0893*** (4.87)
LnMI	0.172*** (9.45)	0.190*** (13.97)	0.179*** (13.89)	0.638*** (32.55)	LnMI	0.0772*** (5.44)	0.0121* (2.28)	0.0468*** (4.90)	0.0100 (1.89)
LnL	-0.804*** (-10.96)	-1.011*** (-28.65)	-0.761*** (-22.77)	0.0174 (0.27)	LnL	-0.887*** (-15.26)	0.0299 (1.88)	-0.608*** (-21.23)	0.0529 (1.57)
LnLQ	-3.903*** (-7.02)	-5.026*** (-17.40)	-4.252*** (-15.53)	-0.986* (-2.01)	LnLQ	-4.786*** (-5.47)	-3.061*** (-15.48)	-5.485*** (-15.48)	-3.005*** (-9.30)
LnAge	0.542*** (4.80)	0.485*** (7.25)	0.448*** (7.11)	0.0382 (0.89)	LnAge	0.547*** (6.05)	0.0305 (1.01)	0.385*** (7.02)	0.0365 (0.87)
LnHERF	-0.452* (-2.50)	-0.279* (-2.11)	-0.248* (-1.99)	0.0970 (1.43)	LnHERF	0.102 (0.78)	-0.126* (-2.36)	0.0545 (0.56)	-0.0124 (-0.17)
Central	0.680*** (4.15)	0.486*** (3.59)	0.517*** (4.04)	0.0682 (1.61)	Central	0.771*** (6.14)	0.527*** (9.70)	0.584*** (5.97)	0.422*** (7.83)
MUN	0.471* (2.39)	0.325 (1.94)	0.512** (3.22)	0.0540 (0.96)	MUN	0.325* (2.06)	0.414*** (6.15)	0.350** (2.89)	0.278*** (4.27)
FOR	2.480*** (4.83)	3.276*** (14.81)	3.545*** (16.99)	5.576*** (12.61)	FOR	0.105 (0.24)	2.747*** (24.84)	1.838*** (9.23)	2.924*** (7.33)
Observations	884	884	884	884	Observations	723	723	723	723
Adjusted R-sq	0.678	0.814			Adjusted R-sq	0.675	0.638		

Notes: The above values are estimated results and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

**reg:** OLS with robust Standard Errors, **rreg:** Robust regression and the command computes a highly efficient M-estimator, **qreg:** Median regression and this estimator protects against vertical outliers but not against bad leverage points, **mmreg:** the command computes a MM-estimator that combine high – breakdown point and high efficiency.

Concerning the division of industry in the data, according to the data summary of the 2006 Business Trade and Services Survey, there are 7 divisions, which can be categorized in detail as follows:

Division 50: Sale, maintenance and repair of motor vehicles and motorcycles etc.

Division 51: Wholesale trade and commission trade, except motor vehicles and motorcycles

Division 52: Retail trade, except of motor vehicles and motorcycles etc.

Division 55: Hotels and restaurants

Division 70: Real estate activities

Division 71-74, 92: Renting of machinery and equipment etc.

Division 93: Other service activities

## EMPIRICAL RESULTS

**Impact of Foreign Ownership/Presence (FOR) on Output per worker (Labor Productivity Spillovers)**

There are two specifications in our benchmark results from Equation (1). The result with outliers (firms with values for variables which are far away from other observations in the sample) and the result without outliers are compared side-by-side in Table 3. It should be noted that extreme values might be the culprit in reporting errors and conclusions, and that conclusion might be influenced by a small number of firms with extremely high or low values. However, we can see that both specifications yield similar results in our analysis, confirming the accuracy of the previous cleanup procedure where we dropped almost every impossible value from the first stage, enabling us to carefully choose the most accurate sample observations to represent for the entire firm in the business trade and services sector.

**Table 3:** Impact of Foreign Ownership/Presence on Output per worker (Labor Productivity Spillovers)

LnYL	With Outliers			Without Outliers		
	(1)	(2)	(3)	(1)	(2)	(3)
LnKI	0.245*** (3.86)	0.245*** (3.86)	0.251*** (3.98)	0.327*** (6.43)	0.327*** (6.41)	0.328*** (6.40)
LnMI	0.147*** (6.46)	0.147*** (6.14)	0.150*** (6.69)	0.172*** (9.45)	0.172*** (9.03)	0.172*** (9.55)
LnL	-0.753*** (-8.50)	-0.753*** (-8.45)	-0.746*** (-8.42)	-0.804*** (-10.96)	-0.803*** (-10.85)	-0.802*** (-10.95)
LnLQ	-2.878** (-3.06)	-2.878** (-3.06)	-2.913** (-3.12)	-3.903*** (-7.02)	-3.903*** (-7.01)	-3.907*** (-6.98)
LnAge	0.401** (2.70)	0.401** (2.71)	0.401** (2.69)	0.542*** (4.80)	0.542*** (4.83)	0.543*** (4.78)
LnHERF	-0.811*** (-3.48)	-0.810** (-2.88)	-1.230* (-2.54)	-0.452* (-2.50)	-0.458* (-2.10)	-0.560 (-1.58)
Central	0.671** (3.16)	0.671** (3.15)	0.692** (3.23)	0.680*** (4.15)	0.679*** (4.15)	0.686*** (4.14)
MUN	0.584* (2.47)	0.585* (2.48)	0.571* (2.42)	0.471* (2.39)	0.470* (2.39)	0.468* (2.38)
FOR	1.527* (2.39)	1.512 (0.79)	2.059** (2.86)	2.480*** (4.83)	2.567 (1.60)	2.614*** (4.94)
LnEFOR		0.0427 (0.01)			-0.256 (-0.06)	
LnYFOR			-2.487 (-1.30)			-0.623 (-0.42)
Observations	908	908	908	884	884	884
Adjusted R-sq	0.499	0.498	0.5	0.678	0.678	0.678

Notes: The above values are estimated results and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

It is common to consider the results from the specification without outliers, which also yield higher adjusted R-squares (where independent variables have more explanatory power). Before reviewing our econometric results, it is important to note that we perform several tests including testing for normality of variables and residuals, testing for heteroscedasticity, testing for multicollinearity, and Ramsey's Regression Specification Error (RESET) for functional form misspecification. Statistical diagnostic tests are not included in the study, but can be shown upon request.

As can be seen in Table 3, most of the coefficients on independent variables are in line with the theoretical expectation. Capital intensity, material intensity, firm age, firms in the central region and in the municipal region show a positive relationship with labor productivity. However, labor input (which implies firm size) and labor quality (which implies the ratio of skilled labor used) show a negative relationship with labor productivity. Interestingly, it is clear from the results that foreign firms (FOR=1) tend to be more productive than domestic firms (FOR=0). However, we find no evidence for (intra-industry) horizontal spillovers at the 2-digit industry level by both EFOR (foreign employment participation) and YFOR (foreign output participation). This may be due to the nature of the data used in our analysis that we only have cross-sectional data at hand. Should we employ the more sophisticated panel data analysis (including fixed and random effects), the result may vary. From Table 3, we find clear evidence that foreign firms tend to exhibit higher labor productivity than domestic firms, however, we find no clear evidence for productivity spillovers in the whole sample.

#### **Impact of FOR by Firm Size (Small, Large) / Form of Legal Organization (Private, Government) /Form of Economic Organization (Head Branch, Single Unit)**

In this section, we extend our analysis and consider the impact of FDI spillovers by various aspects. As shown below, the estimated results in Table 4 yield mixed evidence regarding the impact of FDI spillovers on labor productivity.

**Table 4:** Impact of FOR by Firm Size (Small, Large) / Form of legal Organization (Private, Government) /Form of Economic Organization (Head Branch, Single Unit)

• Measured by EFOR (Foreign employment share)

LnYL	Small	Large	Private	Government	Head Branch	Single Unit
LnKI	0.296*** (5.32)	0.304*** (3.93)	0.137*** (5.03)	0.601*** (4.54)	0.181 (1.47)	0.186*** (4.79)
LnMI	0.118*** (7.55)	0.183*** (5.27)	0.0930*** (9.00)	0.113 (2.17)	0.163*** (4.36)	0.0964*** (8.21)
LnL	-0.987*** (-13.00)	-1.056*** (-8.04)	0.105* (2.12)	-0.713* (-2.84)	-0.550* (-2.57)	-0.166* (-2.00)
LnLQ	-4.346*** (-11.99)	-3.436*** (-3.45)	-2.114*** (-7.88)	-1.808** (-3.34)	-10.62* (-2.42)	-2.756*** (-7.88)
LnAge	0.485*** (4.77)	0.523** (2.62)	0.00204 (0.03)	1.686** (4.21)	0.0478 (0.20)	0.111 (1.46)
LnHERF	-0.602*** (-3.41)	-0.644 (-1.43)	-0.340** (-2.73)	-2.861* (-2.48)	0.305 (0.82)	-0.458** (-3.15)
Central	0.548*** (4.11)	0.695 (1.94)	0.434*** (4.73)	0.721 (1.03)	0.384 (1.65)	0.617*** (5.73)
MUN	0.433**	0.567	0.473***	0.453	-0.307	0.393**

	(2.94)	(1.30)	(4.05)	(0.56)	(-0.69)	(2.98)
FOR	1.155	2.332	N/A	N/A	-4.889	6.055***
	(1.00)	(0.71)	N/A	N/A	(-1.68)	(3.55)
LnEFOR	0.00263	2.455	12.75***	-58.85	23.92**	5.094
	(0.00)	(0.26)	(5.11)	(-1.74)	(3.03)	(1.80)
Observations	518	366	651	21	188	501
Adjusted R-sq	0.805	0.625	0.536	0.823	0.447	0.606

Notes: Robust t-statistics in parentheses and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

- Measured by YFOR (Foreign output share)

LnYL	Small	Large	Private	Government	Head Branch	Single Unit
FOR	1.542*	3.113***	N/A	N/A	3.492*	8.249***
	(2.37)	(3.74)	N/A	N/A	(2.15)	(4.71)
LnYFOR	-2.149	0.239	-3.622***	-7.653*	-1.164	-2.810**
	(-1.62)	(0.09)	(-4.59)	(-2.83)	(-0.50)	(-2.67)
Observations	518	366	651	21	188	501
Adjusted R-sq	0.807	0.624	0.529	0.865	0.417	0.61

Notes: Robust t-statistics in parentheses and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

Other independent variables (not reported here) are the same as in the case of EFOR above.

As we can see in Table 4, the majority of firms in our analysis are small firms (firms with total employees being less than 30 persons), firms that are private in terms of legal organization, and firms that are a single unit type, in terms of economic organization. Specifically, when we use EFOR as a proxy for foreign presence, we find weak evidence for positive horizontal spillovers. In contrast, when we use YFOR as a proxy in the same equation, we find strong evidence for negative horizontal spillovers, especially for private firms and firms which are single unit type. Overall, we can observe the relationship between foreign presence and labor productivity even when we analyze in detail by firm size and by form of legal and economic organization. Foreign firms tend to be more productive than domestic firms, especially in the case of single-unit typed firm. In summary, we find mixed evidence for FDI spillovers in the productivity of private and single unit typed firms in this analysis.

### Impact of Foreign Ownership/Presence (FOR) within Each Industry Level (Labor Productivity Spillovers in each 2-digit ISIC Industry Level)

In this section, we further extend the analysis into each 2-digit ISIC industry level and the empirical results are shown in Table 5. According to the estimated results, we find some positive effects for FDI spillovers in some divisions of business industry; namely, division 52 (retail trade), division 55 (hotels and restaurants) and divisions 92-93 (recreational and sporting activities and other service activities). Apart from that, we find no evidence for horizontal spillovers. This is to be expected, as the retail trade division is one of the biggest and fastest growing service sectors in Thailand and has received and welcomed FDI for many years. These positive results indicate that there is a beneficial effect from FDI in this division and that FDI leads to improved labor productivity.

**Table 5:** Impact of Foreign Ownership/Presence within Each Industry Level (Labor Productivity Spillovers in each 2-digit ISIC Industry Level)

• Measured by EFOR (Foreign employment share)

LnYL	Div50	Div51	Div52	Div55	Div70	Div71-74	Div92-93
LnKI	0.412** (3.01)	0.152 (1.61)	0.371** (2.94)	0.312* (2.19)	0.154 (0.76)	0.506*** (3.89)	0.296** (3.28)
LnMI	0.441*** (4.84)	0.605*** (6.75)	0.218*** (3.89)	0.151** (2.99)	-0.0508 (-0.43)	0.0376 (1.30)	0.130** (3.04)
LnL	-0.689*** (-3.61)	-0.181 (-0.93)	-0.827*** (-6.41)	-0.387 (-1.62)	-1.000** (-3.12)	-0.735*** (-4.47)	-1.284*** (-8.52)
LnLQ	-3.337* (-2.01)	-1.777 (-1.93)	-4.871*** (-7.53)	-2.103 (-1.55)	-1.322 (-1.70)	-4.284*** (-4.41)	-6.887*** (-5.69)
LnAge	0.515 (1.94)	0.631* (2.05)	0.677** (3.20)	0.854* (2.51)	0.778 (2.03)	0.525* (2.17)	-0.300 (-1.22)
Central	-0.254 (-0.54)	0.615* (2.31)	0.294 (0.93)	0.416 (0.74)	1.613 (1.44)	0.702 (1.90)	1.097** (2.99)
MUN	0.317 (0.58)	0.342 (1.54)	0.0469 (0.14)	-0.477 (-1.07)	0.652 (0.46)	0.0506 (0.12)	-0.0544 (-0.10)
LnEFOR	2.233 (0.71)	6.063 (1.70)	6.576* (2.07)	10.03* (2.07)	5.073 (0.71)	6.221 (1.72)	6.994* (2.15)
Observations	146	181	178	108	30	145	96
Adjusted R-sq	0.79	0.705	0.798	0.499	0.654	0.64	0.77

Notes: Robust t-statistics in parentheses and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

• Measured by YFOR (Foreign output share)

LnYL	Div50	Div51	Div52	Div55	Div70	Div71-74	Div92-93
LnYFOR	2.705 (0.71)	5.949 (1.70)	15.44* (2.07)	9.937* (2.07)	329.8 (0.71)	12.16 (1.72)	574.3* (2.15)
Observations	146	181	178	108	30	145	96
Adjusted R-sq	0.794	0.705	0.798	0.499	0.654	0.64	0.77

Notes: Robust t-statistics in parentheses and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

Other independent variables (not reported here) are the same as in the case of EFOR above.

Importantly, we learn that considering both EFOR and YFOR when observing spillover effects is very important in order to cross-check the results, since results may differ and conclusions may change when employing these spillover variables separately. This gives us a crucial warning not to base estimation and analysis solely on one spillover variable and one industry level, since results may vary due to differences in research design and quality of data. Besides, since spillover effects can occur through both EFOR and YFOR in the industry, it is essential to ensure that we fully estimate and observe results by both spillover variables.

From the empirical results in Table 5, it should be noted that division 52 (retail trade) and division 55 (hotels and restaurants) are very important, and it is clear from the results that these divisions benefit greatly from positive horizontal spillovers from FDI which increases the

share of foreign presence by FDI (both EFOR and YFOR) leading to an increase in labor productivity of these divisions.

### Impact of Foreign Ownership/Presence (FOR) on Wage per worker (Wage Spillovers)

Similar to the case of labor productivity spillovers, for wage spillovers, we first compare the benchmark results with the estimated equation with and with outliers in Table 6 from Equation (2). Generally, both specifications yield the same results with expected theoretical signs. As usual, we would prefer the results from the specification without outliers.

From Table 6, the results suggest that foreign firms pay higher average wages than those of domestic firms when considering the equation with EFOR. Surprisingly, we find strong evidence for negative spillover effects from FDI, in the case of wage spillovers for both YFOR and EFOR. This simply means that, average wages in the business trade and services sector tend to decrease when there is strong foreign presence in the whole sample. According to NESDB and the World Bank, the generally poor performance of the Thai services sector raises concerns about its potential to be an engine for gains in the real wages and living standard of Thai workers in the future. Our empirical results provide strong evidence of negative wage spillovers from foreign firms to domestic firms in this sector. Specifically, average wage levels in domestic firms are lower where there is a higher presence of foreign firms (negative horizontal spillovers). The reason for these negative spillovers might be because that the services sector experienced an extraordinary decline in both output and productivity as a result of the 1997-1998 financial crises. Although output recovered to exceed the 1996 level by 2003, labor productivity dropped by 10 percent during 1996-1999, and has been largely stagnant in subsequent years. As a result, average wages of domestic firms tend to decline when they have to compete with those foreign firms and because competitiveness in the business trade and services sector has been low for many years, when there is a strong foreign presence, average wages of domestic firms tend to be lowered.

**Table 6:** Impact of Foreign Ownership/Presence on Wage per worker (Wage Spillovers)

LnAvrRemu	With Outliers			Without Outliers		
	(1)	(2)	(3)	(1)	(2)	(3)
LnKI	0.167** (3.01)	0.179** (3.25)	0.184*** (3.32)	0.250*** (6.80)	0.263*** (7.29)	0.263*** (7.01)
LnMI	0.0847*** (5.04)	0.103*** (6.09)	0.0848*** (5.13)	0.0772*** (5.44)	0.0951*** (6.66)	0.0769*** (5.46)
LnL	-0.838*** (-12.00)	-0.813*** (-11.85)	-0.821*** (-11.84)	-0.887*** (-15.26)	-0.862*** (-15.40)	-0.873*** (-14.96)
LnLQ	-1.060 (-0.92)	-1.177 (-1.00)	-1.105 (-0.98)	-4.786*** (-5.47)	-4.945*** (-6.00)	-4.760*** (-5.55)
LnAge	0.552*** (4.83)	0.541*** (4.81)	0.561*** (4.93)	0.547*** (6.05)	0.536*** (6.08)	0.550*** (6.07)
LnHERF	-0.0611 (-0.37)	-0.474* (-2.38)	-0.939** (-2.66)	0.102 (0.78)	-0.313 (-1.96)	-0.511 (-1.87)
Central	0.819*** (5.68)	0.736*** (5.04)	0.835*** (5.86)	0.771*** (6.14)	0.685*** (5.47)	0.782*** (6.28)
MUN	0.524**	0.494**	0.507**	0.325*	0.291	0.313*

	(2.91)	(2.80)	(2.81)	(2.06)	(1.89)	(1.98)
FOR	-0.385	5.422***	0.684	0.105	5.908***	0.849
	(-0.69)	(3.89)	(1.07)	(0.24)	(4.97)	(1.68)
LnEFOR		-17.07***			-17.05***	
		(-4.46)			(-5.08)	
LnYFOR			-4.688***			-3.238**
			(-3.39)			(-2.94)
Observations	733	733	733	723	723	723
Adjusted R-sq	0.553	0.564	0.562	0.675	0.687	0.679

Notes: The above values are estimated results and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

From Table 6, we again learn that considering both EFOR and YFOR when observing spillover effects are very important in order to crosscheck the estimated results. For both the analysis of productivity and wage spillovers, it should be emphasized not to base the estimation and analysis solely on one spillover variable and one industry level since results can change due to differences in research design and data quality.

#### **Impact of FOR by Firm Size (Small, Large) / Form of Legal Organization (Private, Government) /Form of Economic Organization (Head Branch, Single Unit)**

In this part, we extend our analysis in the same manner as in the previous case of labor productivity spillovers. From Table 7, we repeat the same exercise on different subsamples of firms for analysis. It is clear from the estimated results that negative horizontal spillovers are strong in large firms by both EFOR and YFOR.

**Table 7:** Impact of FOR by Firm Size (Small, Large) / Form of legal Organization (Private, Government) /Form of Economic Organization (Head Branch, Single Unit)

• Measured by EFOR (Foreign employment share)

LnAvrRemu	Small	Large	Private	Government	Head Branch	Single Unit
LnKI	0.147*** (3.39)	0.306*** (5.35)	0.101*** (5.36)	0.845** (5.35)	0.131* (2.27)	0.157*** (4.56)
LnMI	0.0410*** (3.32)	0.0939*** (3.88)	0.0142* (2.06)	-0.0448 (-0.92)	0.00255 (0.17)	0.0243** (2.65)
LnL	-0.978*** (-7.48)	-1.153*** (-14.32)	0.0385 (1.11)	-1.062*** (-9.16)	-0.0781 (-0.88)	-0.0579 (-0.86)
LnLQ	-5.298*** (-9.79)	-4.083*** (-4.40)	-3.100*** (-9.52)	-0.100 (-0.18)	-2.430 (-1.26)	-3.004*** (-7.94)
LnAge	0.393*** (4.91)	0.528*** (3.66)	0.0393 (0.89)	0.538 (1.94)	-0.0601 (-0.75)	0.136* (2.18)
LnHERF	-0.337* (-2.35)	-0.601* (-1.97)	-0.246** (-2.68)	-2.305** (-5.73)	-0.355 (-1.79)	-0.210 (-1.75)
Central	0.572*** (4.89)	0.531* (2.15)	0.558*** (8.52)	1.033* (2.58)	0.523*** (4.86)	0.680*** (7.80)
MUN	0.490***	0.232	0.474***	0.996	0.143	0.460***

	(3.37)	(0.77)	(5.70)	(2.01)	(1.08)	(4.04)
FOR	2.319	9.164***	N/A	N/A	2.907*	5.458***
	(1.78)	(4.63)	N/A	N/A	(2.09)	(3.51)
LnEFOR	-7.090*	-25.84***	-0.250	-35.34	-0.988	-3.039
	(-2.37)	(-4.42)	(-0.14)	(-2.39)	(-0.26)	(-1.33)
Observations	432	291	607	15	182	450
Adjusted R-sq	0.655	0.775	0.424	0.923	0.375	0.491

Notes: Robust t-statistics in parentheses and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

- Measured by YFOR (Foreign output share)

LnAvrRemu	Small	Large	Private	Government	Head Branch	Single Unit
FOR	0.159	1.724**	N/A	N/A	2.850**	4.590**
	(0.15)	(2.65)	N/A	N/A	(2.93)	(2.85)
LnYFOR	-1.328	-5.632**	-1.230*	-8.787*	-1.152	-0.640
	(-1.24)	(-3.01)	(-2.35)	(-2.62)	(-1.00)	(-0.69)
Observations	432	291	607	15	182	450
Adjusted R-sq	0.652	0.768	0.429	0.947	0.379	0.489

Notes: Robust t-statistics in parentheses and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

Other independent variables (not reported here) are the same as in the case of EFOR above.

As expected, we can still observe that foreign firms (FOR=1) tend to pay higher average wages when compared to those of domestic firms, especially for large firms and firms that are both private and state-owned. In conclusion, our results here suggest that a greater presence of foreign firms is negatively associated with average wages of domestic firms especially in terms of legal organization. One of the reasons for negative spillovers here is that the presence of foreign firms may cause a shift in labor demand, leading to a downward pressure on wages faced by both foreign firms and domestic firms.

### Impact of Foreign Ownership/Presence within Each Industry Level (Wage Spillovers in each 2-digit ISIC Industry Level)

**Table 8:** Impact of Foreign Ownership/Presence within Each Industry Level (Wage Spillovers in each 2-digit ISIC Industry Level)

- Measured by EFOR (Foreign employment share)

LnAvrRemu	Div50	Div51	Div52	Div55	Div70	Div71-74	Div92-93
LnKI	0.313**	0.268***	0.265**	0.439***	0.0594	0.214*	0.156*
	(3.17)	(4.52)	(2.69)	(4.83)	(0.49)	(2.16)	(2.09)
LnMI	0.268**	0.316***	0.0980*	0.133*	-0.0879	0.0119	0.0849**
	(3.04)	(5.77)	(2.34)	(2.35)	(-1.18)	(0.63)	(2.89)
LnL	-0.835***	-0.619***	-0.784***	-0.910***	-1.117***	-0.452***	-0.839***
	(-6.02)	(-5.46)	(-4.90)	(-9.40)	(-6.62)	(-3.75)	(-4.10)
LnLQ	-6.594***	-3.599***	-5.296***	-7.164***	-11.33	-1.433	-5.082**
	(-4.69)	(-3.47)	(-4.42)	(-4.72)	(-1.55)	(-1.56)	(-3.18)

LnAge	0.555** (3.26)	0.532** (3.19)	0.401 (1.87)	0.377 (1.89)	0.814* (2.88)	0.741*** (3.66)	-0.0459 (-0.25)
Central	0.209 (0.75)	0.803*** (3.73)	0.663** (2.68)	0.612* (2.23)	0.533 (0.60)	0.547 (1.74)	1.000** (2.82)
MUN	-0.128 (-0.36)	0.443* (2.07)	0.563 (1.44)	0.000585 (0.00)	-2.150 (-1.78)	-0.0575 (-0.17)	0.378 (0.90)
LnEFOR	-7.694** (-3.13)	-1.129 (-0.64)	0.646 (0.16)	2.259 (0.80)	2.851 (1.03)	7.879* (2.05)	-2.830 (-0.96)
Observations	119	151	138	91	25	117	82
Adjusted R-sq	0.824	0.825	0.67	0.776	0.847	0.508	0.537

Notes: Robust t-statistics in parentheses and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

- Measured by YFOR (Foreign output share)

LnAvrRemu	Div50	Div51	Div52	Div55	Div70	Div71-74	Div92-93
LnYFOR	-9.320** (-3.13)	-1.107 (-0.64)	1.516 (0.16)	2.237 (0.80)	185.3 (1.03)	15.40* (2.05)	-232.4 (-0.96)
Observations	119	151	138	91	25	117	82
Adjusted R-sq	0.824	0.825	0.67	0.776	0.847	0.508	0.537

Notes: Robust t-statistics in parentheses and \*\*\*, \*\*, \* indicates a statistical significance at 1, 5, 10 percent, respectively.

The results from Table 8 in this section confirm the results in section 4.4 and 4.5 for negative spillovers from FDI, in which, we observe negative intra-industry spillovers in specific divisions of industry; namely, division 50 (sale, maintenance, and repair of motor vehicles and motorcycles) and positive effects in divisions 71-74 (renting of machinery and equipment, computer and related activities, R&D, and other business activities). Apart from that, we find no clear evidence for wage spillovers in other divisions of industry.

The full explanation for negative wage spillovers can be derived from the study of Aitken and Harrison (1999), which documents negative spillovers in detail. The authors look at panel data of Venezuelan firms and regress plant output on the share of foreign ownership in the industry (weighted by employment) and on a number of controls, including time, industry, and region dummies. The results differ between foreign and domestic firms: for the former, a small positive impact of foreign presence in the industry is found; for the latter, a negative effect is uncovered. This finding is consistent with their theoretical model, which predicts an ambiguous result, depending on whether positive spillovers or market-stealing effects dominate: the former shifts the average cost curve downward whereas the latter increases average cost, due to lower output.

More importantly, the stylized result of zero positive or negative spillovers from FDI is of great importance, as it weakens the main economic argument for governments to spend resources in attracting FDI. If there is no gap between the private benefits of investment (from the point of view of the multinational) and the social benefits of that investment in the host country, then there are no economic factors driving the large hand-outs of public money observed in many years and in many countries (Aitken et al., 1996).

Concerning our estimated results here for wage spillovers from FDI in the business and services sector, since the data used in our econometric analysis is cross-sectional, we cannot

draw a general conclusion that FDI negatively affects the average wage of domestic firms, as we only consider the situation for one year. For this reason, we should remember that the results are likely to vary if we employ panel data analysis. However, the complete panel data for the business trade and services sector for Thailand was not available at the time of analysis. It is hoped that based on this paper, there will be additional and meaningful studies in the future to help formulate policies for other developing countries and the Thai authority regarding the issue of productivity and wage spillovers from FDI in the business trade and services sector.

### **CONCLUSIONS AND POLICY IMPLICATIONS**

This study analyzes productivity and wage spillovers from FDI in Thailand in the business trade and services sector. It is one of the few papers to analyze productivity and wage spillovers simultaneously and to combine the various methods necessary for analysis and to examine a wide range of spillover features regarding the impact of FDI on productivity and wage spillovers in these industries. Spillover effects are examined horizontally at the 2-digit industry level by spillover variables, foreign employment share, and foreign output share. The estimated results indicate that foreign firms are generally more productive and pay higher average wages than domestically owned firms. For productivity spillovers, we find no clear evidence for FDI spillovers in the whole sample, but find mixed results when analyzing the data conditionally by firm size and form of organization of domestic firms. For wage spillovers, we observe negative horizontal spillovers from FDI in the whole sample, especially in large firms, and find negative spillovers in some divisions of industry.

Since business trade and services can be an engine of export growth for some countries such as Thailand, they are a key determinant of the competitiveness for Thai firms in open economies. For this reason, more research is needed on the interaction between business trade and services policies and regulation, and the presence of FDI and MNCs. Promising questions for future research include the magnitude and direction of spillovers (backward and forward linkages) resulting from greater FDI, and the role of services (including services policies). It should be noted here that the problems in estimating output and productivity in service-producing industries for many developing countries arise largely because of the lack of basic survey information covering these industries that could be used for detailed analysis and Thailand is no exception in this regard. In detail, the Thai government undertakes a decennial census of manufacturing, supplemented by regular annual surveys. There also exists an extensive system of statistical reporting for the agricultural regions. In contrast, Thailand has no comprehensive economic census for the services industries and annual surveys are limited to a few select industries.

Recently, a change to this trend has been made with the Business Trade and Services Survey conducted by the NSO. Moreover, the corresponding business census was a major step in developing a business registry that could provide the preliminary framework for future annual surveys. It is also important to note that the surveys need not be as extensive as those used for manufacturing because the desired information is much less – total revenues, purchased inputs, value added, labor compensation, persons engaged, employment and a measure of fixed assets constitute the core coverage. A short, accurate and simple survey is critical to achieve high rates of compliance.

In terms of policy implications, the findings presented in this paper provide encouraging support for the role that foreign direct investment can play in the development of the Thai economy and in the welfare of its citizens in the business trade and services sector. However, one should understand that the impacts of FDI are multi-dimensional, while this

study observes only one aspect of productivity and wages spillovers was addressed due to data limitation. It is hoped that further studies can complement the one presented here. In any case, the results in this paper indicate that the case for FDI as a mechanism for economic development in Thailand, can draw on empirical evidence that FDI could play an important role in the business trade and services sector. However, as supported by the data summary and estimated results, the majority of business establishments in Thailand have no foreign investment and FDI, and MNCs are still not prevalent in these industries, so we may conclude that there are both advantages and disadvantages regarding FDI spillovers from foreign firms to domestic firms in this period of our analysis.

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