

On the Relative Performance of Domestic and Foreign-Owned Manufacturing Firms in Vietnam

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Abstract

This paper seeks to study the relationship between foreign ownership and corporate performance in a small emerging economy. Based on the dataset of Vietnamese manufacturing firms for the period 2000-2013, we investigate differences in performances between foreign-owned firms and domestic owned firms both in static and dynamic approaches. We find that foreign-owned firms outperform domestic owned firms in terms of productivity but under-perform the latter ones in terms of profitability. Besides, we provide evidence showing that foreign-owned firms grow faster than domestic owned firms in all margins of performance. However, they become less profitable once we control for the effects of firm size and R&D. *Convergence effect* is another characteristic of Vietnamese manufacturing firms, implying that firms with lower performance grow faster than firms with higher performance. There is also evidence that foreign-owned firms tend to survive better than domestic firms on Vietnamese market. Finally, we demonstrate that *sunk costs* and *transfer mis-pricing* are two major concerns that Vietnam should take into consideration in order to be a more attractive destination for FDI and to maximize gains that FDI bring into Vietnamese economy.

Keywords: Multinational corporations, Ownership, Foreign direct investment, Firm performance, Micro-panel data, Vietnam

JEL code: D220, D240, F230

1 Introduction

Since the expansion of Foreign direct investment (FDI) after the mid-1990s, there has been a vast literature that has analyzed the trading behavior of various investor categories, distinguishing foreign owned firms and domestic owned firms (Aitken et al. (1997), Dahlquist and Robertsson (2001), Choe et al. (2005), Bernard et al. (2007)). In this strand of literature, the main questions are why performance gaps between foreign-owned firms and domestic owned firms exist theoretically and whether foreign ownership explains such gaps empirically. More specifically, findings often suggested that foreign-owned firms or in other words, multinational corporations (MNCs) tend to perform relatively better than domestic

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owned firms (Konings (2001), Kimura and Kiyota (2007), Kosova (2010), Xu et al. (2006), Ramstetter and Ngoc (2013), etc.). In addition, MNCs are considered as the origin of spillovers that affect the efficiency of non-MNCs through both horizontal and vertical linkages (Liu et al. (2000), Li et al. (2001), Smarzynska Javorcik (2004), Haskel et al. (2007)).

The purpose of this paper is then to investigate empirically the role of FDI by MNCs in Vietnam, as an emerging economy, and compare their economic performance with which of Vietnamese-owned firms. Vietnam provides an interesting case to study these relationships. Indeed, since Vietnam promulgated the Reforms (Doi Moi) policy in 1986 to liberalize the economy and to facilitate the development of the private sector, the country has been slowly but continuously opening for FDI to play as the main source of external financial capital and new technologies. Based on a rich and detailed firm-level dataset conducted by General Statistics Office of Vietnam (GSO), we examined differences in corporate performance between foreign and Vietnamese domestic-owned firms. Various measures of firm performance including total factor productivity (TFP), labor productivity, profits, average wages, capital intensity, etc are considered. We employ a theoretical and empirical methodology that overcome several shortcomings in the literature. Theoretically, we rely on the dynamic model proposed by Roberts and Tybout (1997), Bernard and Jensen (1999). As for empirical analysis, we test determinants of foreign ownership as well as the survivability of foreign firms compared to domestic firms by using *probit model with random effects*. Meanwhile, the performance gaps between them will be checked by *random-effects model*.

Our results first show evidence that foreign-owned firms are younger, more capital intensive and more productive than domestic owned firms. However, unlike previous empirical studies, we find out that foreign firms in Vietnam are smaller in terms of labor, less R&D intensive and mostly less profitable than domestic firms. One finding of the study also shows that foreign-owned firms achieve faster growth than domestic firms in all performance margins. Nevertheless, if we control for the firm size in terms of affiliates number and R&D spending/Sales ratio, foreign firms become less profitable. Finally, we provide evidence showing that foreign-owned firms are likely to survive longer than domestic firms on the Vietnamese market.

Our paper brings two main contributions to the literature that examines the causal link between FDI and corporate performance. The first contribution of the present study is its developing country context. Second, it should be noted that the most sophisticated methodology allowing to compare foreign and domestic owned firms is relying on firm-level data to model a given activity, then comparing the two groups of firms after controlling for relevant effects such as industry, year, cohort...Another approach is to model the economic indicator in question directly (average labor productivity, wages, TFP) as a function of related variables (size, age, factor intensities) and a set of dummy variables identifying the ownership. Unfortunately, due to the lack of access to the firm-level dataset, papers that employed these approaches to address the comparison of foreign and domestic owned firms for the case of Vietnam remained limited. While the majority of works still based on bounded sample size, such analyses have just been recently available since the firm-level data provided by GSO became opened to researchers.

For instance, to compare the performance of foreign and local firms in Vietnam by various indicators, Ngoc and Ramstetter (2004) used three different samples: time series for all industries and the industrial sector from 1994-2002 as available, as well as for three cross-sections of industries from the 1995 economic census, the 1999 industrial survey and the 2001 enterprise census. Also exploring the database of GSO, Nguyen (2008) and Pomfret (2010) used the dataset of Vietnamese manufacturing industries for the period 2000-2005. Therefore, the contribution of our paper is to take advantage of the availability of a large-scale firm-level dataset on Vietnamese manufacturing firms covering about 430,000 firms conducted from 2000 to 2013 to investigate further the issue. To the best of our knowledge, our paper is the first one to comprehensively compare the performance of foreign and domestic-owned firms in Vietnam both in static and dynamic approaches using micro panel data.

The paper is organized as follows. Section 2 reviews the relevant literature. Section 3 describes data and variable measurement. Section 4 describes the differences in performance of foreign and domestic owned firms in static approach. Section 5 presents theoretical, empirical models and discuss empirical findings. The final section concludes.

2 Related Literature

There is currently a variety of literature examining the relationship between foreign ownership and corporate performance. In particular, it is asked whether performance gaps are due to the existence of multinational corporations (MNCs). Generally, the theory of MNCs deals with the hypothesis of specific advantage (Dunning (1973), Caves (2007), Markusen (1995)). According to this theory, MNCs transfer firm-specific advantages internally across borders. MNCs will, therefore, be concentrated in knowledge-intensive sectors, which are generally characterized as growing and highly productive industries. Following Markusen (1995), there are four main characteristics of a MNC: high levels of R&D relative to sales, a large share of professional and technical workers in their workforces, products that are new and/or technically complex, and high levels of product differentiation and advertising.

Most of the previous studies are empirical works and focus especially on productivity, wage and skill gaps as performance indicators. Globerman et al. (1994) examined the relationship between foreign ownership and labor productivity using Canadian firm-level data in 1986. They found that the labor productivity and wages of foreign-owned firms are significantly higher than their local Canadian counterparts. However, these differences vanish once they control for size and capital intensity. By contrast, Doms and Jensen (1998) pointed out that foreign-owned firms perform better than domestic-owned firms even after controlling for industry, size, location and firm age. They also indicated that MNCs are the most productive, most capital intensive and pay the highest wages compared to purely foreign and domestic-owned firms. Using micro-panel data for firms located in Japan, Kimura and Kiyota (2007) examined differences in corporate performance between foreign-owned and domestic-owned firms in the 1990s. They concluded that the former ones not only reflect superior static characteristics but also reach

faster growth. Moreover, foreign investors tend to invest in firms that may not be immediately profitable but would be potentially most profitable in the longer run. In addition, they found no evidence that foreign investor brings useful firm-specific assets into the Japanese market, which might have been considered as an effective catalyst for necessary structural reform.

While a large part of works has focused on advanced countries, a number of recent studies have also examined the case of emerging countries. The majority of these studies have results that are consistent with those carried out in developed countries. For instance, considering the manufacturing industries of Asian economies, Ramstetter (1994), Ramstetter (1999), Sjöholm (1999) suggested that foreign MNC tend to be more efficient than local firms in many cases. Indeed, they indicated that the former are relatively large, capital intensive, pay relatively high wages and have relatively high profit rates. Hallward-Driemeier et al. (2002) also confirmed that foreign-owned firms are more productive than other firms in East Asian countries. Working on a sample covered 2700 manufacturing firms of five East Asian countries: Indonesia, Korea, Malaysia, the Philippines and Thailand, their empirical analysis revealed that MNCs hold the higher productivity relative to domestic firms in all countries except Korea, even after controlling for the sector, size and export orientation. By contrast, Konings (2001) studying the effects of FDI on the performance of firms in 3 emerging market economies, Bulgaria, Romania, and Poland, showed evidence that foreign firms do not perform better than domestic ones, except in Poland, the more advanced transition economy. In addition, he found no evidence of positive spillovers, but rather negative or no spillovers of foreign investment to domestic firms. This is rationalized through a competition effect that dominates a technological spillover effect in less advanced countries such as Bulgaria and Romania. Overall, his study suggests that it takes time for ownership effects to have an effect on performance, due to lags in restructuring. Indeed, these results implied that in the early stages of transition, Bulgaria and Romania are in the increased competition from FDI spillover effects to domestic firms. That is to say, inefficient firms might be eliminated from the market due to foreign competition, which in the long run would increase the overall efficiency of the economy. In the latter stages, when domestic firms have engaged in substantial restructuring and market competition has been established, the dominating competition seems to vanish. Based on two nationwide surveys conducted by the National Bureau statistics of China over the period 1998- 2002, Xu et al. (2006) checked the performance of domestic Chinese firms in various ownership categories versus foreign-owned firms. They found that both domestic non-state-owned firms and foreign-owned firms perform better than state-owned firms. Meanwhile, three categories of Chinese firms- privately owned, collectively owned and shareholding- had higher performance levels than foreign-owned firms.

For Vietnam, a number of studies have investigated various related issues on inward FDI. However, only a few studies examine differences in corporate performance between domestic and foreign-owned firms due to the lack of access to firm level data. The most noticeable works carried out on this issue are studies done by Ngoc and Ramstetter (2004), Ngoc and Ramstetter (2009), Ramstetter and Ngoc (2013), Nguyen (2008) and Pomfret (2010). Particularly, Ngoc and Ramstetter (2004) compared the performance

of multinational corporations (MNCs) and local firms in Vietnam, distinguishing two categories of local firms: state-owned enterprises (SOE) and Non-SOE. Indeed, using firm-level data on the period 1994-2002 from General Statistic Office of Vietnam (GSO) database, they compared time-wise and industry-wise variation in indicators of corporate performance¹. Consistent with the theoretical suggestions, they showed that foreign MNCs are generally larger and have higher labor productivity, capital intensity, wage levels, investment propensities and trade propensities than Non-MNCs. On the other hand, foreign MNCs tend to have relatively low capital productivity and wage shares of value added, while results regarding profitability are mixed². The relationship between firm ownership and productivity has been investigated further by Ramstetter and Ngoc (2013). Using the same dataset but focusing on the period 2000-2006, they confirmed for the first stage, by simple calculations, that foreign MNCs, MNCs joint-ventures, and SOEs often have substantially higher labor productivity and lower capital productivity than local private firms. For the second stage, they tested differences in total factor productivity (TFP) between MNCs and SOEs on the one hand; MNCs and private firms on the other hand by estimating trans-logarithmic production functions. Their empirical results revealed an insignificant or negative difference in 2001-2003 but more often significant and positive difference in 2004-2006 if a lagged specification is used to account for potential simultaneity in this period. In addition, estimates of productivity spillovers from SOEs and MNCs to private firms also tend to be insignificant and inconsistent. Investigating the horizontal and vertical spillovers effects from foreign firms to domestic firms in Vietnam, Nguyen (2008) has run a 2SLS estimation to check the effect of technology spillover. She showed that the effect of horizontal and backward linkage of FDI on the domestic productivity is positive while the one of forward linkage is negative. In contrast, Pomfret (2010) examining wage spillovers found that wage levels in domestic private firms are higher in sectors where there is a higher presence of foreign firms and concluded domestic private firms with backward linkages to foreign firms can gain productivity spillovers and pay higher wages.

In sum, the studies mentioned above suggest that there exist important gaps in terms of performance between domestic and foreign-owned firms though these differences are not always clear. The purpose of our paper is therefore to deepen the understanding of this relationship in the case of an emerging economy. Following suggestions proposed by Kimura and Kiyota (2007), we first attempt to identify the determinants of foreign ownership and check the ability that a potentially profitable firm could become a MNC. We next examine the performance gaps between foreign and domestic-owned firms. Finally, we examine the survival of foreign-owned firms relative to Vietnamese-owned firms.

3 Data Description

In this section, we discuss our database. We first briefly describe a number of firm-specific attributes used in empirical analysis³. These are:

- Foreign-owned dummy (foreign): foreign ownership dummy takes value one if the firm is considered as foreign-owned firm and zero otherwise.

- Survival dummy (survive): survival firm dummy takes value one if the length of firm life⁴ is at least 2 years.
- Labor (lnL): number of workers at the end of each year
- Firm Age (lnage): the number of years that a firm survives from the first entry year to the year reported
- Wage per employee (lnwpe): total wages and other income over the number of employees
- Capital intensity (lnintcap): real capital stock over the number of employees.
- Total factor productivity (lnTFP): computed following a non- parametric approach (Aw et al. (2001), Nishimura et al. (2005), Bellone et al. (2006)).
- Average labor productivity (lnalp): real value added over the number of employees
- Return on asset (lnroa): the ratio of annual net income to average total assets
- Return on equity (lnroe): the ratio of net income to stockholders' equity
- Affiliates (lnaffi): Number of domestic affiliates⁵
- R&D/Sales (lnrds): Ratio of R&D spending to Sales ⁶

Our analysis is based on the large-scale annual survey of enterprises (ASOE) data provided by the General statistics office of Vietnam (GSO) which covers all registered firms in Vietnam over the period from 2000 to 2013. The data covers firms operating in every economic sector, including agriculture, manufacturing, construction and services. Firms included in the survey are all registered firms ⁷ that were in operation on the 31st of December of the previous year. The survey information includes firm identification (tax registration number), assets and liabilities, the number of employees (by qualification), sales, wages, capital stock, industry (5-digit), obligations to the government, exports, imports, debts, date of birth...

For the purpose of our analysis, the ASOE data has the following advantages. First, the survey is comprehensive (all registered firms are covered, without size threshold, at the exception of Household business activities). Second, it includes relevant accounting information on outputs, inputs, and exports. Finally, it includes key information which allows us to identify both the ownership of the firm and the type of trade in which firms are involved.

The ASOE dataset has also some limitations. First, industry classification has changed over the period of observation. From 1993 to 2006, the Vietnam Standard Industrial Classification (VSIC) was built on the basis of International Standard Industrial Classification revision 3 (ISIC Rev.3). From 2007 up to now, VSIC 2007 was developed on the basis of ISIC Rev.4 and ASEAN Common Industrial Classification (ACIC). While VSIC 1993 is detailed at the 4 digits level, VSIC 2007 is detailed at the 5

digits level ⁸. To achieve consistency in the industry codes for the whole sample period (2000-2013), we convert the industry codes in the 2000-2006 data (VSIC 1993) to the new classification system (VSIC 2007) by using a concordance table at the 4 digits level provided by GSO. Then, for the purpose of international comparison, we re-aggregate in this paper industrial codes at the 2 digits level. Second, some key information is missing for some years. In particular, the information on R&D spending and number of affiliates is often missing. Also, information on working hours and capital utilization rates is not available at the firm level.

In order to build a workable dataset from the GSO database, we clean the data as follows. First, only firms with no missing information on sales, labor, capital, age and wages are kept. Second, to estimate Total Factor Productivity (TFP), we follow Ha and Kiyota (2014) to clean up the data as follows: we assign a single industry code to each firm because, if a firm switches industry, its "reference firm" must also change, as the properties of the reference firm are calculated based on industry averages. For firms that switch industry, the mode of the industry code is used⁹. Third, concerning the formula for ROA (return on assets) and ROE (return on owned equity), it should be excluded firms with negative asset and equity; firms with net income higher than average total asset and average total owned equity in database because abnormal returns do not have an obvious interpretation in that sense. In addition, as the equity share of foreign-owned firms is not available for the year 2001, we thus have to define by the alternative way a firm of this year as foreign-owned firm if it registers as foreign-owned firm under the Investment Law issued in 2005 of Vietnam. Finally, in our final sample, we exclude firms in the service industries but concentrated on firms operating in the manufacturing industries. We also drop all firms with less than 10 employees in order to minimize measurement errors issues but also in order to promote the comparability of our study with the earlier literature. Indeed, this size threshold makes our descriptive statistics more comparable to the existing ones in other countries as most of the firm-level databases available worldwide are confronted to size thresholds (See (ISGEP)).

To sum up, our sample consists of about 430,000 manufacturing firms over the period 2000-2013. After the cleanup, comparing to the original ones, the remaining size of the global sample is about 194,900 manufacturing firms accounting for 45.30% in terms of firm numbers, 78%- 83% in terms of labor, wage, sales and value added. Statistics of variables are summarized in table 1. In general, our global sample on the period 2000-2013 shows that the size of Vietnamese manufacturing firms in terms of labor is about 182 workers per firm while the average firm age is 8.5 years. The capital per worker is 183.18 million VND (equivalent to 8.3 thousand US\$) and the average wage is 30.5 million VND per year (about 1.4 thousand US\$). With regard to productivity and profitability, the aggregate manufacturing TFP level (in logarithm) across firms is 0.45; the average rate of ROA is 1.77% while the one of ROE is -2.54%. Foreign-owned firms at time (t) account for 16% of total manufacturing firm number. This figure increases to 18% at time (t+1). Finally, the average survival rate of manufacturing firms in Vietnam is 99%. On the other hand, the sub-sample covering the period 2007-2011 shows that the ratio of R&D to Sales is only 3%, meanwhile the average number of affiliates owned by a firm is only 0.35. In addition, values of

other indicators have not changed significantly compared to those in the global sample.

Table 1: Firm level summary statistics

Variable	Obs	Mean	Std. Dev.
Global sample (2000-2013)			
Labor (number of workers)	194,905	182.80	720.42
Firm age	194,910	8.52	8.51
Capital intensity (million VND, 2010 prices)	194,899	183.18	444.19
Average wage (million VND, 2010 prices)	194,899	30.54	24.13
Labor productivity (million VND, 2010 prices)	194,900	57.39	105.01
Total factor productivity (ln tfp)	194,895	0.45	1.76
Return on asset (ROA, %)	194,900	1.77	9.97
Return on equity (ROE, %)	194,900	-2.54	326.75
Foreign owned dummy	194,910	0.16	0.36
Foreign owned dummy (t+1)	135,125	0.18	0.38
Survive dummy	194,910	0.99	0.11
Sub-sample (2007-2011)			
Labor (number of workers)	101,926	176.40	712.09
Firm age	101,929	8.21	8.19
Capital intensity (million VND, 2010 prices)	101,923	175.31	395.82
Average wage (million VND, 2010 prices)	101,922	31.06	23.02
Labor productivity (million VND, 2010 prices)	101,923	58.26	104.42
Total factor productivity (ln tfp)	101,922	0.51	1.73
Return on asset (ROA, %)	101,922	1.88	10.01
Return on equity (ROE, %)	101,922	-3.00	388.74
R&D expenditure/sales	89,391	0.03	3.37
Number of affiliates	83,388	0.35	1.60
Foreign owned dummy	101,929	0.16	0.37
Foreign owned dummy (t+1)	80,151	0.19	0.39
Survive dummy	101,929	0.99	0.09

Source: GSO database

4 Foreign versus Vietnamese -owned firms in static approaches

In this section, we present different characteristics of foreign-owned firms compared to domestic firms in static aspects. At first, table 2 allows to overview the sectoral distribution of firms by ownership types. Three first columns aggregate firms number for the period 2000-2013. Three next columns show the share of firms across industries while three last columns present their share within industries. The first feature can be drawn from table 2 is that foreign-owned firms concentrate with a high rate in a small number of industries. Specifically, they account for 18% in *Clothing and Leather*, 17% in *Chemical, rubber plastics* and 12% in *Basic metal and metal products*. Meanwhile, their shares in other industries account for only a small rate, generally under 8%. This might be due to the nature of location advantage/disadvantages, but also suggests that large entry costs still remain in many sectors (Kimura and Kiyota (2007)). On the other hand, by share within sectors, though domestic-owned firms account, for the most part, there

are still some industries where the part of foreign-owned firms is not underwhelming. For example, Computer and electronic products (49%), Motor vehicles (44%), House equipment (40%), Clothing and leather (24%), etc. Undoubtedly, these ones are sectors in which Vietnam is strongly engaged into the international trade.

In table 3, we present static differences in corporate characteristics for the whole sample of firms and then for sub-samples distinguished by firm categories: foreign-owned firms versus domestic owned firms, state-owned firms (SOEs) versus Non-SOEs. Overall, our global sample reveals that during 13 years, there has been an increase in the number of firms, average capital intensity, productivity, and wage but a decrease in terms of firm size (labor) and profitability. When we distinguish domestic and foreign-owned firms, we first find that domestic firms record a raise according to labor, capital intensity, average wage and labor productivity but a decline according to profitability (ROA, ROE) and number of affiliates over the period 2000-2013 while foreign-owned firms display a strong improvement according to the same margins, except the number of domestic affiliates, and on the same examined period. That means the performance growth of foreign firms is more rapid than the one of domestic firms although the last ones still account for the overwhelming number of firms. Second, foreign firms outperform domestic firms according to most of our indicators but their profitability indicators (ROA, ROE) are lower than domestic firms, even get negative values in terms of ROE¹⁰. It should be emphasized that profitability is one plant-level characteristic where foreign-owned firms generally perform worse than domestic firms (Bellak (2004)). Nevertheless, there exists some explanations for higher (acquisitions, firm-size, market share, productivity, age) and lower (greenfield, age, internal funds) profitability. In fact, Bellak (2004) argued that the higher capital intensity, which is a primary force behind an increase in labor productivity, may lead to higher profit margins. By contrast, an inferior profitability performance might be due to the motivation of foreign firms to minimize their tax burden, known as *transfer pricing* or *profit shifting*¹¹. That's why the empirical results concerning this variable are often inconclusive in many cases. In Vietnam, the transfer (mis)pricing is a phenomenon recognized in large part of foreign-owned firms. Effectively, in 2012, General Department of Taxation (GDT) documented that 57% of the 5,500 foreign-owned firms investigated (representing 60% of total foreign operations) reported net losses between 2010 and 2011. Furthermore, a deeper report focused on transfer pricing by GDT in 2014 also shows that among 870 foreign firms conducted, 720 of them, including some of the world's biggest MNCs and famous brands and accounting for about 83%, were in violation of transfer mispricing rules according to the GDT's interpretation of Circular 66/2010/TT-BTC (Circular 66). The Vietnam Chamber of Commerce and Industry (VCCI and USAID (2014))¹² analyzed that self-reported profit should be positively correlated with transfer mispricing. The principle of this activity is that firms involve in transfer mispricing to shift profits to low-tax regimes. This means that their official tax statements will yield losses, but these firms will still likely claim credit for success in their internal reporting, especially in subsidiaries of MNCs. Indeed, they find that 65% of extremely profitable firms (more than 20% margins) admit to engaging in the transfer mispricing. Similarly, 44% of highly profitable firms, 12% of moderately profitable firms

Table 2: Firm distribution by sector and by foreign equity share: pooled sample from 2000 to 2013

ID	Sector	Number of firms		Share across sectors		Share within sectors	
		Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
1	Food, beverage & tobacco	25,689	2,593	28,282	0.16	0.08	0.91
2	Textile products	7,026	2,011	9,037	0.04	0.07	0.78
3	Clothing & leather	17,581	5,512	23,093	0.11	0.18	0.76
4	Wood & paper	22,029	1,773	23,802	0.13	0.06	0.93
5	Printing, publishing & recording	9,442	440	9,882	0.06	0.01	0.96
6	Chemical, rubber plastics	16,520	5,147	21,667	0.10	0.17	0.76
7	Pharmaceuticals	1,625	273	1,898	0.01	0.01	0.86
8	Mineral products	17,309	1,014	18,323	0.11	0.03	0.94
9	Basic metal & metal products	22,817	3,711	26,528	0.14	0.12	0.86
10	Computer & electronic products	1,282	1,225	2,507	0.01	0.04	0.51
11	Machinery & apparatus	6,612	1,866	8,478	0.04	0.06	0.78
12	Motor vehicles	1,251	982	2,233	0.01	0.03	0.56
13	Transportation equipments	2,615	974	3,589	0.02	0.03	0.73
14	House equipments	10,294	1,754	12,048	0.06	0.06	0.85
15	Manufacturing, n.e.c	2,132	1,411	3,543	0.01	0.05	0.60
	Total	164,224	30,686	194,910	1.00	1.00	0.84

Source: GSO database

and 9% of positive but low margin operation also engage in the practice. In general, loss-making firms do not employ income shifting techniques with one exception: about 30% of firms with small losses (between 0 and 5%) admit to the practice (see the table C5. in the Appendix). This suggests that *highly sophisticated firms use transfer mispricing to push themselves to just below the margin of profitability that exempts them from company income tax (CIT) payments.*

Results of GDT and VCCI and USAID (2014) are consistent with our findings. As indicated in table 4, we find that the rate of foreign firms who reported losses is generally higher than domestic firms across years. On average of the period 2000-2013, about 37% of foreign firms announced losses while this rate of domestic firms is only 24%. We, therefore, have evidence to suggest that the transfer mispricing is taking place among foreign firms in our sample. That allows explaining the under-performing of foreign firms compared to domestic firms in terms of ROA and ROE as demonstrated in table 3.

When we further examine domestic- owned firms, discriminating SOEs and Non-SOEs (table 3), we see that the share of SOEs has decreased over time. By contrast, the share of Non-SOEs has increased continuously. Indeed, the number of SOEs has fallen from 1,190 firms in 2000 to 347 firms in 2013 while similar figures of Non-SOEs are 3,935 and 17,194 respectively. However, Non-SOEs perform worse than SOEs in all aspects. This feature can be explained by the fact that on the one hand, official statistics of Vietnamese SOEs tend to be overestimated because these ones have incentives to over-report production and profits to meet state targets; on the other hand, Non-SOEs often under-report production and profits so as to avoid taxation and scrutiny of the authorities. However, it is not clear how these biases affect estimates of foreign-owned MNC shares(Ngoc and Ramstetter (2004)).

In brief, static comparisons in performance between foreign-owned firms and domestic firms show that foreign firms are larger in terms of labor, more capital intensive, pay higher wages, perform better in terms of value -added productivity and TFP but have fewer affiliates and lower profitability (ROA, ROE) than domestic- owned firms.

Table 3: Difference between foreign and domestic firms in static aspects

Variable	All firms						Domestic firms						Foreign firms					
	All domestic firms			SOEs			Non-SOEs			All domestic firms			SOEs			Non-SOEs		
	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D
Labor (number of workers)	5,788	220.34	634.80	5,125	196.56	509.06	1,190	504.12	820.66	3,935	103.56	310.99	663	404.12	1215.96	663	406.32	845.99
Capital intensity (million VND, 2010 price)	5,788	169.04	562.72	5,125	138.34	506.89	1,190	147.58	240.57	3,935	135.55	563.14	663	406.32	845.99	663	28.52	26.78
Average wage (million VND, 2010 price)	5,788	18.25	17.82	5,125	16.93	15.83	1,190	22.34	17.43	3,935	15.29	14.93	663	28.52	26.78	663	80.49	167.16
Labor productivity (million VND, 2010 price)	5,788	42.78	95.88	5,125	37.90	81.02	1,190	53.78	93.40	3,935	33.09	76.25	663	80.49	167.16	663	1.43	1.68
Total factor productivity (lnfp)	5,788	0.00	1.96	5,125	-0.19	1.92	1,190	1.63	1.59	3,935	-0.73	1.65	663	1.43	1.68	663	1.49	14.21
Returns on asset (ROA, %)	5,788	2.56	10.99	5,125	2.70	10.50	1,190	1.62	5.76	3,935	3.03	11.54	663	1.49	14.21	663	-2.52	52.55
Returns on equity (ROE, %)	5,787	0.21	115.55	5,124	0.56	121.34	1,190	0.28	39.89	3,934	0.64	136.73	663	-2.52	52.55	663	0.65	2.06
Number of domestic affiliates(*)	3,942	0.67	1.98	3,398	0.68	1.96	697	1.87	3.45									

Variable	All firms						Domestic firms						Foreign firms					
	All domestic firms			SOEs			Non-SOEs			All domestic firms			SOEs			Non-SOEs		
	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D
Labor (number of workers)	20,891	167.17	771.80	17,541	89.94	309.46	347	514.23	786.66	17,194	81.38	285.54	3,350	571.53	1737.62	3,350	477.20	820.97
Capital intensity (million VND, 2010 price)	20,891	236.30	502.93	17,541	190.29	399.20	347	558.35	1146.82	17,194	182.87	365.13	3,350	477.20	820.97	3,350	62.74	42.13
Average wage (million VND, 2010 price)	20,890	42.42	27.60	17,540	38.54	21.79	347	65.41	44.91	17,193	38.00	20.71	3,350	62.74	42.13	3,349	147.15	217.04
Labor productivity (million VND, 2010 price)	20,890	71.06	111.62	17,541	56.54	67.31	347	138.21	180.40	17,194	54.89	61.89	3,348	147.15	217.04	3,348	2.56	1.74
Total factor productivity (lnfp)	20,888	0.69	1.68	17,540	0.33	1.41	347	2.99	1.66	17,193	0.28	1.35	3,350	2.95	13.35	3,350	2.95	13.35
Returns on asset (ROA, %)	20,890	1.17	8.26	17,540	0.83	6.81	347	4.03	6.80	17,193	0.77	6.80	3,350	2.95	13.35	3,350	-2.13	123.34
Returns on equity (ROE, %)	20,891	-0.54	65.96	17,541	-0.23	47.70	347	7.45	19.18	17,194	-0.39	48.09	3,350	-2.13	123.34	3,350	0.15	1.38
Number of domestic affiliates	16,260	0.23	1.27	13,344	0.25	1.24	312	1.30	2.65	13,032	0.22	1.18	2,916	0.15	1.38	2,916	0.15	1.38

(*) As values of domestic affiliates number are not available for the year 2000, they are interpolated from neighboring non-missing values.
Source: GSO database

Table 4: Share of firms by profit threshold across years

Year	All of firms			Domestic firms			Foreign firms					
	Profit <0	Profit=0	Profit>0	Total	Profit <0	Profit=0	Profit>0	Total	Profit <0	Profit=0	Profit>0	Total
2000	0.26	0.02	0.72	1.00	0.24	0.02	0.73	1.00	0.41	0.01	0.58	1.00
2001	0.29	0.02	0.69	1.00	0.27	0.02	0.71	1.00	0.42	0.01	0.57	1.00
2002	0.24	0.01	0.75	1.00	0.21	0.01	0.78	1.00	0.43	0.00	0.57	1.00
2003	0.25	0.02	0.73	1.00	0.22	0.02	0.76	1.00	0.45	0.01	0.54	1.00
2004	0.26	0.02	0.72	1.00	0.24	0.02	0.74	1.00	0.38	0.02	0.59	1.00
2005	0.26	0.02	0.73	1.00	0.23	0.02	0.75	1.00	0.40	0.01	0.59	1.00
2006	0.22	0.02	0.76	1.00	0.18	0.02	0.80	1.00	0.41	0.01	0.58	1.00
2007	0.22	0.01	0.77	1.00	0.19	0.01	0.80	1.00	0.36	0.00	0.63	1.00
2008	0.33	0.01	0.66	1.00	0.32	0.01	0.67	1.00	0.42	0.01	0.57	1.00
2009	0.28	0.02	0.70	1.00	0.26	0.03	0.72	1.00	0.38	0.00	0.61	1.00
2010	0.25	0.01	0.74	1.00	0.24	0.01	0.76	1.00	0.32	0.00	0.68	1.00
2011	0.27	0.00	0.73	1.00	0.25	0.00	0.74	1.00	0.34	0.00	0.66	1.00
2012	0.22	0.20	0.57	1.00	0.20	0.24	0.56	1.00	0.33	0.01	0.66	1.00
2013	0.28	0.01	0.71	1.00	0.28	0.01	0.72	1.00	0.31	0.00	0.69	1.00
Total	0.26	0.03	0.71	1.00	0.24	0.04	0.72	1.00	0.37	0.01	0.63	1.00

Source: GSO database

5 Dynamic model of foreign ownership

In this section, we present evidence of foreign ownership in Vietnam. We begin by reviewing the basic theoretical model of foreign ownership. Following Kimura and Kiyota (2007), we then show the relation between foreign ownership and different firm characteristics. Next, we demonstrate how the dynamic corporate performance is driven by foreign ownership. Furthermore, we consider impacts of this one on firm survival in the Vietnamese market. Finally, in the expanded models, we deepen our understanding of the determinants of foreign ownership by introducing further variables that serve as proxies for firm size and technology effects.

5.1 A theoretical framework

To motivate our empirical work, we follow the theoretical dynamic model developed by Roberts and Tybout (1997), Bernard and Jensen (1999). We start from the assumption that firm i located in Vietnam try to maximize its profit by adjusting its output. Suppose the profit of firm i at period t is π_{it} . The profit of firm i depends on firm i 's characteristics reflected in vector Z_{it} as taking the reduced form:

$$\pi_{it} = f(Z_{it}) \quad (1)$$

Let the foreign-ownership status at period t be FOS_{it} , which takes value one if firm i is owned by foreign investors and zero otherwise. In this setting, the profit function of a foreign firm, denoted as $\tilde{\pi}_{it}$, is expressed as follows:

$$\tilde{\pi}_{it} = f(Z_{it}, FOS_{it}) \quad (2)$$

According to Baldwin and Krugman (1989), foreign firms must incur a sunk entry cost in order to enter the Vietnamese market for the first time. We suppose foreign firms face a sunk cost denoted as C if they were not in the Vietnamese market in the period $t-1$. This sunk cost is assumed to be the same across firms and periods. Rewriting (2), we have:

$$\tilde{\pi}_{it} = f(Z_{it}, FOS_{it}) - C(1 - FOS_{it-1}) \quad (3)$$

In period t , the foreign investors choose the sequence of their status $\{FOS_{ij}\}_{j=t}^{\infty}$ that maximizes the current value of payoffs given by:

$$V_{it}(Z_{it}) = \max E_t \left(\sum_{j=t}^{\infty} \delta^{j-t} \pi_{it} \mid Z_{it} \right) \quad (4)$$

where δ is the one period discount rate and expectations are conditioned on the firm characteristics set, Z_{it} . The foreign ownership status of firm i can be presented as FOS_{it} value that satisfies:

$$\tilde{\pi}_{it}^* = \tilde{\pi}_{it} + \delta(E[V_{it+1}(Z_{it+1}) | FOS_{it} = 1] - E[V_{it+1}(Z_{it+1}) | FOS_{it} = 0]) \quad (5)$$

Then, the dynamic framework of the foreign ownership status is given by:

$$FOS_{it} = \begin{cases} 1 & \text{if } \tilde{\pi}_{it}^* > C(1 - FOS_{it-1}) \\ 0 & \text{otherwise} \end{cases} \quad (6)$$

5.2 Baseline model

5.2.1 Foreign ownership and firms characteristics

We begin our empirical analysis by checking the determinants of foreign ownership. Taking equation (6), we have the empirical analysis form as follows:

$$FOS_{it} = \begin{cases} 1 & \text{if } \gamma Z_{it} - C(1 - FOS_{it-1}) + \varepsilon_{it} > 0 \\ 0 & \text{otherwise} \end{cases} \quad (7)$$

where ε_{it} is a disturbance term. Since our sample period is not long enough to adapt a linear probability model which requires at least two lags of the independent variables as instruments (see furthermore Bernard and Jensen (1999)), we thus follow Roberts and Tybout (1997), Bernard and Wagner (2001), Kimura and Kiyota (2007) to employ the probit model with random effects of the form:

$$FOS_{it} = \alpha + \beta FOS_{it-1} + \gamma Z_{it-1} + \eta_i + \mu_{it} \quad (8)$$

where η_i is firm-specific random effects and μ_{it} is a disturbance term. According to Kimura and Kiyota (2007), we lag all plant characteristics and other exogenous variables by one year to avoid possible simultaneity problems. The vector Z include some measure of profitability (ROA, ROE, TFP) and other characteristics such as the capital-labor ratio the number of domestic regular workers and average wages. The problem of multicollinearity arises when we use both value-added productivity and TFP as independent variables. Therefore, we include only TFP in the regression analysis¹³. Considering as a determinant of profitability, firm age is also controlled for. Indeed, young affiliates of foreign owned firms entering a new market may have to be cross-subsidized by their parent for some time. These firms could face high start-up and restructuring costs. Since there are sectoral differences in inward FDI, we include industry dummies to control for them. Year dummies are also used to control for exogenous

macroeconomic shocks. Thus our baseline econometric model has the form as:

$$FOS_{it} = \alpha + \beta FOS_{it-1} + \gamma_1 \ln L_{it-1} + \gamma_2 \ln age_{it-1} + \gamma_3 \ln wpe_{it-1} + \gamma_4 \ln intcap_{it-1} + \gamma_5 \ln tfp_{it-1} + \gamma_6 \ln roa_{it-1} + \gamma_7 \ln roe_{it-1} + \eta_i + \mu_{it} \quad (9)$$

To explain, $\ln L_{it-1}$ - number of employees, $\ln age_{it-1}$ - firm age, $\ln wpe_{it-1}$ - wage per employee, $\ln intcap_{it-1}$ - capital intensity, $\ln tfp_{it-1}$ - total factor productivity, $\ln roa_{it-1}$ - return on asset and $\ln roe_{it-1}$ - return on equity.

If the sunk cost has strong effects on foreign ownership, the coefficient β should be positive. We also expect the coefficient of profitability variables ($\gamma_5, \gamma_6, \gamma_7$) to have positive signs as we believe that they are an important factor for the decision of foreign acquisitions.

5.2.2 Performance gaps between domestic and foreign-owned firms

In a second stage, we examine the effects of foreign ownership on dynamic corporate performance. According to Bellak (2004), the standard empirical model of performance gaps between foreign owned firms and domestic owned firms has the following structure:

$$A_gap_i = f_i(FDI_i, Z_{i1}, Z_{i2}, O_{ij}) \quad (10)$$

where Z_{ij} is a vector of other firm- and industry-specific factors, postulated to impact on A_gap . A_gap may be defined in levels, in growth-rates or in differences domestic and foreign owned firms. The components of Z_{i1} include a wide range of industry-specific and firm-specific variables. Three variables, namely size of plants or firms, industry and parent country are standard control variables irrespective of the particular gap. The other variable of interest is FDI_i and measures, whether an indigenous firm is a multinational firm or a purely domestic firm. The components of Z_{i2} are specific to the gap in question. Ownership is accounted for by the variable O_{ij} , which may be a dummy variable (0,1) or represented, e.g. by the share of employees in foreign owned firms. We then run a simple regression of changes in performance measures, Z_{it} , on initial foreign ownership status and other firm characteristics as follows:

$$\begin{aligned} \Delta Z_{it} &= \ln Z_{it} - \ln Z_{it-1} \\ &= \alpha + \beta FOS_{it-1} + \gamma Char.s_{it-1} + \varepsilon_{it} \end{aligned} \quad (11)$$

where ΔZ_{it} denotes dependent variables that represent the gaps in the annual average growth rate of the performance between foreign and domestic firms in the same country such as: $\ln L_gr$, $\ln wpe_gr$, $\ln intcap_gr$, $\ln alp_gr$, $\ln tfp_gr$... Additional variables for firms characteristics in the initial year are the same as those used in equation (9). Therefore, the specification (11) is re-written as:

$$\begin{aligned} \Delta Z_{it} &= \alpha + \beta FOS_{it-1} + \gamma_1 \ln L_{it-1} + \gamma_2 \ln age_{it-1} + \gamma_3 \ln wpe_{it-1} \\ &\quad + \gamma_4 \ln intcap_{it-1} + \gamma_5 \ln tfp_{it-1} + \gamma_6 \ln roa_{it-1} + \gamma_7 \ln roe_{it-1} + \varepsilon_{it} \end{aligned} \quad (12)$$

In previous studies, they suggest that γ_3 has a positive sign implying that foreign owned firms pay higher wages than their counterparts as the organization of production or their use of production technology may require that they employ more skill-intensive employees than domestic owned firms (Doms and Jensen (1998)). Wage gaps thus can be an indication of a skill gap. However, Globerman et al. (1994) find that wage gaps will vanish if they control for size and capital-intensity. That means γ_3 should be ambiguous and will need to be estimated empirically. Closely related to wage gaps are skill gaps represented by capital-intensity. Clearly, higher wages could give rise to higher levels of effort by workers, so higher capital intensity. That's why the coefficient γ_4 should be positive. On the other side, higher wages may also increase an incentive of domestic workers. Then, γ_1 might have a positive sign. Generally, the theoretical analysis show that foreign owned firms perform better than domestic firms. The coefficient γ_5 must therefore have positive sign. Finally, as discussed in the previous section, we do not have any expectation for the sign of γ_6 and γ_7 .

5.2.3 Impacts of foreign ownership on firm survival

Respecting impacts of foreign ownership, another important question to be examined is whether foreign ownership is related to the likelihood of firm exit. It is often argued that foreign owned firms offer good performance, but may be more likely to exit from the local market, i.e., "foot-loose", compared to domestic owned firms. Then we end up with the model examining the impact of foreign ownership on firm survival. We run the regression of the form:

$$\begin{aligned}
S_{it} &= \alpha + \beta FOS_{it-1} + \gamma Z_{it-1} + \kappa_i + \varepsilon_{it} \\
&= \alpha + \beta FOS_{it-1} + \gamma_1 \ln L_{it-1} + \gamma_2 \ln age_{it-1} + \gamma_3 \ln wpe_{it-1} + \\
&\quad + \gamma_4 \ln intcap_{it-1} + \gamma_5 \ln tfp_{it-1} + \gamma_6 \ln roa_{it-1} + \gamma_7 \ln roe_{it-1} + \kappa_i + \varepsilon_{it}
\end{aligned} \tag{13}$$

where S_{it} equals 1 if the firm survives from year (t-1) to year t, FOS_{it-1} represents the foreign ownership dummies in year (t-1) and Z_{it} is a vector of corporate characteristics in year (t-1). If foreign firms are more likely to exit from the Vietnamese market than Vietnamese firms, the coefficient β must have a negative and statistically significant coefficient.

5.3 Model with size and technology effects

Because of the discontinuity of data, we have estimated contemporaneous specifications including the effects of firm size and technology under form of domestic affiliates number and R&D with a reduced sample size running from 2007 to 2011¹⁴. Particularly, we expand models (9), (12) and (13) by adding two variables controlling for affiliates number and the effect of R&D intensity which is defined as the

ratio of *R&D* spending to sales. Then, our models have the new form as:

$$\begin{aligned}
FOS_{it} = & \alpha + \beta FOS_{it-1} + \gamma_1 \ln L_{it-1} + \gamma_2 \ln age_{it-1} + \gamma_3 \ln wpe_{it-1} + \\
& + \gamma_4 \ln intcap_{it-1} + \gamma_5 \ln tfp_{it-1} + \gamma_6 \ln roa_{it-1} + \\
& + \gamma_7 \ln roe_{it-1} + \gamma_8 \ln affi_{it-1} + \gamma_9 \ln rds_{it-1} + \eta_i + \mu_{it}
\end{aligned} \tag{14}$$

$$\begin{aligned}
\Delta Z_{it} = & \alpha + \beta FOS_{it-1} + \gamma_1 \ln L_{it-1} + \gamma_2 \ln age_{it-1} + \gamma_3 \ln wpe_{it-1} + \\
& + \gamma_4 \ln intcap_{it-1} + \gamma_5 \ln tfp_{it-1} + \gamma_6 \ln roa_{it-1} + \\
& + \gamma_7 \ln roe_{it-1} + \gamma_8 \ln affi_{it-1} + \gamma_9 \ln rds_{it-1} + \varepsilon_{it}
\end{aligned} \tag{15}$$

$$\begin{aligned}
S_{it} = & \alpha + \beta FOS_{it-1} + \gamma_1 \ln L_{it-1} + \gamma_2 \ln age_{it-1} + \gamma_3 \ln wpe_{it-1} + \\
& + \gamma_4 \ln intcap_{it-1} + \gamma_5 \ln tfp_{it-1} + \gamma_6 \ln roa_{it-1} + \\
& + \gamma_7 \ln roe_{it-1} + \gamma_8 \ln affi_{it-1} + \gamma_9 \ln rds_{it-1} + \kappa_i + \varepsilon_{it}
\end{aligned} \tag{16}$$

where $\ln affi_{it-1}$ denotes the number of domestic affiliates while $\ln rds_{it-1}$ represent R&D spending-Sales ratio. In terms of firm size, many empirical studies reveal that foreign-owned firms tend to be larger than domestic owned firms. For instance, Howenstine and Zeile (1992) provide descriptive evidence in plant-scale gaps indicated that foreign-owned establishments are larger, on average, than US owned establishments. Furthermore, other studies also demonstrate that firm *size* and firm *growth* are not independent (Blonigen and Tomlin (2001), Oulton et al. (1998)). On this side, the question is whether the larger size of foreign-owned firms implying that foreign-owned firms grow faster than domestic firms. Regarding this question, there are two conflicting hypotheses, one on lower and the other on higher growth rates of foreign-owned firms¹⁵. Therefore, we suppose the coefficient of the variable $\ln affi$ should be ambiguous. In terms of *R&D* effects, several authors indicate that *R&D* expenditure might be reduced in the course of a foreign acquisition as *R&D* activities could be moved from affiliates to their parent companies and vice versa (Fors (1997)). This would lead to the hypothesis of a lower *R&D* spending of foreign-owned firms. The coefficient γ_9 is thus expected to have a negative sign.

5.4 Empirical Results

Tables 5, 7, 9 present regression results of equations 8, 10 and 11 respectively. The dataset applied for these models consist of about 194,900 firms from 2000 to 2013. Meanwhile, results of their expanded models including number of affiliates and R&D effects (i.e. equations 14, 15, 16) are reported in tables 6, 8, 10. The sample using in expanded models has reduced to 101,900 firms over the period 2007-2011.

Table 5 demonstrates that our baseline results are strongly robust irrespective of models with or without industry and year dummies. Lagged variables of *foreign ownership* are significant and positive implying that sunk cost has strong effects on foreign-ownership. Coefficients of *labor* is significantly negative in all regressions, indicating that potential foreign firms are not larger than other firms. This contrasts with evidence found in advanced countries but consistent with the reality that the size of

foreign firms in Vietnam remains quite small by international standards. According to the report of VCCI and USAID (2016), the median size of foreign firms in Vietnam is about 125 employees; 73.5 % of them have fewer than 200 employees. Indeed, 46.16 % of them have fewer than 50 employees. This share of small foreign firms has increased over time. A few sizable firms are represented in their survey; about 93 firms have over 1,000 employees. A significant and negative coefficient is also confirmed for the firm age, meaning potential foreign firms are younger than other firms. On the other hand, potential foreign firms tend to be more capital-intensive and more productive in terms of TFP as coefficients on *capital intensity* ($\ln\text{intcap}$) and *TFP* ($\ln\text{tfp}$) are significant and positive, supporting hypotheses that foreign investors which prefer to invest in domestic firms are more productive and more capital intensive. Finally, although coefficients of both indicators on profitability (ROA, ROE) are significant but ROA has a positive sign while ROE has a negative sign, meaning that potential foreign firms may have a higher return on asset but their return on equity is still lower than other firms. These results are different relative to the finding of Kimura and Kiyota (2007). He found that coefficients of ROA and ROE are not statistically significant and concluded that the entry decision by foreign investor does not depend on current profitability. In line with their conclusion but by another way, our results suggest that the investment decision of foreign firms does not depend on current profitability based on the mixed signs of ROA and ROE. It should be noted that the phenomenon of *transfer mis-pricing* may cause these results.

Table 6 is an expansion of table 5 which specifically focuses on two new independent variables represented number of affiliates ($\ln\text{affi}$) and ratio R&D on Sales ($\ln\text{rds}$). The main features of this table are as follows. First, since both coefficients on labor and affiliates number are significantly negative, we have more solid evidence to validate that the size of potential foreign firms is not larger than other firms. Second, as our expectation, the variable R&D/Sales has a significant and negative sign. That is to say among MNCs, R&D activities are only improved in parents enterprises then applied in affiliates abroad. Therefore, R&D spending of these affiliates should be reduced compared to local firms in host countries. In addition, coefficients on foreign dummy, labor, age, capital intensity, and TFP have the same signs as those reported in table 5. By contrast, the coefficient of average wage gets negative value but is not significant. Finally, ROA and ROE have negative signs but they are not significant, implying that their effects on foreign ownership are ambiguous. Nevertheless, this is consistent with the empirical result of Kimura and Kiyota (2007).

Table 7 reports regression results of the specification 10 by the random-effects model. The first column demonstrates the estimation result when the growth of labor is used as dependent variable. Results of the same regression but with the growth of wage per employee, capital intensity, TFP, ROA, ROE as dependent variables are presented in columns numbered from (2) to (7) respectively. Generally, the majority of estimated coefficients are significant at 1% meaning that our regression results are confident. The table shows that foreign ownership has strong positive effects on corporate performance as coefficients of foreign-owned dummy are positive in all margins, implying that foreign-owned firms grow faster than

Table 5: Regression Result of baseline model : Determinants of Foreign Ownership (1)

Independent variables (year t)	Dependent variable: Foreign ownership dummy (year t+1)			
	foreign (foreign owned dummy)	5.196*** (0.0673)	5.212*** (0.0643)	4.622*** (0.0444)
lnL (number of workers)	-0.218*** (0.0540)	-0.182*** (0.0515)	-0.200*** (0.0486)	-0.187*** (0.0463)
lnage (firm age)	-0.241*** (0.0292)	-0.253*** (0.0277)	-0.240*** (0.0267)	-0.253*** (0.0260)
lnwpe (W/L, millions VND, 2010 prices)	0.0992* (0.0520)	0.0354 (0.0496)	0.107** (0.0456)	0.0618 (0.0443)
lntcap (K/L, millions VND, 2010 prices)	0.146*** (0.0249)	0.105*** (0.0236)	0.157*** (0.0213)	0.104*** (0.0200)
lnthp (total factor productivity)	0.355*** (0.0513)	0.358*** (0.0498)	0.349*** (0.0473)	0.372*** (0.0461)
lnroa (Return on assets, %)	0.0858** (0.0360)	0.0894** (0.0347)	0.119*** (0.0329)	0.114*** (0.0311)
lnroe (Return on equity, %)	-0.0853** (0.0348)	-0.0956*** (0.0338)	-0.116*** (0.0309)	-0.123*** (0.0295)
Constant	3.165*** (0.397)	2.788*** (0.371)	3.107*** (0.342)	2.644*** (0.324)
Observations	102,459	102,459	102,459	102,459
Number of id	32,257	32,257	32,257	32,257
Industry dummy	Yes	No	Yes	No
Year dummy	Yes	Yes	No	No
Log-Likelihood	-1771	-1861	-2468	-2585

Notes: The dataset covers about 194,900 firms on the period 2000-2013. Random-effect probit model is in use. Robust standard errors are in parentheses (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: GSO database.

Table 6: Regression Result of expanded model : Determinants of Foreign Ownership (2)

Independent variables (year t)	Dependent variable: Foreign ownership dummy (year t+1)			
foreign (foreign owned dummy)	5.140*** (0.0762)	5.153*** (0.0715)	4.672*** (0.0639)	4.697*** (0.0613)
lnL (number of workers)	-0.294*** (0.0703)	-0.263*** (0.0672)	-0.341*** (0.0630)	-0.329*** (0.0596)
lnage (firm age)	-0.176*** (0.0388)	-0.185*** (0.0378)	-0.173*** (0.0365)	-0.182*** (0.0364)
lnwpe (W/L, millions VND, 2010 prices)	-0.0489 (0.0643)	-0.0876 (0.0614)	-0.0236 (0.0572)	-0.0517 (0.0543)
lnintcap (K/L, millions VND, 2010 prices)	0.0971*** (0.0302)	0.0597** (0.0289)	0.0653** (0.0259)	0.0229 (0.0247)
lnthp (total factor productivity)	0.439*** (0.0689)	0.449*** (0.0673)	0.505*** (0.0629)	0.531*** (0.0613)
lnroa (return on asset, %)	0.000313 (0.0440)	-0.000801 (0.0432)	-0.00136 (0.0389)	-0.00534 (0.0383)
lnroe (return on equity, %)	-0.0242 (0.0432)	-0.0316 (0.0427)	-0.0371 (0.0380)	-0.0449 (0.0377)
lnaffi (number of domestic affiliates)	-0.0349** (0.0139)	-0.0458*** (0.0139)	-0.0452*** (0.0140)	-0.0605*** (0.0145)
lnrds (R&D/Sales, %)	-0.0382* (0.0227)	-0.0435* (0.0222)	-0.215*** (0.0252)	-0.224*** (0.0242)
Constant	2.903*** (0.502)	2.688*** (0.481)	3.274*** (0.431)	2.992*** (0.406)
Observations	62,572	62,572	62,572	62,572
Number of id	23,630	23,630	23,630	23,630
Industry dummy	Yes	No	Yes	No
Year dummy	Yes	Yes	No	No
Log-Likelihood	-1156	-1201	-1526	-1584

Notes: The dataset covers about 101,900 firms on the period 2007-2011. Random-effect probit model is in use. Robust standard errors are in parentheses (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Source: GSO database.

domestic firms according to all performance measures. Particularly, gaps of annual average growth rates between these two types of firms are 2.83% in terms of labor, 1.57% in terms of average wage, 4.06% in terms of capital intensity, 2.46% in terms of average labor productivity, 5.34% in terms of TFP, 9.23% in terms of ROA and 8.39% in terms of ROE. Clearly, the highest gaps of growth rates are observed in profitability (ROA, ROE). However, in level, foreign-owned firms are still less profitable than domestic firms as indicated in section 4. Except for foreign-owned dummy, most of other independent variables seem to have negative effects on dependent variables. According to Kimura and Kiyota (2007), this fact is due to the "convergence effect" meaning that firms with lower performance grow faster than firms with higher performance and firms with poor performance must exit from the market. The coefficient of age gets the negative sign in the growth of average wage, labor productivity, and TFP but positive sign in the growth of labor, ROA, and ROE. That means younger firms under-perform older firms in terms of wages and productivity but outperform these latter in terms of labor and profitability. By contrast, the coefficient of capital intensity has a positive sign with respect to the growth of labor, wage, labor productivity and TFP but a negative sign to ROA and ROE accordingly, implying that more capital intensive firms could have performed better in terms of labor wage and productivity but might have less profitability than more labor-intensive firms.

Further, we investigate specification 10 controlling for effects of firm size in terms of affiliates number and R&D/Sales. Results are presented in table 8. Overall, the signs of estimated coefficients are mainly significant but slightly weaker than those reported in table 7. Foreign ownership does not positively affect all indicators of corporate performance. Indeed, coefficients of foreign-owned dummy show that foreign firms still grow faster but have lower profitability than domestic firms. Both additional variables *domestic affiliates number* and *R&D/Sales* have the same signs with regard to labor productivity, TFP, ROA, and ROE, indicating larger and more R&D intensive firms are more productive but less profitable than smaller and less R&D intensive firms. Finally, similar to results reported in the previous table, coefficient signs of other independent variables are mostly negative, confirming the convergence effect.

As for effects of ownership on firm survival, tables 9 and 10 present regression results of equations 13 and 16 respectively, using the probit model with random effects. Contrary to our expectation, results of both tables demonstrate that foreign-owned dummy variable is significantly positive whether or not we include industry and year dummies and control for various characteristics of firms. There is no evidence that firms with foreign ownership are more likely to exit from the Vietnamese market than local firms. Estimation results also show that surviving firms tend to be older, larger and more capital intensive than exiting firms. Therefore, on the one hand, firms with good performance seem to survive better than firms with bad performance, on the other hand, foreign ownership is not decisive in exiting from the market; by contrast, foreign-owned firms are likely to survive longer than domestic firms.

To sum up, our dynamic models demonstrate that potential foreign-owned firms in Vietnam are neither larger, nor more R&D intensive but younger, more productive and more capital intensive than other firms. Similar to the finding of Kimura and Kiyota (2007), the current profitability is not a

Table 7: Regression Result of baseline model: Effects of Foreign ownership on Dynamic corporate performance (1)

Independent variables (year t)	Dependent variables: growth of variables from year (t) to year (t+1)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
foreign (foreign owned dummy)	lnL-gr	lnwpe-gr	lnintcap-gr	lnalp-gr	lnftp-gr	lnroa-gr	lnroe-gr
	0.283*** (0.0104)	0.157*** (0.00685)	0.406*** (0.0143)	0.246*** (0.0106)	0.534*** (0.0145)	0.923*** (0.0229)	0.839*** (0.0236)
lnL (number of workers)	-0.396*** (0.00845)	-0.101*** (0.00624)	-0.144*** (0.0121)	0.697*** (0.00924)	0.316*** (0.0122)	-0.154*** (0.0183)	-0.142*** (0.0190)
lnage (firm age)	0.0443*** (0.00341)	-0.0791*** (0.00249)	0.0147*** (0.00506)	-0.0793*** (0.00328)	-0.0556*** (0.00477)	0.0968*** (0.00852)	0.0880*** (0.00900)
lnwpe (W/L, millions VND, 2010 prices)	0.0360*** (0.00751)	-0.868*** (0.00618)	-0.161*** (0.0103)	-0.0763*** (0.00804)	-0.0366*** (0.0108)	-0.118*** (0.0161)	-0.0997*** (0.0167)
lnintcap (K/L, millions VND, 2010 prices)	0.0634*** (0.00278)	0.00676*** (0.00202)	-0.684*** (0.00517)	0.0478*** (0.00274)	0.112*** (0.00385)	-0.0573*** (0.00672)	-0.0715*** (0.00722)
lnftp (total factor productivity)	0.0288*** (0.00782)	0.171*** (0.00597)	0.240*** (0.0115)	-0.611*** (0.00897)	-0.597*** (0.0118)	0.258*** (0.0174)	0.303*** (0.0181)
lnroa (return on asset, %)	-0.00947** (0.00456)	-0.0333*** (0.00312)	-0.0577*** (0.00649)	-0.0345*** (0.00421)	-0.0482*** (0.00614)	-0.619*** (0.0103)	-0.0241** (0.0112)
lnroe (return on equity, %)	0.0151*** (0.00430)	0.0288*** (0.00289)	0.0392*** (0.00610)	0.0331*** (0.00396)	0.0521*** (0.00577)	-0.249*** (0.00981)	-0.886*** (0.0109)
Constant	0.564*** (0.0572)	2.846*** (0.0436)	3.317*** (0.0837)	-2.810*** (0.0610)	-2.368*** (0.0829)	0.974*** (0.126)	1.196*** (0.131)
Observations	144,008	144,002	144,005	144,001	144,002	115,348	115,243
Number of id	49,257	49,256	49,255	49,257	49,255	40,117	40,072
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq overall	0.130	0.301	0.231	0.206	0.167	0.321	0.343

Notes: The dataset covers about 194,900 firms on the period 2000-2013. Random-effect model is in use.

Estimated coefficients indicate the gaps of growth rate between foreign and domestic firms.

Robust standard errors are in parentheses (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: GSO database.

Table 8: Regression Result of expanded model: Effects of Foreign ownership on Dynamic corporate performance (2)

Independent variables (year t)	Dependent variables: growth of variables from year (t) to year (t+1)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	L-gr	w-gr	intcap-gr	alp-gr	tfp-gr	roa-gr	roe-gr	affi-gr	rds-gr
foreign (foreign owned dummy)	0.158*** (0.00996)	0.146*** (0.00809)	0.289*** (0.0152)	0.240*** (0.0123)	0.409*** (0.0152)	0.837*** (0.0276)	0.754*** (0.0289)	-0.106*** (0.0122)	-0.0696*** (0.0164)
lnL (number of workers)	-0.266*** (0.00984)	-0.117*** (0.00844)	-0.126*** (0.0154)	0.630*** (0.0124)	0.379*** (0.0155)	-0.115*** (0.0249)	-0.0646*** (0.0262)	-0.00690 (0.0143)	0.0512*** (0.0132)
lnage (firm age)	0.00492 (0.00386)	-0.0632*** (0.00320)	0.0269*** (0.00651)	-0.0769*** (0.00428)	-0.0853*** (0.00569)	0.0374*** (0.0113)	0.0162 (0.0120)	0.0240*** (0.00492)	0.0315*** (0.00635)
lnwpe (W/L, millions VND, 2010 prices)	0.0606*** (0.00882)	-0.839*** (0.00858)	-0.159*** (0.0126)	-0.101*** (0.0109)	-0.0349** (0.0137)	-0.0900*** (0.0216)	-0.0566** (0.0225)	0.00433 (0.0130)	0.0133 (0.0123)
lnintcap (K/L, millions VND, 2010 prices)	0.0620*** (0.00334)	0.000647 (0.00267)	-0.588*** (0.00746)	0.0489*** (0.00364)	0.113*** (0.00488)	-0.0229** (0.00933)	-0.0310*** (0.0101)	0.00637 (0.00434)	0.0103** (0.00405)
lnlfp (total factor productivity)	0.0365*** (0.00912)	0.196*** (0.00815)	0.222*** (0.0146)	-0.533*** (0.0121)	-0.511*** (0.0151)	0.243*** (0.0239)	0.254*** (0.0251)	0.0327** (0.0138)	0.00289 (0.0128)
lnroa (return on asset, %)	0.00887* (0.00500)	-0.0183*** (0.00379)	-0.0428*** (0.00779)	-0.00538 (0.00510)	0.00411 (0.00703)	-0.532*** (0.0140)	-0.0218 (0.0155)	-0.0233*** (0.00702)	-0.00965 (0.00705)
lnroe (return on equity, %)	-0.00451 (0.00495)	0.0194*** (0.00366)	0.0326*** (0.00742)	0.0136*** (0.00491)	0.00939 (0.00688)	-0.249*** (0.0138)	-0.799*** (0.0157)	0.0173** (0.00689)	0.00224 (0.00698)
lnaffi (number of domestic affiliates)	0.00586*** (0.00165)	0.0117*** (0.00128)	0.00585** (0.00258)	0.0107*** (0.00174)	0.0160*** (0.00242)	-0.0167*** (0.00426)	-0.0104** (0.00462)	-0.178*** (0.00338)	0.0165*** (0.00269)
lnrds (R&D/Sales, %)	0.00260 (0.00281)	0.00808*** (0.00232)	0.00850** (0.00333)	0.00641** (0.00278)	0.00868** (0.00391)	-0.0294*** (0.00665)	-0.0238*** (0.00688)	0.00259 (0.00505)	-0.945*** (0.0111)
Constant	0.515*** (0.0667)	3.324*** (0.0606)	3.491*** (0.108)	-1.831*** (0.0835)	-1.397*** (0.106)	0.221 (0.174)	0.419** (0.183)	-0.721*** (0.101)	-4.528*** (0.100)
Observations	71,296	71,295	71,296	71,294	71,294	59,052	59,013	68,643	48,290
Number of id	27,777	27,776	27,776	27,777	27,777	23,506	23,496	26,654	21,924
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-sq overall	0.0772	0.267	0.197	0.149	0.0747	0.228	0.236	0.110	0.507

Notes: The dataset covers about 101,900 firms on the period 2007-2011. Random-effect model is in use.

Estimated coefficients indicate the gaps of growth rate between foreign and domestic firms.

Robust standard errors are in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Source: GSO database.

Table 9: Regression Result of baseline model: Effects of Foreign ownership on Firm survival (1)

Independent variables (year t)	Dep. var: firm survival dum. (year t+1)	
foreign (foreign owned dummy)	0.291*** (0.0626)	0.394*** (0.0779)
lnL (number of workers)	0.0659 (0.0422)	0.0643 (0.0563)
lnage (firm age)	0.365*** (0.0231)	0.456*** (0.0276)
lnwpe (W/L, millions VND, 2010 prices)	-0.177*** (0.0461)	0.0295 (0.0512)
lnintcap (K/L, millions VND, 2010 prices)	-0.0312** (0.0138)	-0.0266 (0.0169)
lnthp (total factor productivity)	0.0526 (0.0416)	0.0490 (0.0540)
lnroa (return on asset, %)	0.121*** (0.0224)	0.0156 (0.0292)
lnroe (return on equity, %)	-0.0808*** (0.0206)	0.00736 (0.0271)
Constant	-2.747*** (0.364)	-1.262*** (0.392)
Observations	144,011	144,011
Number of id	49,257	49,257
Industry dummy	No	Yes
Year dummy	No	Yes
Log-Likelihood	-8014	-7234

Notes: The dataset covers about 194,900 firms on the period 2000-2013. Random-effect probit model is in use. Robust standard errors are in parentheses (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.1$. Source: GSO database.

Table 10: Regression Result of expanded model: Effects of Foreign ownership on Firm survival (2)

Independent variables (year t)	Dep. var.: firm survival dum.	
	(year t+1)	
foreign (foreign owned dummy)	0.365*** (0.135)	0.371*** (0.139)
lnL (number of workers)	0.160** (0.0778)	0.172** (0.0821)
lnage (firm age)	0.0632** (0.0299)	0.0567* (0.0311)
lnwpe (W/L, millions VND, 2010 prices)	0.0286 (0.0716)	0.0341 (0.0754)
lnintcap (K/L, millions VND, 2010 prices)	0.0750*** (0.0209)	0.0525** (0.0224)
lnthp (total factor productivity)	-0.0404 (0.0732)	-0.0383 (0.0777)
lnroa (return on asset, %)	0.0385 (0.0390)	0.0276 (0.0418)
lnroe (return on equity, %)	0.00473 (0.0380)	0.0134 (0.0398)
lnaffi (number of domestic affiliates)	-0.00969 (0.0122)	-0.0189 (0.0126)
lnrds (R&D/Sales, %)	-0.0130 (0.0266)	0.0116 (0.0281)
Constant	-1.490*** (0.536)	-1.560*** (0.560)
Observations	71,299	71,299
Number of id	27,778	27,778
Industry dummy	No	Yes
Year dummy	No	Yes
Log-Likelihood	-1526	-1491

Notes: The dataset covers about 101,900 firms on the period 2007-2011. Random-effect probit model is in use. Robust standard errors are in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Source: GSO database.

determinant of foreign ownership. However, there might be biases concerning self-reported profits due to the phenomenon called *transfer mis-pricing* within MNCs in Vietnam. Our study of the performance gaps between foreign and domestic owned firms, consistent with previous studies, also confirm that foreign firms generally grow faster than domestic firms according to all margins of performance. However, after controlling for the effects of firms size in terms of affiliates number and R&D/Sales ratio, though foreign firms grow faster in mostly margins, they are less profitable than domestic firms. Furthermore, there exists a *convergence effect* implying that firms with lower performance grow faster than firms with higher performance. Additionally, younger firms perform better than older firms in wages, productivity but underperform the last ones in terms of labor and profitability. By contrast, larger, more capital intensive and more R&D intensive firms display higher productivity growth but have lower profitability than smaller, more labor intensive and less R&D intensive firms. Finally, by examining the impact of foreign ownership on firm survival, we found significant evidence suggesting that foreign-owned firms can survive better on local market than domestic firms.

6 Conclusion

The paper is an attempt to recent new empirical studies of the relationship between foreign ownership and corporate performance. Based on the dataset of Vietnamese manufacturing firms for the period 2000-2013, this study tries to further investigate the role of FDI in an emerging economy by comparing economic performances of foreign-owned firms with those of Vietnamese firms both in static and dynamic approaches. Important findings of this paper are threefold. First, static comparison results, as well as regression results, confirm that foreign-owned firms outperform domestic owned firms in terms of productivity but under-perform these latter ones in terms of profitability. Nonetheless, there exists among MNCs in Vietnam the phenomenon *transfer mis-pricing* which might underestimate the real profitability of foreign-owned firms. That could cause the bias in our estimation results. In any respect, consistent with the finding of Kimura and Kiyota (2007), we suggest that the current profitability does not matter in the decision of foreign investors. Besides, foreign-owned firms have other characteristics such as younger, smaller, more productive, more capital intensive and less R&D intensive than Vietnamese-owned firms. Second, foreign-owned firms grow faster than domestic firms in all margins of performance. However, once controlling for the effects of firm size and R&D spending/Sales, they become less profitable than domestic firms. In this aspect, we also find out the *convergence effect* among Vietnamese manufacturing firms, meaning that firms with lower performance grow faster than firms with higher performance. Third, by checking the survival of foreign firms relative to Vietnamese firms, unlike the suggestion of Kimura and Kiyota (2007), we see that foreign-owned firms seem to survive better on the Vietnamese market than domestic firms.

Finally, our results show that spillovers have occurred between foreign firms and Vietnamese-owned firms as the latter ones could benefit through learning, adaptation, worker mobility from the former which

have superior performance in capital, technology, and productivity. On the other hand, performance comparisons can also be linked to the literature of foreign entry effect on the market structure. In this strand of literature, the foreign entry may have a direct impact on the conduct and performance of local firms and improve the competition between two kinds of firms to avoid elimination from the market. Our evidence proved that firms with good performance tend to survive better than firms with bad performance and Vietnamese firms are more likely to exit, which might be due to the selection process. With respect to policy intervention, another concern that Vietnamese policy makers have to face is the *transfer mispricing* within MNCs which may seriously reduce public gains of the total economy. Bellak (2004) argued that foreign-owned firms are often less profitable despite their superior performance in economic terms, points to such rent-shifting activity rather than to inferior profitability. This is absolutely in line with our finding in the paper. In addition, the sunk cost is also an issue which needs to pay attention on, suggesting that Vietnamese policymakers must improve transparency which has important direct and indirect effects on foreign investors' decisions to expand their operations.

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Notes

¹They divided indicators examined into five groups of economic indicators related to (i) firm or plant size (e.g. employees, sales [output] or value added per firm or plant); (ii) factor productivity and factor payments (e.g. value added or sales per worker or unit of capital, compensation per employee); (iii) factor intensity (total assets or fixed assets per employee, investment per unit of value added); (iv) functional income distribution (labor compensation per unit of value added or sales, profits per unit of value added or sales); and (v) trade propensities (exports or imports per unit of value added or sales).

²In general, these differentials tend to be small between foreign MNCs and SOE and SOE tend to be larger than foreign MNCs in terms of employment. Correspondingly, comparisons of foreign MNCs with Non-MNCs reveal more consistent differences.

³For the full definition of variables, see Appendix A

⁴For the definition of the length of firm life, see Appendix A

⁵The data collection for the number of domestic affiliates is discontinued.

⁶The data collection for R&D spending is discontinued.

⁷A registered firm is defined as "an independent economic unit that has acquired its legal status under Law on State-owned Enterprises, Cooperative Law, Law on Enterprises, Foreign Investment Law or by the Agreement between Vietnamese government and the government of foreign countries" (GSO, 2010, p. 4).

⁸See <http://unstats.un.org/unsd/cr/ctryreg/ctrydetail.asp?id=1448>

⁹If there is a tie in the industry code to which the firm belonged for the majority of the surveyed years, the code of the latest year is assigned.

¹⁰A negative ROE can be obtained when firms have loss (negative income)/positive equity or when they have positive income/negative equity. Since we excluded firms with negative equity in the database, then only firms with negative income remain in our sample

¹¹The most common form of a set of profit shifting techniques is called *transfer mispricing*.

¹²The foreign investment survey carried out by VCCI covers a highly representative selection of 1,609 firms from 49 countries whose operations are located in the 13 most economically developed provinces of Vietnam. While the PCI-FDI survey is not the only survey of foreign investment in Vietnam, it is the largest and most comprehensive

¹³For the multicollinearity test, see Appendix table C3.

¹⁴See Appendix C2. for the availability of variables used in the dataset.

¹⁵The argument for lower growth rates of foreign-owned firms entering for the first time into a local market is uncertainties in obtaining material inputs which may arise from monitoring problems of employees or other factors and the lower capital intensity, mostly if they are small firms. On the other hand, the argument for higher growth rates of foreign-owned firms is that growth is related to learning. In this case, the growth rate of the firm will depend on the FDI type (i.e. acquisition or greenfield).

Appendices

A Main Variables

All nominal output and inputs variables are available at the firm level. Industry level data are used for price indexes and depreciation rates.

Foreign-owned firm. Foreign-owned firm is a firm that satisfies two conditions: register as foreign-owned firm under the Investment Law issued in 2005 of Vietnam and account for at least 10% equity share by foreigners.

Domestic-owned firm. The domestically-owned firm is a firm registered as a foreign-owned firm with less than 10% equity share by foreigners or a firm belongs to other firm types except foreign-ownership type under the Investment Law issued in 2005 of Vietnam.

Nominal net sales. Following the law no 14/2008/QH12 on enterprise income tax and the Circular no 200/2014/TT-BTC guiding accounting policies, (nominal) gross sales are defined as the total revenue including revenue of selling goods, products and provisions of services (such as providing transportation or travel services, leasing of fixed assets by operating lease way, construction contract...) plus the remuneration from processing (not including values of materials and processed goods) when the firm is a processing enterprise. Net sales are gross sales less the cost of sales returns, allowances, and discounts: tax on special consumption, tax on exported goods, VAT calculated by the direct method.

Real net sales. Real net sales are defined as nominal net sales deflated by the Producer's price index (PPI) at the 2 digits industrial level with the base year 2010.

Real value added. Real value added is defined as Nominal value added deflated by the PPI. Nominal value added is not directly observable on GSO data as we lack the information on the material consumptions. Thus, nominal value added is measured using the addition method, in which the value added is the sum of total labor cost, annual depreciation of fixed assets, operating profit before tax and other taxes on production.

Total labor cost. The total labor cost includes wages and other income that employees receive in terms of allowance and bonuses, and the employers contribution to social insurance, health insurance, and trade union fees.

Annual depreciation of fixed assets. Annual depreciation of fixed assets is computed as the difference between the accumulated depreciation of fixed assets at the end and the beginning of each year. Following the circular no 45/2013/TT-BTC, accumulated depreciation of fixed assets is the total depreciation deducted in the production and business costs through the business cycles of fixed assets as of the reporting date. Accumulated depreciation of fixed assets is compiled directly from GSO's data.

Other taxes on production Other taxes on production consist of taxes that enterprise must pay to the State to undertake production activities. They mainly consist of annual taxes on the land ownership/land-use rights, buildings, and other assets used in the production. As these taxes are not observable directly on GSO's data, they are computed as the difference between total taxes and taxes

on products including VAT (VAT on domestic selling goods/imported goods), tax on imported/exported goods, tax on income, tax on special consumption.

Average labor productivity. Real value added over the number of employees

Real capital stock. Real capital stock is measured as the real fixed tangible assets at the end of each year. Real tangible fixed assets are measured as nominal tangible fixed assets divided by the manufacturing PPI. Following Ha and Kiyota (2014), because of the unavailability of the investment goods price deflator, we have to replace it by the manufacturing PPI. That's also why it's not possible to employ the perpetual investment method to compute the TFP.

Capital intensity. Real capital stock over the number of employees

Input cost share. Input cost share is the sum of total labor cost and capital cost. For the capital cost, we use nominal fixed tangible assets.

Labor input. The total number of employees at the end of each year.

Wage per employee. Total labor cost over the number of employees.

ROA (returns on assets). Return on assets is the ratio of annual net income to average total assets of a business during a financial year.

ROE (returns on equity). Return on equity or return on capital is the ratio of net income of a business during a year to its stockholders' equity during that year.

Net income. Net income is the after-tax income.

Average total asset. Average total assets are calculated by dividing the sum of total assets at the beginning and at the end of the financial year by 2.

Average shareholders' equity. Average shareholders' equity is calculated as the mean of shareholders' equity at the beginning and at the end of the year.

Survival firm dummy. Survival firm dummy equals 1 if the firm survives from year $t-1$ to year t .

Length of firm life. The number of years that a firm survives from the first entry year to the exit year ($\text{length} = \text{exit_year} - \text{entry_year} + 1$)

Firm age. The number of years that a firm survives from the first entry year to the reported year ($\text{age} = \text{reported_year} - \text{entry_year} + 1$).

SOE (State-owned enterprises) include following types: (1) Enterprises with 100% of capital owned by the State and under control of central or local authorities; (2) Limited liability companies with 100% of capital owned by the State and under control of central or local authorities; (3) Joint-stock companies with domestic capital, of which the State owns more than 50% of the registered charter capital.

Non-SOE (Non-state owned enterprises) are enterprises set up by domestic capital. The capital may be owned by private with 1 or individual group or the government when the capital of the government is equal or less than 50% of registered capital. There are following types of non-state enterprises: (1) private enterprises; (2) cooperative name companies; (3) private limited companies; (4) joint stock companies without capital of State; (5) Joint-stock companies with capital contributed from the State is less than 50% of the registered charter capital.

B Computation of Total Factor Productivity

The methodology given in Caves et al. (1982) and Good et al. (1997) consists of computing the TFP index for firm i at time t as follows:

$$\ln TFP_{it} = \ln Y_{it} - \overline{\ln Y}_t + \sum_{\tau=2}^t (\overline{\ln Y}_\tau - \overline{\ln Y}_{\tau-1}) - \left[\begin{aligned} & \sum_{n=1}^N \frac{1}{2} (S_{nit} + \overline{S}_{nt}) (\ln X_{nit} - \overline{\ln X}_{nt}) \\ & + \sum_{\tau=2}^t \sum_{n=1}^N \frac{1}{2} (\overline{S}_{n\tau} + \overline{S}_{n\tau-1}) (\overline{\ln X}_{n\tau} - \overline{\ln X}_{n\tau-1}) \end{aligned} \right] \quad (\text{A-1})$$

where Y_{it} denotes real added value produced by firm¹⁶. i at time t using the set of n inputs X_{nit} , where input X is alternatively capital stocks (K), labour in terms of hours worked (L) and intermediate inputs (M). S_{nit} is the cost share of input X_{nit} in the total cost (Appendix A provides a full description of the variables). Subscripts τ and n are indices for time and inputs, respectively. Symbols with upper bars correspond to measures for the reference point (the hypothetical firm), computed as the means of the corresponding firm level variables, over all firms in year t . Note that Eq.(A-1) implies that reference points $\overline{\ln Y}$ and $\overline{\ln X}$ are the geometric means of the firm's output quantities and input quantities respectively, whereas the cost shares of inputs for representative firms \overline{S} are computed as the arithmetic mean of the cost share of all firms in the dataset. This approach to measuring TFP growth has the advantage of not requiring direct estimation of the underlying technology and therefore of not requiring econometric specification and estimation of production functions. This multilateral productivity index measures the proportional difference in the TFP of any firm i against the reference firm. It guarantees the transitivity of any comparison between two firm-year observations in expressing each firm's input and output as deviations from a single reference point. This method is therefore particularly well-suited for the analysis of panel data. Finally, note that first-differencing the logarithmic values of our TFP index measures can be interpreted as gaps in percentage points if they remain small.

C Additional tables

Table C1.: Number of firms across years

Year	Domestic firms	Foreign firms	Total
2000	5,125	663	5,788
2001	5,431	898	6,329
2002	6,643	980	7,623
2003	7,507	1,286	8,792
2004	9,118	1,639	10,757
2005	10,381	1,839	12,220
2006	10,315	2223	12,537
2007	12,045	2,404	14,448
2008	15,386	2,597	17,983
2009	14,803	2,886	17,689
2010	15,981	3,107	19,088
2011	16,761	3,421	20,182
2012	17,187	3,393	20,580
2013	17,541	3,350	20,891
Total	164,224	30,686	194,910

Source: GSO database

Table C2.: The availability of variables used in the dataset

Variable name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sales	a	a	a	a	a	a	a	a	a	a	a	a	a	a
Number of labors	a	a	a	a	a	a	a	a	a	a	a	a	a	a
Capital labor ratio (K/L)	a	a	a	a	a	a	a	a	a	a	a	a	a	a
Average wage (wages/L)	a	a	a	a	a	a	a	a	a	a	a	a	a	a
Labor productivity (VA/L)	a	a	a	a	a	a	a	a	a	a	a	a	a	a
Value added	a	a	a	a	a	a	a	a	a	a	a	a	a	a
TFP (total factor productivity)	a	a	a	a	a	a	a	a	a	a	a	a	a	a
Returns on asset (ROA)	a	a	a	a	a	a	a	a	a	a	a	a	a	a
Returns on equity (ROE)	a	a	a	a	a	a	a	a	a	a	a	a	a	a
R&D expenditure	a	a	a	n/a	a	n/a	n/a	a	a	a	a	a	n/a	n/a
N. of domestic affiliates	n/a	a	n/a	n/a	n/a	n/a	a	a	a	a	a	a	a	a
Firm age	a	a	a	n/a	n/a	a	n/a	a	a	a	a	n/a	a	a
Equity share of foreign owned firms	a	n/a	a	a	a	a	a	a	a	a	a	a	a	a

Missing values of domestic affiliates number and age are interpolated from neighboring non-missing values. The equity share of foreign-owned firms is not available for the year 2001, we thus have to define foreign-owned firm of this year by the alternative way according to its business registration under the Investment Law issued in 2002 of Vietnam. Source: GSO database

Table C3.: Multicollinearity test

Model including both lntfp and lnalp			Model including only lntfp		
Variable	VIF	1/VIF	Variable	VIF	1/VIF
lntfp	316875.63	0.00	lntfp	31.31	0.03
lnL	185337.28	0.00	lnL	19.72	0.05
lnalp	82209.15	0.00	sector15_5	12.12	0.08
y_9	1013.34	0.00	sector15_1	10.83	0.09
y_12	886.95	0.00	sector15_15	10.15	0.10
y_13	839.23	0.00	lnroa	9.85	0.10
y_11	536.13	0.00	lnroe	9.77	0.10
y_10	515.45	0.00	sector15_2	9.66	0.10
y_8	126.24	0.01	sector15_9	8.83	0.11
y_6	70.74	0.01	sector15_3	8.71	0.11
y_5	41.20	0.02	sector15_6	5.79	0.17
y_7	27.46	0.04	sector15_12	5.08	0.20
y_2	17.44	0.06	lnwpe	4.86	0.21
sector15_5	11.98	0.08	sector15_13	4.82	0.21
sector15_1	10.68	0.09	sector15_7	4.67	0.21
sector15_15	10.03	0.10	y_12	4.66	0.21
lnroa	9.86	0.10	y_13	4.48	0.22
y_3	9.84	0.10	y_11	4.44	0.23
lnroe	9.77	0.10	y_10	4.21	0.24
sector15_2	9.53	0.10	y_9	3.97	0.25
sector15_9	8.75	0.11	y_8	3.80	0.26
sector15_3	8.41	0.12	y_7	3.50	0.29
y_4	6.58	0.15	y_6	3.24	0.31
sector15_6	5.67	0.18	y_5	3.05	0.33
sector15_12	5.13	0.19	y_4	2.67	0.38
lnwpe	4.86	0.21	sector15_14	2.59	0.39
sector15_13	4.70	0.21	lnintcap	2.59	0.39
sector15_7	4.61	0.22	y_3	2.48	0.40
lnintcap	2.59	0.39	sector15_8	2.45	0.41
sector15_14	2.55	0.39	y_2	2.13	0.47
sector15_8	2.39	0.42	sector15_10	2.04	0.49
sector15_10	2.00	0.50	sector15_4	2.02	0.49
sector15_11	1.98	0.51	foreign	1.50	0.67
foreign	1.50	0.67	lnage	1.21	0.83
lnage	1.21	0.83			
Mean VIF	16818.02		Mean VIF	6.27	

Source: GSO database

Table C4.: Correlation matrix

	foreign	foreign (t+1)	lnL	lnage	lnwpe	lnintcap	lnthfp	lnroa	lnroe	lnaffi	lnrds
Correlation Matrix 1											
(obs=62,572)											
foreign (foreign owned dummy)	1.000										
Foreign (t+1)	0.977	1.000									
lnL (number of workers)	0.322	0.319	1.000								
lnage (firm age)	0.002	-0.001	0.306	1.000							
lnwpe (W/L, millions VND, 2010 prices)	0.272	0.279	0.170	0.113	1.000						
lnintcap (K/L, millions VND, 2010 prices)	0.305	0.309	0.108	0.197	0.377	1.000					
lnthfp (total factor productivity)	0.456	0.459	0.861	0.294	0.566	0.404	1.000				
lnroa (return on asset, %)	0.270	0.268	0.193	0.068	0.194	0.002	0.328	1.000			
lnroe (return on equity, %)	0.257	0.255	0.275	0.106	0.253	0.037	0.412	0.925	1.000		
lnaffi (number of domestic affiliates)	-0.064	-0.069	0.232	0.202	0.085	0.094	0.222	0.010	0.056	1.000	
lnrds (R&D/Sales, %)	-0.010	-0.031	0.105	0.075	-0.037	0.032	0.065	0.007	0.013	0.099	1.000
Correlation Matrix 2											
(obs=71,299)											
foreign (foreign owned dummy)	1.000										
survive (survive dummy)	0.011	1.000									
lnL (number of workers)	0.325	0.020	1.000								
lnage (firm age)	0.007	0.091	0.305	1.000							
lnwpe (W/L, millions VND, 2010 prices)	0.264	0.037	0.173	0.101	1.000						
lnintcap (K/L, millions VND, 2010 prices)	0.295	0.027	0.114	0.198	0.370	1.000					
lnthfp (total factor productivity)	0.452	0.033	0.863	0.290	0.568	0.401	1.000				
lnroa (return on asset, %)	0.260	-0.002	0.189	0.064	0.176	-0.014	0.314	1.000			
lnroe (return on equity, %)	0.251	0.005	0.274	0.102	0.239	0.024	0.404	0.926	1.000		
lnaffi (number of domestic affiliates)	-0.056	0.001	0.243	0.198	0.088	0.098	0.232	0.009	0.057	1.000	
lnrds (R&D/Sales, %)	-0.008	-0.014	0.110	0.071	-0.039	0.033	0.068	0.009	0.015	0.099	1.000

Source: GSO database

Table C5.: Estimated share of firms engaged in transfer mis-pricing (by profit)

Profit threshold	N	Estimated transfer mis-pricing (%)				
		Share of firms	SE	T-value	P-value	High estimate
Over 20% profit margin	39	65.1%***	10.1%	6.4	0.0	48.9%
10% -20% profit margin	105	44.5%***	6.9%	6.4	0.0	33.5%
5%- 10% profit margin	262	12.3%	9.7%	1.3	0.23	-3.2%
0%- 5% profit margin	455	9.1%*	4.8%	1.9	0.08	1.4%
Broke even	163	19.7%	15.2%	1.3	0.22	-4.6%
5%-0% loss	176	30.9%	17.4%	1.8	0.1	3.1%
10%-5% revenue loss	76	-2.1%*	24.6%	-0.1	0.93	-41.5%
Over 10% revenue loss	68	-0.3%	20.4%	0.0	0.99	-32.9%

*** p<0.01, ** p<0.05, * p<0.1 Source: VCCI and USAID (2014)

Table C6.: Survival and exit patterns of the manufacturing firms, by year

year	All of firms			Domestic owned firms			Foreign owned firms		
	Exit	Survival	Total	Exit	Survival	Total	Exit	Survival	Total
2000	196	5,592	5,788	181	4,944	5,125	15	648	663
2001	97	6,232	6,329	88	5,343	5,431	9	889	898
2002	119	7,504	7,623	108	6,535	6,643	11	969	980
2003	41	8,752	8,793	40	7,467	7,507	1	1,285	1,286
2004	80	10,677	10,757	77	9,041	9,118	3	1,636	1,639
2005	147	12,073	12,220	143	10,238	10,381	4	1,835	1,839
2006	29	12,509	12,538	28	10,287	10,315	1	2,222	2,223
2007	181	14,268	14,449	172	11,873	12,045	9	2,395	2,404
2008	200	17,783	17,983	193	15,193	15,386	7	2,590	2,597
2009	144	17,545	17,689	138	14,665	14,803	6	2,880	2,886
2010	260	18,828	19,088	255	15,726	15,981	5	3,102	3,107
2011	53	20,129	20,182	51	16,710	16,761	2	3,419	3,421
2012	162	20,418	20,580	157	17,030	17,187	5	3,388	3,393
2013	795	20,096	20,891	659	16,882	17,541	136	3,214	3,350
Total	2,504	192,406	194,910	2,290	161,934	164,224	214	30,472	30,686

Conditional exit rate and survival rate

year	All of firms			Domestic owned firms			Foreign owned firms		
	Exit	Survival	Total	Exit	Survival	Total	Exit	Survival	Total
2000	0.03	0.97	1.00	0.04	0.96	1.00	0.02	0.98	1.00
2001	0.02	0.98	1.00	0.02	0.98	1.00	0.01	0.99	1.00
2002	0.02	0.98	1.00	0.02	0.98	1.00	0.01	0.99	1.00
2003	0.00	1.00	1.00	0.01	0.99	1.00	0.00	1.00	1.00
2004	0.01	0.99	1.00	0.01	0.99	1.00	0.00	1.00	1.00
2005	0.01	0.99	1.00	0.01	0.99	1.00	0.00	1.00	1.00
2006	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
2007	0.01	0.99	1.00	0.01	0.99	1.00	0.00	1.00	1.00
2008	0.01	0.99	1.00	0.01	0.99	1.00	0.00	1.00	1.00
2009	0.01	0.99	1.00	0.01	0.99	1.00	0.00	1.00	1.00
2010	0.01	0.99	1.00	0.02	0.98	1.00	0.00	1.00	1.00
2011	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
2012	0.01	0.99	1.00	0.01	0.99	1.00	0.00	1.00	1.00
2013	0.04	0.96	1.00	0.04	0.96	1.00	0.04	0.96	1.00
Total	0.01	0.99	1.00	0.01	0.99	1.00	0.01	0.99	1.00

A conditional survival rate is for the ratio of surviving firms to that in the previous year.

Source: GSO database