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Entry Mode Choice and Performance of Foreign Direct Investment Firms in Emerging Economies: Micro-evidence from Viet Nam

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Abstract: *Does the right entry mode choice help foreign direct investment (FDI) firms to perform efficiently in emerging economies? This study attempts to answer this question by examining the impact of the entry mode choice made by FDI firms on their post-entry performance in emerging markets. Using a dataset derived from specific firms for the period 2002–2016, this study accounts for the selection biases and inherent differences of FDI firms that affect their selection of entry strategies. The study found that, with regard to the manufacturing sector, the ownership type with a wholly owned subsidiary (WOS) had negative impacts on either the technical efficiency or the total factor productivity (TFP) of firms. Conversely, regarding all sectors in the economy, the WOS is likely to have a positive role on technical efficiency and TFP. It is also interesting to see that for firms with an equity joint venture (EJV) type, the higher proportion of capital contribution from domestic firms might lead to lower technical efficiency and TFP. It implies that the higher degree of management and control by the domestic firms compared with foreign firms would have negative impacts on the EJV firms' performance.*

Keywords: Entry mode choice; FDI firms; Viet Nam; Endogenous switching regression model; Foreign firm performance; Emerging economies.

JEL Classification: L24, L25, P27, F23, D22.

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1. Introduction

During the past 2 decades, foreign direct investment (FDI) has become a significant source of economic modernisation, economic growth, and job creation in emerging economies (OECD, 2002). Many emerging economies have rapidly reduced their barriers to FDI and created a policy infrastructure to increase and sustain multinational firms (Hanson, 2001). Amongst emerging investment markets, Viet Nam is one of the most attractive destinations. This is not surprising, given the country's large population, 70% of which is under the age of 35, and a rapidly growing middle class and high annual economic growth. FDI has become an important element of Vietnamese economic development. It not only contributes to catalyse Viet Nam's socio-economic development but also promotes its economic integration into the global economy since Viet Nam started transitioning to a market-oriented model. It specifically contributes to Viet Nam's economic development in many aspects, such as creating jobs and contributing to the state budget, modernising manufacturing and industrial production, promoting growth, and increasing export capacity. However, many FDI firms still do not perform well, with low productivity and failure to achieve their business targets, and many still exit the market. Therefore, one of the most pressing concerns, not only in the case of Viet Nam, is to have a better understanding of how to enhance FDI's role and improve its performance. This would also be helpful to other emerging economies. In other words, only through better clarification of the factors' impact on their performance can we provide better advice and solutions.

Based on these issues, the role and question of what factors have an impact on the performance and survival of foreign firms in emerging countries to improve their performance has recently aroused much interest from scholars (Agarwal and Audretsch, 2001; Arnold and Javorcik, 2009; Bandick and Gorg, 2010; Lin, 2000). Entry mode choice is one of the most important factors that determine the success or failure of firms' strategies during their international expansion. It is defined as the institutional arrangement for the organisation and conduct of international business transactions (Andersen, 1997). Many theoretical and empirical studies on entry mode choice have focused on its determinants, such as market potential, competitive conditions, transaction cost, institutional factors, and country risk.

Although there is a substantial body of literature examining the model of entry mode choice, its impact on firms' post-entry performance remains largely unknown (Agarwal and Audretsch, 2001; Bandick and Gorg, 2010). This shortcoming is notable in the growing number of FDI firms investing in emerging economies.

A relevant question that could be raised is, 'Does the right entry mode choice help FDI firms to perform efficiently?' To answer this question, this study investigates several cases of FDI projects in Viet Nam, taking the country as an emerging economy representative. Specifically, it aims to investigate these impacts by employing an econometric model (endogenous switching regression model) to correct the problem of endogeneity and selection bias. The study focuses on the firms' productivity and technical efficiency to cultivate a more comprehensive understanding of their performance. We utilise datasets from 28,785 FDI projects in the manufacturing sector in Viet Nam during 2002–16. The data were sourced from the Vietnamese Ministry of Planning and Investment. FDI projects comprise around 86% of the projects included in the study, and joint ventures account for 14%. The two main choices of entry mode examined were wholly owned subsidiaries (WOSs) and equity joint ventures (EJVs).

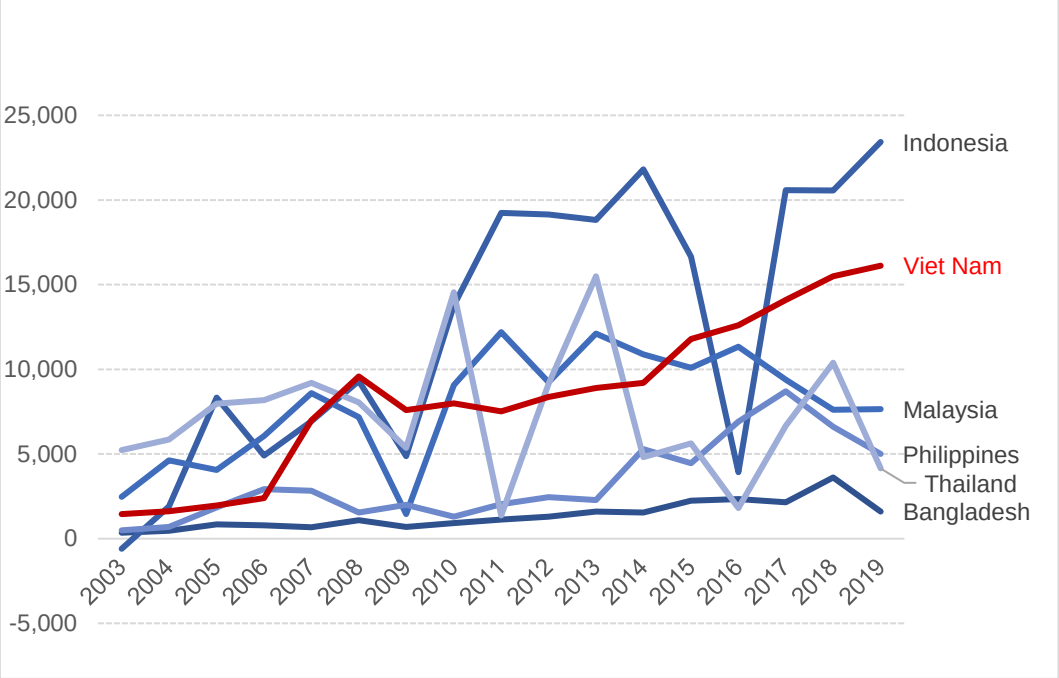
Since firms choose their entry mode strategies based on their attributes and the conditions of the relevant industry, their entry mode choice exposes endogeneity and self-selection. If these econometric problems are not considered, the results will be significantly biased. To correct this, we employed an endogenous switching regression model. This model accounts for both endogeneity and selection bias. The findings of this research contribute to a better understanding of the processes and determinants of survival in the global market, especially in emerging economies. Specifically, they demonstrate the causal relationship between a firm's global market-entry decisions and its subsequent performance.

There are several compelling reasons for studying the case of Viet Nam as an emerging economies' representative. First, since its integration into the global economy in the early 1990s, Viet Nam, an emerging country, has undergone a transition process that involves a firm commitment to attracting FDI. Viet Nam was amongst the top 20 host economies worldwide for inward FDI in 2018 (United Nations Conference on Trade and Development [UNCTAD], 2019; see Figure 1).

According to UNCTAD (2019), Viet Nam attracted 5.4% of the total inward FDI in the Association of Southeast Asian Nations by the end of 2014. Besides, the number of foreign countries that set up their operations in Viet Nam varies and can therefore advance a more comprehensive view of investment in emerging countries. From this perspective, then, Viet Nam presents an appropriate case study through which to investigate the effects of FDI firm entry strategies on a company's survival in an emerging country. Second, studies have examined some exogenous factors in emerging economies that affect foreign firms' performance, but many have ignored the endogenous factors, such as chosen entry strategy, which might lead to their success or failure. With Viet Nam and other emerging countries, these factors may be especially significant (Shieh and Wu, 2012; Tsang, 2005; Vu, Yamada, and Otsuki, 2017). For FDI firms, an entry mode choice into Viet Nam, as well as into other emerging countries, could be made difficult by the high levels of external uncertainty and internal constraints in those countries (Kokko and Thang, 2014; Lin, 2000). Despite the rapid growth of FDI inflow in Viet Nam, the census data show a high rate of multinational enterprises (MNEs) exiting the Vietnamese market, a finding consistent with that of Ha and Kiyota (2014), who found a high turnover (approximately 35% for both entry and exit rates in 2008) of manufacturing firms in the country, including domestic firms. Third, although much academic literature has focused on the determinants of the entry mode choice of foreign firms in Viet Nam, there has been little research into its impact on firms' performance. Therefore, from a policy perspective, questions about the impact of FDI firms' entry mode choices on their performance are very important.

Figure 1: Foreign Direct Investment: Inward Flows and Stock

(million US$)



Data source: www.unctadstat.unctad.org/ (accessed 1 January 2021).

The paper proceeds as follows. Section 2 is the literature review. Section 3 provides the conceptual framework. Section 4 focuses on the analytical framework. Section 5 explains the data collection and extraction and the descriptive statistics. Section 6 reports the estimation results and discussion. The final section concludes with policy implications.

2. Literature

This study is based on three main strands of literature. The first strand provides evidence of how the FDI firms' performance is affected by their entry mode choice. Few empirical studies have been conducted in this field. Li (1995) employed the hazard rate model to examine the effects of entry strategies, diversification strategies, and organisational learning on the probability of foreign subsidiaries' survival. The results showed that foreign firms that enter through joint ventures and acquisitions are more likely to exit than those that enter through greenfield investments. These results are highly supported in the pharmaceutical

and computer industries. Shaver (1998) emphasised the importance of accounting for selection bias in research on the impact of entry mode choice on firm performance. He showed that, without accounting for selection bias, greenfield entries could have more survival advantages compared to acquisitions. However, estimates from models that did not consider self-selection bias could lead to misleading conclusions. Vu et al. (2017) provided important evidence of the relationship between firms' characteristics and ownership structure and the probability of firm exit in Viet Nam by using the Cox hazard model. The study found that the ownership type is highly associated with the likelihood of exiting and, hence, the duration of survival.

Our study differs from that of Vu et al. (2017) in different aspects: first, Vu et al. (2017) used dummy variables representing the foreign ownership types. This approach can provide estimates of dummy variables for firms that will exit. However, it may not profoundly reflect a firm's entry mode choice—the focus of our study. This estimation could not accurately capture the impact of the firm's type on its survival unless is satisfies the following two conditions: (1) firms make errors regularly when they select their strategy, which means their choice process is random; (2) there are no unobservables on the firm's survival, implying that all determinants of firm survival are incorporated in the model. Our study clarifies the impact of a firm's entry mode choice through selection and outcome equations. These regimes will effectively help us incorporate the firm's choice and managerial strategic decision-making into estimates of strategy performance. Second, Vu et al. (2017) focused on the determinants of firm survival using Cox hazard models, which can effectively examine all determinants of a firm's probability of survival. However, this study does not account for endogeneity or self-selection bias. Their methodology mainly accounts for the problem of sample selection bias and heterogeneity, which we highly appreciate. However, since our study concentrates on the impact of entry mode choice on firm performance instead of other determinants, the endogeneity problem (especially self-selection bias) needs to be addressed. Third, by employing the endogenous switching regression (ESR) model, we can evaluate the counterfactuals in the entry mode choice. For example, would the firm be better off if they select other entry modes instead of their current choice?

Another value added to our study over Vu et al. (2017) is that we incorporate the technical efficiency and productivity of FDI firms as a measure of firm performance, whereas Vu et al. (2017) only considered the probability of firms' survival as their main indicator. Hence, we believe that our research contributes as a significant supplement to the study by Vu et al. (2017).

The second strand of literature concerns the theoretical foundation of entry mode choice. There are several theoretical approaches related to foreign firms' choices of WOS and EJV. One could be the resource-based view approach, which argues that firms' entry mode choice is mainly motivated by profit maximisation (Kogut and Zander, 1992). Others are based on the transaction cost approach, which emphasises that firm entry decisions are motivated by the minimisation of production and transaction costs (Chen and Hu, 2002; Williamson, 1979).

The third strand of literature relates to the determinants of firms' performance in emerging economies. These studies provide important evidence on which to base our selection of appropriate covariates in our ESR model. For example, economic and cultural distances are considered important factors that determine FDI firms' performance. Tsang and Yip (2007) argued that the hazard rates of FDI firms are lower in countries that are more or less developed compared to a home country than are FDI firms' hazard rates in countries with similar economic development; they examined a sample of FDI made by Singaporean firms and found that acquisitions lead to lower hazard rates than greenfield investments in more developed countries and vice versa in less developed countries.

Based on previous literature, a vast gap exists in examining the impact of firm entry strategies on performance in emerging economies. There is no agreement about which entry model is the best choice for such firms (Woodcock, Beamish, and Makino, 1994). Additionally, most research has considered market share performance as the main indicator of evaluation of the long-term potential of foreign firms. This approach might not be sufficient to reflect the success of a firm's strategy. Firm performance as the technical efficiency and productivity is increasingly arousing interest as an important indicator of business performance because it indicates a failure in the firms' original business strategies.

The key contributions of our study are as follows: The findings could be

important to previous research on the process and effect on global market entry, survival, and exit of firms. In addition, employing the ESR model could correct selection bias when dealing with firms' entry decisions. Results from this econometric model would significantly contribute to previous research on entry mode choices, which mostly ignored this important econometric issue. Another value added by our study is that, since we focus on emerging economies, with Viet Nam as the case study, we focus more on the factors that determine the external uncertainty and internal constraints that are striking features of emerging economies. Next, investigating the dynamics of firm behaviour in relation to their choice of entry mode and their performance would help us further analyse the outcomes based on structural changes in companies' management processes. Finally, our research extends the previous literature by incorporating technical efficiency as another indicator of firm performance. Most studies on the impact of entry mode choice only focus on the firm's exit as the main indicator of firm performance. However, in our study, the analysis of firm's technical efficiency would cultivate a better understanding of firm performance, which could enable us to investigate the impacts of entry mode choice on their performance more comprehensively.

3. Conceptual Framework

3.1. Entry mode choice theory

When a firm wants to enter a foreign market, the primary factor to be carefully considered is the entry mode choice, i.e. their internationalisation strategy. Shen et al. (2017) defined the entry mode choice as a structural agreement that enables a firm to carry out its business activities in a foreign market given its market strategy and resources. The strategies of foreign market entry relate to the choice of the target market, entry mode choice, marketing strategies, and management and control systems. The type of entry mode choice in the foreign market determines firm performance (Davidson, 1982; Killing, 1982). There are four main modes of foreign market entry: EJV, WOS, licensing, and exporting. An EJV is defined as follows: 'A joint venture occurs when two or more firms pool a portion of their resources within a common legal organization' (Kogut, 1988). Conversely, a WOS

is a separate, independent legal entity that is entirely owned and controlled by a foreign firm.

A firm may decide to operate and conduct activities such as production, research and development, and marketing through its subsidiaries. A firm might take advantage of independent distributors to export and invest in the host country. It will take considerable time, money, and effort to make a correct decision, and, once the decision is made, it is also very difficult to change it. Evidently, the entry mode choice plays a very important role in both pre-entry and post-entry of the firm and is tied to the firm's core control over subsidiaries, competency contributions, parent-subsidiary relations, and potential vulnerability to external changes in foreign countries.

The theory of Dunning's ownership, localisation, and internationalisation (OLI) paradigm, the bargaining power theory, the transaction cost theory, and the theory of organisational capability paradigm are amongst the popular theories related to the choices of entry mode during international expansion. Dunning's OLI paradigm states that the entry mode choice is determined by three types of determinants (or OLI advantages), namely, the locational advantages of the market, the internalisation advantages of integrating, and the advantages of firm ownership (Dunning, 1980). In particular, contextual uncertainties, market opportunities, and governmental policies from the host country have a fundamental influence on MNEs' entry mode choice. It is also noted that once a firm selects its entry mode choice, the cost that stems from the interactions between the mode and these factors would be largely exogenous. This implies that it would not be easy to switch entry modes once those firms have already entered the foreign market. The theory distinguishes between the low control entry mode and high control entry mode in that the latter is preferred when integration with the target host country is high; otherwise, when integration is narrow, low control modes may be more appropriate.

Conversely, the transactional cost theory argues that the entry mode that MNEs would choose is mainly based on their attitudes toward transaction cost minimisation (Hennart, 1989; Williamson, 1985). Here, transactional costs come from transactions with other parties in the market. This includes the costs of contract negotiation and monitoring the behaviour of those parties to the contracts. When

the transactional cost is high, a rational firm would prefer an entry in which the control system follows an internal management structure (for example, a WOS). However, if the cost of adaptation and performance monitoring is low, then the firm prefers its transactions to be controlled by the market.

The theory of organisational capability holds the view that the entry mode should be chosen with careful consideration of the status and development of MNEs' capabilities. The theory indicates that it would be inadequate if a firm relies solely on its capabilities. Hence, an entry mode based on the collaboration will be more effective when the MNEs face the pressure of intense global competition. The fundamentals of collaboration are not only through the cost-efficient alternative but also the spillover from knowledge acquisition.

From these theories, we realised that a firm's entry mode choice depends on both external and internal factors. These factors are very helpful for referring to and selecting the appropriate determinants for the entry mode choice. This means that we prefer the multi-factorial approach to examining entry mode choices, following the eclectic paradigm proposed by Dunning (1980), rather than simply considering a single theory to explain foreign investors' choices. We specified these explanatory variables in Section 5.2.

3.2. Performance of the firms

There are different frameworks and approaches for assessing the performance of FDI firms. According to Worthington and Dollery (2000), an organisation's performance can be divided into two principal components: efficiency and effectiveness.

(i) Efficiency relates to the level at which an organisation utilises its resources to produce its services. Alternatively, it reflects the relationship between the optimal and actual combination of inputs taken to produce a given amount of output. Both theoretical and empirical studies indicate that efficiency can be categorised into three types: technical, allocative, and productive efficiency. Technical efficiency is considered a principal element in economic profitability because it relates to the ability of the firm to produce the maximum output from the minimum quantity of inputs, such as labour and capital. Allocative efficiency refers to a firm's capability to allocate its inputs into optimal proportions given its prices (Ajibefun and

Daramola, 1999). Productive efficiency is a combination of allocative and technical efficiency.

(ii) Effectiveness describes the level at which an organisation achieves the programme and its policy targets, especially if it involves a variety of desired aspects linked to the goals of the programme outcome: (1) appropriateness (how well it matches customer service needs); (2) affordability (aspects such as availability, priority group representation, and physical accessibility); (3) the outcome itself; and (4) quality (the process of achieving the requirements or the incidence of service failure).

We see that this framework is feasible and effectively allows us to assess the performance of the firm based on the micro-data of the Vietnamese enterprises' survey. In our study, we focus on technical efficiency and total factor productivity as the main indicators for the efficiency assessment of FDI firms' performance. More details of how we construct the technical efficiency and total factor productivity (TFP) with Olley and Pakes' method can be found in Appendix A.1 and A.2. The FDI firms' performances are illustrated in Appendix C, with the estimates of firms' TFP under either ordinary least squares (OLS) or the Olley–Pakes approach as well as firms' technical efficiency through the stochastic frontier production approach.

4. Analytical Framework

The OLS method could be one of the most straightforward approaches to investigate the impact of entry mode choice on firm performance, which enables us to simply add a dummy variable of entry mode (0 if a firm takes the EJV and 1 if a firm chooses WOS as their main strategy). However, this approach would expose the bias problem of endogeneity because there are unobservable characteristics, capacities of those firms, and other unobservable factors that not only influence firms' entry mode decisions but also impact their performance. This issue leads to inconsistent estimates.

Furthermore, the problem of self-selection bias arises because the selection of firms' entry mode choice depends mainly on their own decisions (Wooldridge, 2020; Greene, 2018). Therefore, we employed an ESR to account for these

problems (self-selection bias and endogeneity). This model is well-designed to tackle these problems by applying the Full information maximum likelihood (FIML) method to match the ESR (Lokshin and Sajaia, 2004). An advantage of the ESR model is that it also accounts for the structural differences between firms with EJV and WOS toward their outcome functions.

4.1. Endogenous switching regression model

An ESR model is employed to evaluate the impact of firm entry mode choice on FDI performance. The representative variables for the performance of FDI firms are the firms' technical efficiency indicators and TFP. To account for selection bias, the Heckman sample selection and treatment effect could be considered as an effective model (Heckman, 1979). However, one of the main disadvantages is that it cannot capture the inherent differences between the two groups, which are, in this case, the FDI firms that chose the WOS as their entry mode and those that chose EJV as their entry mode. For this issue, the ESR model can solve the selection bias and capture the inherent differences between the two models. The first stage demonstrates the decision of whether FDI firms choose WOS or EJV. The second stage is executed by the ERS model to evaluate the impact of each entry decision on the outcome variables.

Stage 1: Selection equation of choosing the entry mode:

$$C_i^* = I_i\alpha + u_i \tag{1}$$

with $$C_i = \begin{cases} 1 & if \;\; C_i^* > 0 \\ 0 & otherwise \end{cases} \tag{2}$$

Stage 2: Outcome equation:

Regime 1

(FDI firms with WOS): $$Y_{1i} = X_{1i}\beta_1 + \varepsilon_{1i} \qquad if \quad C_i = 1 \tag{3}$$

Regime 2

(FDI firms with EJV): $$Y_{0i} = X_{0i}\beta_0 + \varepsilon_{0i} \qquad if \quad C_i = 0 \tag{4}$$

We define the selection of entry mode in equation (1) as the difference in the expected value of entering by WOS and the expected value of entering by EJV for investment i. C_i^* denotes the latent variable that represents the probability that the FDI firms will select WOS as the entry mode choice. A firm will decide to enter by WOS if its expected value of entering by WOS is higher than the expected value of entering by EJV for investment i. C_i will equal 1 if a firm selects WOS as its entry strategy and 0 otherwise. I_i represents the vector of covariates that determine a firm's entry decisions. In this case, I_i encompasses the following explanatory variables: the characteristics of an FDI firm: firm's size, assets, investments, the indicators of provincial business management and the indulgence versus restraint (IVR) index. These variables were selected based on a review of explanatory variables on entry mode choice in the FDI literature (e.g. Harzing, 2002).

Equations (3) and (4) represent endogenous switching regressions that account for the selection biases and structural differences between their entry decisions (Lokshin and Sajaia, 2004). These equations are estimated using the FIML method. A foreign firm encounters two regimes: entry with the WOS (regime 1) and entry with the EJV (regime 2). Y_{0i} and Y_{1i} are the outcomes of FDI firms' performance. In this case, they are the technical efficiency indicator, TFP under OLS estimation and TFP under Olley and Pakes' 1996 estimation. X_{0i}, X_{1i} denote vectors of exogenous variables. In our model, we include the variable of firm's size, capital, short-term assets, long-assets, investment, and external factors that could affect the performance which come from the provincial management and business environment. The sets of variables I_i from the selection equation and X_i from the outcome equation could overlap.

The ESR model can be used to estimate the expected outcomes of a firm's performance as follows:

$$E(Y_{1i}|C_i = 1; X_{1i}) = X_{1i}\beta_1 + \sigma_{\varepsilon_{1i}u_i}\lambda_{1i} \quad (5)$$

$$E(Y_{0i}|C_i = 0; X_{1i}) = X_{0i}\beta_0 + \sigma_{\varepsilon_{0i}u_i}\lambda_{0i} \quad (6)$$

$$E(Y_{0i}|C_i = 1; X_{1i}) = X_{1i}\beta_0 + \sigma_{\varepsilon_{0i}u_i}\lambda_{1i} \quad (7)$$

$$E(Y_{1i}|C_i = 0; X_{1i}) = X_{0i}\beta_1 + \sigma_{\varepsilon_{1i}u_i}\lambda_{0i} \quad (8)$$

Equations (5) and (6) reflect the actual expectation that could be observed, while equations (7) and (8) represent the counterfactuals expected outcomes. $\sigma_{\varepsilon_{1i}u_i}$ represents the covariance of the error terms ε_{1i} and u_i. $\sigma_{\varepsilon_{0i}u_i}$ denotes the covariance of the error terms ε_{0i} and u_i. λ_{1i} and λ_{0i} represent inverse mills ratios, which are derived from the selection equation to correct for possible selection bias.

According to Heckman et al. (1998) and Di Falco, Veronesi, and Yesuf (2011), the effects of the Average Treatment on the Treated (ATT), which estimates the impact of the firm performance that actually have WOS as their entry choice rather than EJV, is as follows:

$$\begin{aligned} ATT = {} & E(Y_{1i}|C_i = 1; X_{1i}) - E(Y_{0i}|C_i = 1; X_{1i}) \\ & = (\beta_1 - \beta_0)X_{1i} + \left(\sigma_{\varepsilon_{1i}u_i} - \sigma_{\varepsilon_{0i}u_i}\right)\lambda_{1i} \end{aligned} \tag{9}$$

Additionally, we are able to evaluate the effect of the average treatment effect on the untreated (ATU) for firms that actually did not choose WOS as the difference between equations (8) and (6) as follows:

$$\begin{aligned} ATU = {} & E(Y_{1i}|C_i = 0; X_{1i}) - E(Y_{0i}|C_i = 0; X_{1i}) \\ & = (\beta_1 - \beta_0)X_{0i} + (\sigma_{\varepsilon_{1i}u_i} - \sigma_{\varepsilon_{0i}u_i})\lambda_{0i} \end{aligned} \tag{10}$$

Furthermore, we could also examine the heterogeneity effects (BH_1 and BH2) as the difference between equations (5)–(8) as well as (6)–(7) as follows:

$$\begin{aligned} BH_1 = {} & E(Y_{1i}|C_i = 1; X_{1i}) - E(Y_{1i}|C_i = 0; X_{1i}) \\ & = (X_{1i} - X_{0i})\beta_1 + \sigma_{\varepsilon_{1i}u_i}(\lambda_{1i} - \lambda_{0i}) \end{aligned} \tag{11}$$

$$\begin{aligned} BH_2 = {} & E(Y_{0i}|C_i = 1; X_{1i}) - E(Y_{0i}|C_i = 0; X_{1i}) \\ & = (X_{1i} - X_{0i})\beta_0 + \sigma_{\varepsilon_{0i}u_i}(\lambda_{1i} - \lambda_{0i}) \end{aligned} \tag{12}$$

Our study also takes into consideration of the 'transitional heterogeneity' (TH), accounting for the difference between ATU and ATT. The TH effect shows whether the decision of taking WOS as the main entry mode choice of the firm will lead to higher technical efficiency for the firms who did not take this strategy in the counterfactual case that they took this entry mode choice.

To estimate the endogenous switching regression model, FIML is considered the most efficient method. The method simultaneously accounts for both selection and outcome equations. All parameters are also estimated simultaneously to generate consistent standard errors (Lokshin and Sajaia, 2004).

$$\begin{aligned} \ln L = \sum_{i} \Bigg(& C_i w_i \left[\ln\{F(\eta_{1i})\} + \ln \left\{ \frac{f\left(\frac{\varepsilon_{1i}}{\sigma^2_{\varepsilon_{0i}}}\right)}{\sigma^2_{\varepsilon_{0i}}} \right\} \right] + (1 \\ & - C_i) w_i \left[\ln\{1 - F(\eta_{2i})\} + \ln \left\{ \frac{f\left(\frac{\varepsilon_{2i}}{\sigma^2_{\varepsilon_{1i}}}\right)}{\sigma^2_{\varepsilon_{1i}}} \right\} \right] \Bigg) \end{aligned} \tag{13}$$

$$\text{and } \eta_{ij} = \frac{(\gamma Z_i + \frac{\rho_j \varepsilon_{ji}}{\sigma^2_{\varepsilon_{ji}}})}{\sqrt{1 - \rho_j^2}} \; ; j = 0,1 \tag{14}$$

Where w_i represents an optional weight for observation C_i; F demonstrates the cumulative normal distribution function; and f is a normal density distribution function; $\rho_0 = {\sigma_{\varepsilon_{0i}u_i}}^2 / \sigma_{\varepsilon_{0i}} \sigma_{u_i}$ is denoted as the correlation coefficient between ε_{0i} and u_i. Similarly, $\rho_1 = {\sigma_{\varepsilon_{1i}u_i}}^2 / \sigma_{\varepsilon_{1i}} \sigma_{u_i}$ is the correlation coefficient between ε_{1i} and u_i. In this paper, we apply the probability weights (pweight) for FIML. The probability weights would enable us to get the standard errors using a robust sandwich estimator. To guarantee that ρ_0, ρ_1 fell into the range of $(-1,1)$ and that the estimated values of $\sigma^2_{\varepsilon_{0i}}$ and $\sigma^2_{\varepsilon_{1i}}$ were positive, the FIML estimation directly accounts for $ln\sigma^2_{\varepsilon_{0i}}$, $ln\sigma^2_{\varepsilon_{1i}}$ and $atanh\ \rho_j$ as follows:

$$atanh\,(\rho_j) = \frac{1}{2} ln\left(\frac{1+\rho_j}{1-\rho_j}\right) \tag{15}$$

where $atanh\,(\rho_j)$ represents the inverse hyperbolic tangent of ρ_j. The atanh function works on ρ_j element-wise.

4.2. Tests for the validity of Instrumental Variables for ERS model

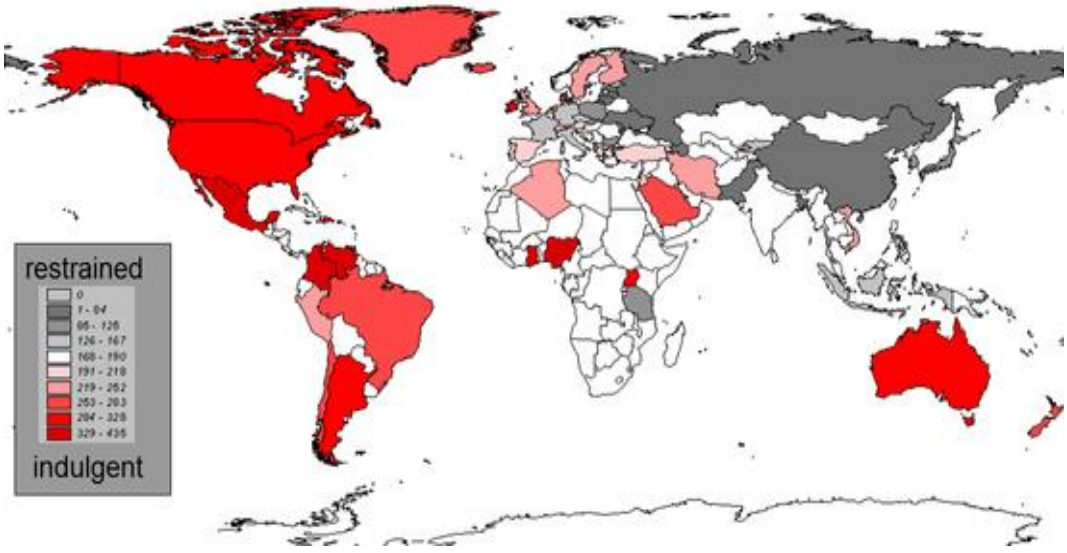
There is a problem of endogeneity when we investigate the impact of entry mode choice on a firm's performance. This stems from two potential causes, which are omitted variables and simultaneous causality. Simultaneous causality happens if there is a simultaneous association between the firm's performance and the entry mode choice. Omitted variable bias occurs if the model omits those variables that are correlated to the regressor of interest and are the determinant of the dependent variable. In this case, there are some unobservable characteristics, such as management ability, organizational capacity, and risk-taking attitudes. While hardly measured in the data, these characteristics have an impact on the firm's technical efficiency and its entry mode choice. For example, for some enterprises, the strong management skills of the firm's managers might be the factor that would lead them to choose WOS as their entry strategy. The ability of senior management also has a positive impact on the firm's performance. Hence, omitting the variable of management skills would lead to the problem of endogeneity. To correct the endogeneity bias, the instrumental variable (IV) is considered as the effective method (Green, 2018; Wooldridge, 2020). A valid and effective IV should satisfy two conditions: (1) an exogeneity condition: it should be uncorrelated with disturbance terms and (2) a relevant condition: it is correlated with endogenous variables. In other words, it means that the instrument could correlate with the dependent variable only indirectly through its relationship with the endogenous variable.

In this study, we see the IVR variables as the suitable IV. The IVR index was created and measured by Professor Geert Hofstede in 2020 (Hofstede, 2020). The range of the index has indulgence as the lower bound and restraint as the upper bound. Indulgence stands for a society that allows relatively free gratification of

basic and natural human needs related to enjoying life and having fun. Restraint stands for a society that suppresses the gratification of needs and regulates it using strict social norms (Hofstede et al., 2010; Hofstede et al., 2020; see Figure 2). In this sense, the population in a society with a higher restraint index would be more likely to adapt to strict social norms than those belonging to a society with more indulgence. In this case, if the foreign firms are from a country with a high degree of restraint, they would find it easier to accept the rules and regulations of the host country. Regarding EJV enterprises, the host country sets as many rules and regulations as possible so as to monitor and control the operation of foreign firms. Hence, those foreign firms from high-restraint countries could be more likely to consider EJV if they found it was a more efficient strategy. On the other hand, those firms used to a high degree of indulgence might find it hard to adapt to the new, stricter regulations of the host country and might prefer WOS as their entry strategy.

The IVR index is also expected to satisfy the condition of exclusion restriction in this case. Indeed, the degree of indulgence and restraint of the society does not influence the firm's technical efficiency and it affects its outcome only through the entry mode choice. Hence, the IVR index is believed to be the suitable IV in this case.

Figure 2. World Map of Indulgence Versus Restraint (IVR) Index



Source: Hofstede et al. (2020).

Technically, to check the validity of the IV, we conducted several tests, which are illustrated in Table 1 with a 2016 dataset. To check whether the problem of endogeneity appears in the model, we used the Durbin–Wu–Hausman test as the effective tool. The Durbin–Wu–Hausman test shows that the P-value is small (P=0.0667), which indicates that we are able to reject the hypothesis of H_0 that the variables were exogenous, confirming the presence of endogeneity in the model. The next step is to check whether the IV is associated with the endogenous variable but uncorrelated with the disturbance terms in the model. Specifically, the first stage will assess the strength of the IV. In this case, the Stock and Yogo (2005) test of a weak instrument would be efficient. The test provides useful rules of thumb related to the weakness of instruments to ensure that a weak IV does not pose a serious problem. Table 1 indicates the test statistics of the limited information maximum likelihood estimator size of a nominal 5% Wald test, 2SLS size of a nominal 5% Wald test, and the Kleibergen–Paap rk Wald F statistic. Since those variances in this case are robust, we use Kleibergen–Paap rk Wald F statistics to check the weak IV. These values demonstrate that the IV is not weak because the Kleibergen–Paap rk Wald F value of 40.29 is much higher than the critical value of 16.38 at the 10% rejection rate for the IV.

Table 1. Tests of Instrumental Variables for ESR model

First Stage Regression Test IV	The technical efficiency of FDI firms as dependent variable IVR index as instrument variable			
	Critical value			
	10%	15%	20%	25%
2SLS Size of nominal 5% Wald test	16.38	8.96	6.66	5.53
LIML Size of nominal 5% Wald test	16.38	8.96	6.66	5.53
Kleibergen–Paap rk Wald F statistic	40.29			
Summary Statistics	R-Sq. = 0.0413 Adjusted. R-Sq. = 0.0386; Partial R-Sq. = 0.0149 Prob > F = 0.0000			
Tests of endogeneity				
Durbin (score) chi2(1)	3.34071 (p =0.0676)			
Wu–Hausman F(1;1,356)	3.36515 (p =0.0667)			

ESR = endogenous switching regression, FDI = foreign direct investment, IV = instrumental variable, IVR = indulgence versus restraint, LIML = limited information maximum likelihood estimator.
Note:
IVR index is measured as the range between indulgence and restraint. Indulgence reflects a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. By contrast, restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms (Hofstede, 2020).
Source: Authors' calculation.

4.3. Propensity Score Matching (PSM) as the robustness check

The Propensity Score Matching (PSM) method aims to reconstruct the counterfactuals based on a framework of estimating the probability of joining a program that is conditional on the observed characteristics of different groups. In particular, it compares the expected outcomes between the samples of the comparison group and participants that get similar observable characteristics. The validity of this approach is based on two core assumptions.

The first assumption reflects conditional independence, indicating that given observable characteristics in pre-treatment, the outcomes of both nonparticipants

and participants are assumed to be independent of treatment assignment (Lechner, 2002). The second is the overlap condition assumption, which assumes that a substantial overlap of the covariates between nonparticipants and participants happens to guarantee that those with common covariate values would obtain positive values of the probability of being participants or nonparticipants. We employed the PSM approach to account for two types of bias: bias that resulted from different density weighting and bias that is created due to the shortage of a distribution overlap (Becker and Ichino, 2002).

Fundamentally, PSM generates estimations by processing the matching observations from the treated and control groups, based primarily on their estimated propensity scores. Based on these grounds of assumption, our PSM method would follow the below steps.

First, we categorised two groups: the treated group that has entry mode choice as WOS and the control group that has EJV.

Second, we conducted the estimation of the propensity score for each group of firms. Popularly, a probit or logit model is employed for this approach. Based on that, we selected the observed covariates X that had influenced the likelihood of being assigned to the treated group.

Third, we obtain the propensity score as the conditional or predicted probability of having the treatment given pre-treatment characteristics X:

$$p(X) = prob(T = 1|X) = E(T|X) \quad (16)$$

where X denotes a vector of the firm's characteristics, and $p(X)$ represents the propensity scores given X. Next, treatment T denotes a binary variable that is equal to 1 if firms have WOS and 0 otherwise.

Fourth, we conducted the matching process each participant belonged to the treated group to one or more nonparticipants in the control group basing on their propensity scores.

Fifth, we measured the treatment effects by taking the comparison of the outcomes y between the observations from treated-group and control-group after matching:

$$Y = \begin{cases} Y_1 \; if \; T = 1 \\ Y_0 \; if \; T = 0 \end{cases} \quad (17)$$

After having the propensity scores, we could estimate the ATT as the difference in mean between the outcome of the participants $(Y_1|T = 1)$ and nonparticipants $(Y_0|T = 0)$:

$$ATT = E(Y_1|p(X), T = 1) - E(Y_0|p(X), T = 0) \qquad (18)$$

The propensity score in this case is the probability of a foreign firm taking WOS mode.

To satisfy the conditional independence assumption, the vector of covariates must include all variables that determine either the decision into joint venture and performance outcomes.

5. Data and Descriptive Statistics

5.1. Data

In this study, we utilised three main datasets. The first is Viet Nam's annual Enterprise Survey (VES) dataset, which is conducted every year by the General Statistical Office of Vietnam under the Ministry of Planning and Investment with technical support from the World Bank. To date, this survey is amongst the most popular of enterprise datasets of emerging economies because it contains comprehensive information on the enterprise's characteristics and business performance. For example, it shows assets and capital sources, production and business results, taxes and other budget remittances, and information about employees and their incomes. It also displays uses of production technology and machinery, equipment, information technology, and communication, as well as the structure of inputs and outputs and their international integration. The dataset is designed with the purpose of collecting basic information to improve the policymaking process, as well as to serve the socioeconomic and business development plans of the country. In this dataset, the foreign-invested enterprise sector includes enterprises with 100% foreign capital and enterprises with joint ventures with foreign countries. The dataset follows Vietnam Standard Industry Classification (VSIC), which categorises and codes industries into three levels: one-

digit, two-digit, and three-digit, with 21 sub-sectors, 88 sub-sectors, and 242 sub-sectors, respectively. To estimate the technical efficiency index, we take the data from three of the 99 sub-sectors from the three-digit manufacturing sector. Sub-sectors targeted for analysis are those which have absorbed large investments from FDI enterprises in the manufacturing sector. To create the final cross-sectional dataset, we conduct and merge each data file with the tax code of enterprises. The sample of datasets is sufficient to employ the ESR model, which provides a broad picture of how firms' entry strategies impacted their performance in Viet Nam during the long period of 2002–16. Note that all asset and investment variables, which are calculated in the model, are taken with their values at the beginning of an investment year.

The second dataset is Geert Hofstede's Cultural Dimensions. This dataset is based on Hofstede's Cultural Dimensions Theory and aims to understand and compare different national cultures using different perspectives and dimensions. This theory is one of the most widely used for cultural studies and international business. The data are categorised into six cultural dimensions: power distance; individualism–collectivism; masculinity–femininity; uncertainty avoidance; long-term orientation; and IVR (Dow and Larimo, 2009).

The third dataset is the Provincial Competitiveness Index (PCI) survey which has been compiled annually by the Vietnam Chamber of Commerce and Industry since 2007. PCI is a very comprehensive index that assesses and ranks the economic governance all 63 provinces of Viet Nam. Through the evaluation and assessment of 10 indicators measuring provincial competitiveness, it aims at creating a favourable business environment for the development of the private sector. We select seven out of 10 indicators for this study: entry cost; informal charge; policy bias; proactivity; business services support; labour policy; and legal institutions.

5.2. Descriptive results

Table 2 indicates the characteristics of FDI firms in the manufacturing sector under the full sample, as well as samples of firms with WOS or EJV. The descriptive statistics of seven indicators of provincial business environment are also demonstrated in the table. It can be seen that the technical efficiency of FDI firms in the manufacturing sector is at a low level, around 0.3 on average. FDI firms with EJV have a slightly higher technical efficiency index than those with WOS. These firms also located in the province with a relative advantage of business environment compared to the location of FDI firms with WOS. In addition, it is recognized that EJV firms have higher output than WOS firms, but their investment and total employees are smaller. Over 90% of FDI firms are one-business enterprises. On average, the proportion of domestic firms' capital contribution over total capital of a EJV firm is quite high at around 39%. Additionally, the kernel density estimates of the firms' performance in manufacturing sectors (WOS firm vs EJV firm) in Figure B.1 (Appendix B) indicate that, on average, the technical efficiency and TFP of EJV firms is higher than WOS firms.

Table 2. Comparison of Characteristics of FDI Firms in Manufacturing and Indicators of Provincial Business Environment

Variable	Definition	Full sample		Firms with WOS		Firms with EJV	
		2012	2016	2012	2016	2012	2016
Firm's characteristics							
Technical efficiency	This index reflects the ability of the firm to produce the maximum output from the minimum quantity of inputs, such as labour and capital.	0.312 (0.201)	0.332 (0.20)	0.308 (0.19)	0.331 (0.20)	0.343 (0.22)	0.339 (0.21)
Firm's output	Gross output of the firm (in million VND)	374,867 (4,042,160)	534,249.3 (7,324,617)	340,940 (4,131,978)	508,713 (7,528,540)	711,621 (2,991,215)	844,598 (4,095,105)
Firm's capital	Capital of the firm at the beginning of the year (in million VND)	219,770 (921,908)	345,705 (3,645,117)	204,023 (890,438)	336,777 (3,758,176)	373,163 (1,175,738)	453,346 (1,786,332)
Firm's labour	Total employees	460 (1,983)	476 (1,946)	475 (2,062)	487 (2,002)	317 (884.4)	339 (1,060)
Firm's short-term asset	The short-term assets of the firm at the beginning of the year (in million VND)	116,396 (573,460)	167,303 (1,666,924)	107,357 (567,279)	159,010 (1,692,200)	205,066 (624,646.7)	267,495 (1,321,058)
Firm's investment	Investment of the firm starting at the beginning of the year (in million VND)	67,402 (968,108)	57,228 (634,919)	69,614 (1,019,488)	58,204 (658,385)	47,608 (152,934)	44,864 (135,808)
One business firm[a]	Whether a firm is a one-business enterprise or diversified enterprise	0.964 (0.187)	0.936 (0.245)	0.968 (0.177)	0.939 (0.240)	0.927 (0.260)	0.904 (0.296)
EJV_degree (with all domestic firms)	A proportion of capital contribution of domestic firms over total capital of a EJV firm	0.148 (0.226)	0.096 (0.2084)			0.383 (0.205)	0.396 (0.245)
EJV_degree (with state-owned enterprises)	A proportion of capital contribution of state-owned firms over total capital of a EJV firm	0.052 (0.142)	0.025 (0.106)			0.231 (0.22)	0.170 (0.228)

EJV_degree (with private enterprises)	A proportion of capital contribution of state-owned firms over total capital of a EJV firm	0.0409 (0.142)	0.037 (0.133)			0.313 (0.265)	0.325 (0.251)
EJV[a] with state-owned enterprises	Whether the joint venture is with state-owned enterprises	0.0269 (0.162)	0.012 (0.107)			0.291 (0.455)	0.153 (0.360)
EJV[a] with private enterprises	Whether the joint venture is with private enterprises	0.0655 (0.247)	0.065 (0.246)			0.709 (0.455)	0.847 (0.359)
Provincial business environment							
Entry costs[b]	This sub-index is to assess the differences in entry costs for new firms across provinces.	8.19 (0.31)	8.22 (0.31)	8.19 (0.29)	8.23 (0.29)	8.19 (0.29)	8.22 (0.42)
Informal charges[b]	A measure of how much firms pay in informal charges, how much of an obstacle those extra fees pose for their business operations.	5.42 (0.65)	5.45 (0.64)	5.44 (0.65)	5.45 (0.63)	5.43 (0.65)	5.34 (0.73)
Policy bias[b]	A measure of whether provinces give privileges to state-owned economic group, corporations, causing difficulties to your business.	4.76 (0.60)	4.78 (0.59)	4.78 (0.59)	4.79 (0.58)	4.78 (0.57)	4.65 (0.71)
Proactivity[b]	A measure of the creativity and cleverness of provinces in implementing central policy, designing their own initiatives for private sector development, and working within sometimes unclear national regulatory frameworks to assist and interpret in favour of local private firms.	4.87 (0.733)	4.96 (0.71)	4.89 (0.73)	4.97 (0.704)	4.89 (0.73)	4.80 (0.79)
Business support services[b]	A measure of provincial services for private sector trade promotion, provision of regulatory information to	5.80 (0.64)	5.74 (0.59)	5.77 (0.63)	5.72 (0.59)	5.77 (0.63)	5.98 (0.65)

	firms, business partner matchmaking, provision of industrial zones or industrial clusters, and technological services for firms.						
Labour policy[b]	A measure of the efforts by provincial authorities to promote vocational training and skills development for local industries and to assist in the placement of local labour.	6.68 (0.608)	6.63 (0.63)	6.67 (0.588)	6.63 (0.61)	6.67 (0.59)	6.71 (0.81)
Legal institutions[b]	A measure of the private sector's confidence in provincial legal institutions; whether firms regard provincial legal institutions as an effective vehicle for dispute resolution, or as an avenue for lodging appeals against corrupt official behaviour.	5.23 (0.707)	5.28 (0.69)	5.24 (0.69)	5.29 (0.68)	5.24 (0.69)	5.20 (0.86)
Observations		5,210	7,458	4,729	6,888	481	570

EJV = equity joint venture, FDI = foreign direct investment, PCI = Provincial Competitiveness Index, WOS = wholly owned subsidiary.
Note: a Dummy variables; b Definition of these indicators are taken from the PCI indices (data access is available from https://pcivietnam.vn/en).
Source: Author's calculation.

6. Estimation Results and Discussion

6.1. The impacts of entry mode choice on FDI performance

Regarding the manufacturing sector with cross-sectional data analysis, Table 3 illustrates the impacts of entry mode choice on firms' performance (technical efficiency) though OLS and IV method. The results from Table 3 indicate that, even when we account for the problem of endogeneity by IV approach, the choice with WOS leads to lower technical efficiency than the choice with EJV. Tables 4 and 5 show the results from outcomes and selection equation, as well as the average effects of entry mode choice through the endogenous switching regression model. Again, the outcomes of average treatment effects in the last column of Table 5 indicate that, compared to the choice with EJV, the choice with WOS as the entry mode will result in lower technical efficiency. In 2016, the value of ATT was –0.049, implying that FDI firms with WOS would have higher technical efficiency index (15.76%; 0.049/0.311) if they had selected EJV as their strategy. On the other side, FDI firms selecting EJV would have a lower technical efficiency index (33.73%; 0.168 [ATT]/0.498) if they had chosen WOS. The results are relatively similar in 2012. Those FDI firms that had selected WOS would have had a much higher technical efficiency index (0.416 [ATT]/0.3) if they had EJV business types. Similarly, firms that run a business under EJV would have had a lower technical efficiency (36.6%; 0.119 [ATU]/ 0.3248) if they had selected WOS. In other words, taking the entry mode choice as WOS decreased their technical efficiency. In addition, results from potential heterogeneity also confirm that FDI firms in the manufacturing sector that selected their entry mode as EJV would have had higher technical efficiency than those that selected WOS.

Under the panel dataset analysis, for manufacturing sectors, WOS will have negative impacts on technical efficiency and TFP under the OLS and Olley and Pakes' methods. However, the picture is reversed if we look at all sectors in the economy. When looking at the whole economy, a WOS is likely to have positive impacts on technical efficiency and TFP.

From Table 6 and Table 7, it is interesting to see that, in manufacturing sectors, the firms that have an EJV with private enterprises will have higher technical efficiency and productivity than those under one with state-owned enterprises. However, when considering all sectors, the inverse is true: those under an EJV with state-owned enterprises have higher technical efficiency and productivity than those under one with private enterprises. This reflects the active role of private enterprises in EJVs in manufacturing sectors. However, in the whole economy, state-owned enterprises would gain higher technical efficiency and productivity than private EJV firms, which could be due to the scope of the economy from state-owned enterprises.

It is also interesting that, for EJV firms, the higher proportion of capital contribution from domestic firms might lead to lower technical efficiency and productivity. It implies that the higher degree of management and control by domestic firms in comparison with foreign firms would decrease production efficiency. This finding is consistent with the idea from previous literature that the control mechanism would have strong impacts on firms' performance. Geringer and Hebert (1989) defined the control mechanism of joint-venture enterprises as the process by which one entity has influence with different degrees on the output and behaviour of another entity. Their control process is created by using their power, authority, and various bureaucratic, cultural, and informal mechanisms. In a study of Japanese joint-venture enterprises in 12 Asian countries, Lu and Hebert (2004) found that when one entity attempts to have a dominant controlling stake during any period of an international joint venture operation, it will create a high-risk factor leading to the termination of the firm. Barden, Steensma, and Lyles (2005), by examining 65 international joint ventures in Viet Nam, also showed that a harmonised relationship between control and resource contribution is crucial for each firm to obtain the optimal return without misusing any resources. Hence, the effective and proper control mechanism is an important factor in determining the performance of EJV firms.

Table 3. Determinants of Firm's Performance (Technical Efficiency)

Variables	2012		2016	
	OLS	2SLS-IV[a]	OLS	2SLS-IV[a]
	Coef.	Coef.	Coef.	Coef.
Firm's Characteristics				
Entry mode[b]	**–0.0388***** (0.139)	–0.0649 (0.134)	–0.0154 (0.0118)	**–0.209**** (0.104)
Capital	$1.14.\ 10^{-9}$ $(1.43.\ 10^{-8})$	$-1.14.\ 10^{-9}$ $(1.98.\ 10^{-8})$	$-2.47.\ 10^{-8}$*** $(9.24.\ 10^{-9})$	$-2.6.\ 10^{-8}$*** $(9.62.\ 10^{-9})$
Labour	$-5.39.\ 10^{-7}$ $(1.65.\ 10^{-6})$	$-3.82.\ 10^{-7}$ $(1.93.\ 10^{-6})$	$-2.47.\ 10^{-6}$ $(1.71.\ 10^{-6})$	$-7.06.\ 10^{-7}$ $(1.93.\ 10^{-6})$
Asset	$-1.57.\ 10^{-9}$ $(1.02.\ 10^{-8})$	$-5.42.\ 10^{-10}$ $(1.28.\ 10^{-8})$	$-2.7.\ 10^{-8}$*** $(7.96.\ 10^{-9})$	$2.71.10^{-8}$*** $(8.25.\ 10^{-9})$
Provincial business environment				
Entry costs	**–0.101***** (0.0202)	**–0.0974***** (0.0285)	**–0.114***** (0.0145)	**–0.136***** $(0.181.\ 10^{-9})$
Informal charges	**–0.0568***** (0.0196)	**–0.0516**** (0.0234)	**–0.09045***** (0.0134)	**–0.0845***** (0.0148)
Policy bias	**0.0268*** (0.0152)	0.267 (0.0169)	**0.0542***** (0.00976)	**0.0553***** (0.0104)
Proactivity	**0.0372*** (0.0159)	**0.0378**** (0.0169)	**0.0518***** (0.0109)	**0.0646***** (0.0123)
Business support services	–0.0111 (0.0115)	–0.0156 (0.0171)	0.0153** (0.00753)	0.000497 (0.0111)
Labour policy	0.0246* (0.0126)	0.0318** (0.0138)	–0.00714 (0.00794)	–0.00577 (0.00845)
Legal institutions	0.00284 (0.014)	–0.00635 (0.0181)	**0.0311***** (0.00935)	0.0188 (0.0116)
Observations	2,064	1,923	4,058	3,844

Note: Robust standard errors in parentheses.

[a] Estimated by Instrumental variables (2SLS) regression with IVR index as instrumental variable.

[b] Entry mode equals 1 if a firm selects WOS as its entry strategy and 0 otherwise.

*Mean statistically significant at 10%.

**Mean statistically significant at 5%.

***Mean statistically significant at 1%.

Source: Authors' calculation.

Table 4. Outcome and Selection Equation Using Endogenous Switching Regression Model

Variable	2012			2016		
	Outcome equation		Selection equation	Outcome equation		Selection equation
	TE_Y1	TE_Y0	WOS	TE_Y1	TE_Y0	WOS
Indulgence versus restraint			**–0.016** ***			**–0.015** ***
			(0.0033)			(0.0031)
Firms' characteristics						
Capital	$-6.09.10^{-9}$ ***	$6.85.10^{-9}$ ***	$-1.29.10^{-7}$ ***	$4.17.10^{-9}$ ***	$7.33.10^{-9}$ ***	$-2.85.10^{-8}$ ***
	$(4.54.10^{-9})$	$(1.35.10^{-8})$	$(2.86.10^{-8})$	$(1.32.10^{-9})$	$(6.80.10^{-9})$	$(1.38.10^{-8})$
Labour	$-4.94.10^{-7}$ ***	$1.7.10^{-5}$ ***	$1.3.10^{-4}$ ***	$-3.71.10-^{7}$ ***	$-6.01.10^{-6}$ ***	$6.48.10^{-5}$ ***
	$(1.71.10^{-6})$	$(1.8.10^{-5})$	$(4.56.10^{-5})$	$(1.87.10^{-6})$	$(1.15.10^{-5})$	$(3.32.10^{-5})$
Provincial business environment						
Entry costs	**–0.126** **	**–0.055** *	–0.785	**–0.083** **	**–0.085** **	–0.248
	(0.027)	(0.068)	(0.162)	(0.018)	(0.062)	(0.161)
Land accessibility	0.062**	0.044 *	0.464	–0.011 **	–0.075 *	0.203
	(0.019)	(0.054)	(0.143)	(0.016)	(0.056)	(0.140)
Transparency	–0.045 **	0.057 *	0.116	–0.071 **	0.075 *	–0.107
	(0.017)	(0.053)	(0.140)	(0.012)	(0.052)	(0.117)
Time costs	–0.005 **	–0.059 *	–0.192	0.046 **	0.039 *	–0.095
	(0.021)	(0.052)	(0.159)	(0.017)	(0.061)	(0.155)
Informal charges	–0.072 **	0.071*	0.403	–0.039 **	0.039 *	0.384
	(0.026)	(0.062)	(0.184)	(0.021)	(0.072)	(0.183)
Proactivity	0.033 **	–0.037 **	–0.082	0.053 **	0.003 *	–0.047
	(0.019)	(0.043)	(0.141)	(0.015)	(0.057)	(0.140)

Business support services	–0.020 **	–0.039 **	–0.531 *	–0.009 ***	–0.006 **	–0.329 *
	(0.014)	(0.048)	(0.085)	(0.008)	(0.035)	(0.076)
Labour policy	0.035 **	0.061 **	0.167	0.014 **	–0.067 **	0.198 *
	(0.016)	(0.035)	(0.109)	(0.011)	(0.037)	(0.098)
Legal institutions	0.004 **	–0.026 **	–0.311	0.014 **	0.003 **	–0.217
	(0.017)	(0.040)	(0.114)	(0.012)	(0.042)	(0.105)
Observations		**1,923**			**2,665**	

TE = technical efficiency, WOS = wholly owned subsidiary.
*Mean statistically significant at 10%.
**Mean statistically significant at 5%.
***Mean statistically significant at 1%.
Source: Authors' calculation.

Table 5. Average Effects of Entry Mode Choice Using Endogenous Switching Regression Model

The technical efficiency of FDI firms as dependent variable		Treatment Variable: Entry Mode Choice		
		Decision Stage		
		WOS	EJV	Average Treatment Effects
2016				
	Firms that had WOS	(a) 0.311	(c) 0.360	ATT= –0.049***
	Firms that had EJV	(d) 0.498	(b) 0.330	ATU= 0.168
	Heterogeneity effects	BH_1= –0.187	BH_2= 0.03	TH= –0.217
2012				
	Firms that had WOS	(a) 0.3003	(c) 0.716	ATT= –0.416***
	Firms that had EJV	(d) 0.3248	(b) 0.206	ATU= 0.119***
	Heterogeneity effects	BH_1= –0.0245	BH_2= 0.51	TH= –0.535

EJV = equity joint venture, FDI = foreign direct investment, WOS = wholly owned subsidiary.
Notes:
(a) and (b) denote observed expected outcomes; (c) and (d) denote counterfactual expected outcome.
ATT: The effects of the treatment on the treated (i.e. firms took the WOS as their strategy);
ATU: The effects of the treatment on the untreated (i.e. firms took the EJV as their strategy);
BH_i: the effect of base heterogeneity for firms that had WOS as their strategy (i = 1), and had EJV as their main strategy (i = 2);
TH=(ATT–ATU): transitional heterogeneity.
*Mean statistically significant at 10%.
**Mean statistically significant at 5%.
***Mean statistically significant at 1%.
Source: Authors' calculation.

Table 6. Dependent Variable: Firm Performance Indicators for Manufacturing Sectors (TFP under OLS Estimation, TFP under Olley–Pakes Estimation, Technical Efficiency)

(2009–16)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Pooled			Between			Fixed effects			IV [a]		
	TFP_OLS	TFP_OP	TE	TFP_OLS	TFP_OP	TE	TFP_OLS	TFP_OP	TE	TFP_OLS	TFP_OP	TE
Firm's Characteristics												
Entry mode (WOS)[b]	**–0.197***** (0.0599)	**–0.174*** (0.0733)	**–0.0317*** (0.0190)	**–0.297**** (0.0918)	**–0.129*** (0.0649)	**–0.0229**** (0.00980)	–0.0388 (0.0974)	–0.0606 (0.158)	–0.131 (0.109)	–0.0159 (0.0337)	**–0.232*** (0.405)	**–0.0208**** (0.00924)
Capital	$6.08.10^{-7}$*** $(1.1.10^{-7})$	$–1.1.10^{-7}$ $(8.03.10^{-8})$	$3.35.10^{-8}$ $(2.10.10^{-8})$	$1.08.10^{-6}$*** $(9.66.10^{-8})$	$5.51.10^{-8}$ $(7.92.10^{-8})$	$–6.44.10^{-9}$ $(2.23.10^{-8})$	$1.91.10^{-7}$** $(6.29.10^{-8})$	$–1.72.10^{-8}$ $(8.87.10^{-8})$	$2.98.10^{-8}$ $(7.67.10^{-8})$	$6.11.10^{-7}$*** (4.10^{-8})	$–1.06.10^{-8}$ $(4.42.10^{-8})$	3.4310^{-8}* $(1.51.10^{-8})$
Labour	$1.28.10^{-4}$*** $(3.71.10^{-5})$	$–1.69.10^{-5}$*** $(4.97.10^{-6})$	$–1.58.10^{-6}$ $(1.12.10^{-6})$	$1.30.10^{-4}$*** $(7.56.10^{-6})$	$–1.68.10^{-5}$* $(6.77.10^{-6})$	$–1.50.10^{-6}$ $(1.30.10^{-6})$	$1.02.10^{-4}$*** $(3.32.10^{-5})$	$–3.37.10^{-5}$ $(2.16.10^{-5})$	$9.36.10^{-7}$ $(1.79.10^{-5})$	$1.27.10^{-4}$*** $(6.68.10^{-6})$	$–1.70.10^{-5}$ $(6.41.10^{-7})$	$–1.70.10^{-6}$ $(1.25.10^{-6})$
Short-term asset	$–4.81.10^{-7}$* $(2.37.10^{-7})$	$2.66.10^{-7}$* $(1.09.10^{-7})$	$–2.01.10^{-8}$ $(2.46.10^{-8})$	$–1.03.10^{-6}$*** $(1.02.10^{-7})$	$1.98.10^{-7}$* $(8.32.10^{-8})$	$1.92.10^{-8}$ $(2.32.10^{-8})$	$2.47.10^{-7}$** $(9.52.10^{-8})$	$–8.90.10^{-8}$ $(1.35.10^{-7})$	$–8.07.10^{-8}$ $(9.12.10^{-8}$	$–4.96.10^{-7}$*** $(5.45.10^{-8})$	$–2.63.10^{-8}$ $(5.93.10^{-8})$	$–2.08.10^{-8}$ $(1.74.10^{-8}$
Long-term asset	$1.54.10^{-7}$** $(4.75.10^{-8})$	$–8.35.10^{-8}$ $(4.37.10^{-8})$	$–2.33.10^{-8}$ $(2.06.10^{-8})$	$–1.71.10^{-7}$ $(1.06.10^{-7})$	$–3.41.10^{-7}$*** $(9.16.10^{-8})$	$2.28.10^{-8}$ $(2.36.10^{-8})$	$1.54.10^{-7}$*** $(3.09.10^{-8})$	$–8.43.10^{-8}$ $(5.69.10^{-8})$	$–7.60.10^{-8}$*** $(2.12.10^{-8})$	$1.57.10^{-7}$*** $(2.69.10^{-8})$	$–2.63.10^{-8}$ $(5.93.10^{-8})$	$–2.5310^{-8}$* $(1.41.10^{-8})$
Investment	$–5.24.10^{-7}$*** $(6.54.10^{-8})$	$–7.30.10^{-8}$ $(9.62.10^{-8})$	$–3.56.10^{-10}$ $(1.04.10^{-8})$	$–4.25.10^{-7}$*** $(3.27.10^{-8})$	$–2.91.10^{-7}$** $(8.91.10^{-8})$	$–4.55.10^{-9}$ $(1.53.10^{-8})$	$–4.64.10^{-7}$*** $(4.98.10^{-8})$	$3.06.10^{-7}$ $(1.59.10^{-7})$	$3.93.10^{-9}$ $(4.67.10^{-8})$	$–5.24.10^{-7}$*** $(2.62.10^{-8})$	$–7.62.10^{-8}$ $(7.86.10^{-8})$	$5.88.10^{-11}$ $(1.46.10^{-8})$
One business firm	–0.0983* (0.0406)	–0.0302 (0.0597)	–0.0117 (0.0179)	–0.247** (0.0825)	0.0290 (0.0739)	–0.00730 (0.0216)	–0.0469 (0.0476)	–0.0894 (0.0728)	–0.0144 (0.0319)	–0.112** (0.0433)	–0.0313 (0.0540)	–0.0155 (0.0181)
Ownership												

EJV_degree (with all domestic firms)	–0.0266 (0.116)	–0.0498 (0.147)	–0.0664 (0.0415)	–0.298 (0.221)	–0.107 (0.193)	–0.0480 (0.0542)	–0.0692 (0.214)	0.0902 (0.343)	–0.192 (0.143)	–0.0151 (0.166)	–0.0950 (0.178)	–0.0760 (0.0520)
EJV_degree (with state–owned enterprises)	**0.793***** (0.145)	**0.669**** (0.212)	0.00245 (0.0541)	**1.301***** (0.264)	**0.840**** (0.281)	–0.0152 (0.0616)	0.0813 (0.265)	–0.353 (0.538)	–0.0477 (0.174)	**0.869***** (0.181)	**0.735***** (0.248)	–0.0236 (0.0577)
EJV_degree (with private enterprises)	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted
EJV with state–owned enterprises	–0.185** (0.0583)	–0.0885 (0.0828)	–0.0124 (0.0190)	–0.300*** (0.0903)	Omitted	Omitted	–0.00935 (0.119)	0.169 (0.243)	0.0777 (0.0936)	Omitted	0.332 (0.439)	Omitted
EJV with private enterprises	Omitted	Omitted	Omitted	Omitted	0.0574 (0.0964)	0.00446 (0.0220)	Omitted	Omitted	Omitted	0.183** (0.0679)	0.429 (0.421)	0.0211 (0.0217
Manufacturing sub–sectors												
Food	0.216* (0.0891)	0.353*** (0.0684)	0.0319* (0.0141)	0.287*** (0.0597)	0.367*** (0.0630)	0.0405*** (0.0138)	–0.392** (0.151)	0.420* (0.209)	–0.381** (0.140)	**0.214***** (0.0569)	0.362*** (0.0608)	**0.0303**** (0.0137)
Textile	–0.209*** (0.0606)	–0.113** (0.0349)	–0.0332*** (0.00842)	–0.0925* (0.0362)	–0.0897* (0.0363)	–0.0271*** (0.00857)	–0.590*** (0.0737)	–0.215 (0.123)	–0.144*** (0.0655)	–0.215*** (0.0334)	–0.0936** (0.0354)	–0.0381*** (0.00858)
Electric	0.331*** (0.0519)	–0.00314 (0.0454)	0.0256** (0.00962)	0.367*** (0.0403)	–0.00673 (0.0404)	0.0268** (0.00977)	0.247*** (0.0604)	0.0949 (0.0957)	0.0507 (0.0417)	0.338*** (0.0345)	0.000613 (0.0379)	0.0255*** (0.00952)
Provincial business environment												
Entry costs	–0.0472*** (0.0141)	–0.0554* (0.0218)	–0.00718 (0.00462)	–0.126*** (0.0214)	–0.125*** (0.0242)	–0.00129 (0.00519)	0.0737* (0.0374)	0.403*** (0.0795)	–0.0202 (0.0298)	–0.0479*** (0.0136)	–0.0602** (0.0199)	–0.00741 (0.00452)
Land accessibility	–0.0593* (0.0246)	–0.0911 (0.0582)	–0.0172* (0.00687)	0.00281 (0.0295)	–0.0182 (0.0456)	–0.0262*** (0.00729)	–0.145*** (0.0306)	–0.106 (0.0800)	0.0434*(0.0239)	–0.0625*** (0.0187)	–0.114** (0.0389)	–0.0189*** (0.00681)

Transparency	–0.148***	0.0913**	–	–0.161***	0.0624	–0.00998	–0.0796*	0.350**	0.0332	–0.140***	0.0873**	–0.0116
	(0.0298)	(0.0294)	0.00885 (0.00790)	(0.0341)	(0.0336)	(0.00833)	(0.0398)	(0.110)	(0.0282)	(0.0234)	(0.0274)	(0.00779)
Time costs	0.0783**	0.0707*	–0.00377	0.0186	0.0227	–0.00357	0.0303	–0.0799	0.0113	0.0852***	0.0824**	–0.00219
	(0.0243)	(0.0360)	(0.00796)	(0.0312)	(0.0333)	(0.00791)	(0.0344)	(0.0864)	(0.0287)	(0.0206)	(0.0277)	(0.00766)
Informal charges	–0.0431***	0.0914***	0.00440	–0.0202	0.0897***	0.00330	0.0744**	0.215***	0.0188	–0.0448***	0.0931***	0.00567
	(0.0110)	(0.0219)	(0.00447)	(0.0227)	(0.0232)	(0.00544)	(0.0248)	(0.0550)	(0.0213)	(0.0117)	(0.0191)	(0.00437)
Proactivity	0.0186	–0.0297	0.00992*	–0.00110	–0.0250	0.0137**	0.171***	0.0659	–0.00527	0.0137	–0.0221	0.00901*
	(0.0157)	(0.0347)	(0.00481)	(0.0204)	(0.0338)	(0.00494)	(0.0344)	(0.0613)	(0.0300)	(0.0153)	(0.0271)	(0.00468)
Business support services	–0.144***	0.0232	–	–0.0917***	0.0202	–0.0222***	–0.0789*	0.474***	0.0440	–0.150***	0.0275	–0.0145***
	(0.0189)	(0.0330)	0.0142** (0.00537)	(0.0235)	(0.0332)	(0.00566)	(0.0368)	(0.0767)	(0.0303)	(0.0145)	(0.0240)	(0.00521)
Labour policy	0.174***	0.0154	0.00591	0.0917**	0.106*	0.00819	0.283***	–0.131	0.00448	0.176***	0.00278	0.00642
	(0.0167)	(0.0384)	(0.00679)	(0.0340)	(0.0456)	(0.00789)	(0.0257)	(0.0814)	(0.0210)	(0.0178)	(0.0347)	(0.00677)
Legal institutions	–0.00653	–0.0419*	0.00265	–0.0326	–0.0545*	0.000630	0.0503*	0.136*	0.00224	–0.00848	–0.0460**	0.00188
	(0.0136)	(0.0179)	(0.00470)	(0.0247)	(0.0238)	(0.00594)	(0.0215)	(0.0546)	(0.0174)	(0.0135)	(0.0174)	(0.00493)
R^2	0.25	0.057	0.043	0.26	0.059	0.04	0.15	0.01	0.063	0.24	0.057	0.047
Observations	7,829	4,970	3,452	7,829	4,970	3,452	7,829	4,970	3,452	7,526	4752	3323

EJV = equity joint venture, OLS = ordinary least squares, TE = technical efficiency, TFP = total factor productivity, WOS = wholly owned subsidiary.
Note: Robust standard errors in parentheses.
[a] Estimated by Instrumental variables (2SLS) regression with indulgence versus restraint index as an instrumental variable.
[b] Entry mode equals 1 if a firm selects WOS as its entry strategy and 0 otherwise.
*Mean statistically significant at 10%.
**Mean statistically significant at 5%.
***Mean statistically significant at 1%.
Source: Authors' calculation.

Table 7. Dependent Variable: Firm Performance Indicators for All Sectors
(TFP under OLS Estimation, TFP under Olley–Pakes Estimation, Technical Efficiency)

(2009–16)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Pooled			Between			Fixed effects			IV[a]		
	TFP_OLS	TFP_OP	TE	TFP_OLS	TFP_OP	TE	TFP_OLS	TFP_OP	TE	TFP_OLS	TFP_OP	TE
Firm's Characteristics												
Entry mode (WOS)[b]	–0.379***	0.0663	–0.0102	–0.0639*	0.0586	–0.0102	–0.199**	0.0715	0.0333	**9.971*** **	**0.846***	**0.502*** **
	(0.0879)	(0.111)	(0.0125)	(0.0388)	(0.0777)	(0.0125)	(0.0617)	(0.112)	(0.0298)	(0.303)	(0.422)	(0.0690)
Capital	$2.00.10^{-7}$***	$-4.15.10^{-8}$*	$-7.11.10^{-10}$	$1.30.10^{-7}$***	0.0586	$-7.11.10^{-10}$	$1.95.10^{-7}$***	$-1.94.10^{-8}$	$-1.09.10^{-8}$	$1.87.10^{-7}$***	$-1.02.10^{-5}$	$-1.45.10^{-7}$
	($5.57.10^{-8}$)	($1.77.10^{-8}$)	($2.48.10^{-9}$)	($2.01.10^{-8}$)	(0.0777)	($2.48.10^{-9}$)	($2.04.10^{-8}$)	($3.92.10^{-8}$)	($7.99.10^{-9}$)	($1.41.10^{-8}$)	($7.16.10^{-6}$)	($1.13.10^{-6}$)
Labour	$1.80.10^{-4}$***	$-1.85.10^{-5}$*	$9.83.10^{-8}$	$1.91.10^{-4}$***	$-6.69.10^{-6}$	$9.83.10^{-8}$	$1.21.10^{-4}$***	$-6.93.10^{-5}$***	$7.73.10^{-6}$	$-9.50.10^{-8}$***	$-1.02.10^{-5}$	$-1.45.10^{-7}$
	($4.84.10^{-5}$)	($8.62.10^{-6}$)	($1.26.10^{-6}$)	($8.77.10^{-6}$)	($7.67.10^{-6}$)	($1.26.10^{-6}$)	($1.59.10^{-5}$)	($1.91.10^{-5}$)	($9.10.10^{-6}$)	($1.58.10^{-8}$)	($7.16.10^{-6}$)	($1.13.10^{-6}$)
Short-term asset	$-1.13.10^{-7}$	$3.65.10^{-8}$	$2.18.10^{-10}$	$-8.91.10^{-8}$***	$2.83.10^{-8}$	$2.18.10^{-10}$	$5.33.10^{-9}$	$-7.06.10^{-8}$	$3.55.10^{-9}$	$-9.50.10^{-8}$***	$4.05.10^{-8}$*	$5.26.10^{-10}$
	($7.37.10^{-8}$)	($1.91.10^{-8}$)	($2.55.10^{-9}$)	($2.15.10^{-8}$)	($1.87.10^{-8}$)	($2.55.10^{-9}$)	($2.29.10^{-8}$)	($5.35.10^{-8}$)	($8.47.10^{-9}$)	($1.58.10^{-8}$)	($1.67.10^{-8}$)	($2.89.10^{-9}$)
Long-term asset	$1.38.10^{-7}$***	$-6.00.10^{-8}$*	$2.54.10^{-9}$	$3.78.10^{-7}$***	$-1.37.10^{-7}$***	$2.54.10^{-9}$	$7.25.10^{-8}$***	$-4.79.10^{-8}$*	$-5.43.10^{-9}$	$1.45.10^{-7}$***	$-5.99.10^{-8}$**	$4.15.10^{-9}$
	($4.50.10^{-8}$)	($3.01.10^{-8}$)	($2.84.10^{-9}$)	($3.21.10^{-8}$)	($3.65.10^{-8}$)	($2.84.10^{-9}$)	($1.76.10^{-8}$)	($2.23.10^{-8}$)	($4.72.10^{-9}$)	($1.67.10^{-8}$)	($2.01.10^{-8}$)	($3.68.10^{-9}$)
Investment	$-1.67.10^{-7}$***	$1.46.10^{-7}$*	$2.59.10^{-8}$***	$-1.45.10^{-7}$***	$1.44.10^{-7}$*	$2.59.10^{-8}$***	$-2.68.10^{-7}$***	$2.16.10^{-7}$**	$1.36.10^{-8}$	$-1.60.10^{-7}$***	$1.52.10^{-7}$**	$3.21.10^{-8}$***
	($5.45.10^{-8}$)	($6.82.10^{-8}$)	($6.14.10^{-9}$)	($2.57.10^{-8}$)	($6.19.10^{-8}$)	($6.14.10^{-9}$)	($2.50.10^{-8}$)	($7.86.10^{-8}$)	($1.27.10^{-8}$)	($1.76.10^{-8}$)	($5.04.10^{-8}$)	($8.42.10^{-9}$)
One business firm	–0.433***	0.192***	0.0115	–0.925***	0.191**	0.0115	–0.0694	0.185*	–0.00130	–0.420***	0.180***	$7.09.10^{-4}$
	(0.0471)	(0.0501)	(0.0102)	(0.0620)	(0.0594)	(0.0102)	(0.0490)	(0.0720)	(0.0200)	(0.0407)	(0.0480)	(0.0111)
Ownership												
EJV_degree (with all	–0.194	–0.0436	–0.0587*	2.252***	–0.573**	**–0.0587***	–0.357	0.259	–0.0531	**–0.271***	–0.0987	**–0.0636***

domestic firms)	(0.164)	(0.173)	(0.0274)	(0.163)	(0.188)	(0.0274)	(0.189)	(0.308)	(0.0791)	(0.122)	(0.139)	(0.0308)
EJV_degree (with state–owned enterprises)	**2.301***** (0.172)	–0.536* (0.249)	0.0118 (0.0310)	Omitted	Omited	0.0118 (0.0310)	–0.0979 (0.322)	–0.944 (0.518)	–0.0773 (0.104)	**2.351***** (0.165)	**–0.404*** (0.205)	0.0207 (0.0343)
EJV_degree (with private enterprises)	Omitted	Omitted	Omitted	–2.590*** (0.182)	0.471* (0.212)	Omitted	Omitted	Omited	Omitted	Omitted		Omitted
EJV with state–owned enterprises	–0.207*** (0.0786)	–0.0146 (0.0920)	0.00945 (0.0118)	Omitted	0.00141 (0.0769)	0.00945 (0.0118)	0.215 (0.110)	–0.0173 (0.188)	0.0570 (0.0460)	10.15*** (0.313)	0.784 (0.449)	0.523*** (0.0710)
EJV with private enterprises	Omitted	Omitted	Omitted	0.422*** (0.0665)	Omited	Omitted	Omitted	Omited	Omitted	10.36*** (0.309)	0.795 (0.430)	0.513*** (0.0711)
Sectors												
Finance	2.494*** (0.204)	–1.495*** (0.311)	–0.107*** (0.0138)	2.675*** (0.106)	–1.561*** (0.215)	–0.107*** (0.0138)	1.915*** (0.154)	–1.055 (0.806)	0.0906 (0.0750)	2.505*** (0.0915)	–1.521*** (0.213)	–0.0970*** (0.0178)
Estate	0.0150 (0.0894)	0.330 (0.197)	–0.0613** (0.0196)	0.178** (0.0781)	0.239 (0.151)	–0.0613** (0.0196)	–0.163 (0.0860)	1.353** (0.514)	–0.0330 (0.0785)	0.0633 (0.0600)	0.287 (0.148)	–0.0593*** (0.0178)
Education	–0.340** (0.159)	–0.488*** (0.122)	0.0350 (0.0313)	–0.174 (0.145)	–0.559 (0.334)	0.0350 (0.0313)	–0.870** (0.304)	–0.196 (0.754)	Omitted	–0.343* (0.139)	–0.496 (0.299)	0.0384 (0.0301)
Mining	1.291*** (0.252)	0.361 (0.671)	0.126 (0.0723)	1.236*** (0.242)	0.456 (0.473)	0.126 (0.0723)	1.407** (0.512)	0.239 (0.863)	Omitted	1.494*** (0.232)	0.216 (0.456)	0.121 (0.0748)
Manufacturing	0.864*** (0.0440)	**–0.307***** (0.0644)	–0.0728*** (0.00669)	0.958*** (0.0332)	–0.322*** (0.0582)	–0.0728*** (0.00669)	0.214** (0.0688)	–0.0383 (0.191)	–0.126*** (0.0339)	0.876*** (0.0304)	**–0.312***** (0.0569)	**–0.0711***** (0.00663)
WOS x Food		**0.384***** (0.0899)			**0.363***** (0.0947)						0.376*** (0.0873)	
WOS x Textile		–0.0775 (0.0426)			**–0.115*** (0.0509)						–0.0832 (0.0475)	
WOS x Electric		0.0430 (0.0483)			0.0408 (0.0554)						0.0463 (0.0510)	
WOS x Finance		–0.124 (0.327)			–0.306 (0.253)						–0.108 (0.238)	
WOS x Estate		–0.0457			0.149						0.0122	

		(0.227)			(0.180)						(0.170)	
WOS x Education		–0.152			–0.0481						–0.0407	
		(0.231)			(0.413)						(0.381)	
WOS x Mining		–1.405			–1.468*						–1.269	
		(0.733)			(0.715)						(0.709)	
WOS x Manufacturing		–0.234**			–0.205**						**–0.237****	
		(0.0805)			(0.0736)						(0.0700)	
Provincial business environment												
Entry costs	–0.0173	–0.0777***	–0.00169	–0.122***	–0.157***	–0.00169	0.0640	0.265**	–0.00515	–0.0215	–0.0857***	–0.00143
	(0.0147)	(0.0233)	(0.00405)	(0.0211)	(0.0273)	(0.00405)	(0.0684)	(0.0953)	(0.0290)	(0.0157)	(0.0227)	(0.00402)
Land accessibility	–0.196***	–0.0727	–0.0201***	–0.0241	–0.0228	–0.0201***	–0.314***	–0.0219	0.0185	–0.185***	–0.0985*	–0.0218***
	(0.0276)	(0.0544)	(0.00578)	(0.0284)	(0.0496)	(0.00578)	(0.0513)	(0.106)	(0.0213)	(0.0210)	(0.0437)	(0.00562)
Transparency	–0.116***	0.0871**	–0.0127	–0.171***	0.0713	–0.0127	0.00937	0.342**	0.0371	–0.116***	0.0712*	–0.0143*
	(0.0305)	(0.0304)	(0.00679)	(0.0348)	(0.0367)	(0.00679)	(0.0575)	(0.125)	(0.0229)	(0.0261)	(0.0308)	(0.00676)
Time costs	0.0374	0.102**	0.00704	–0.0145	0.0667	0.00704	0.131*	0.0126	–0.00236	0.0416	0.110***	0.00863
	(0.0243)	(0.0359)	(0.00707)	(0.0314)	(0.0365)	(0.00707)	(0.0612)	(0.0991)	(0.0320)	(0.0267)	(0.0322)	(0.00709)
Informal charges	–0.0990***	0.0821***	0.00654	–0.0864***	0.0914***	0.00654	0.0368	0.110	0.00253	–0.107***	0.0878***	0.00760**
	(0.0115)	(0.0218)	(0.00358)	(0.0214)	(0.0250)	(0.00358)	(0.0435)	(0.0676)	(0.0207)	(0.0137)	(0.0212)	(0.00361)
Proactivity	0.0768***	–0.112**	0.00756	0.0364	–0.104**	0.00756	0.226***	0.0243	–0.0186	0.0689***	0.0878***	0.00716*
	(0.0158)	(0.0358)	(0.00435)	(0.0201)	(0.0358)	(0.00435)	(0.0602)	(0.0790)	(0.0304)	(0.0180)	(0.0212)	(0.00433)
Business support services	–0.311***	0.0255	–0.0138**	–0.129***	0.0428	–0.0138**	–0.305***	0.342***	0.00923	–0.310***	0.0265	–0.0138***
	(0.0223)	(0.0324)	(0.00444)	(0.0226)	(0.0367)	(0.00444)	(0.0643)	(0.0948)	(0.0285)	(0.0162)	(0.0273)	(0.00424)
labour policy	0.221***	0.0429	0.0112*	0.0734*	0.136**	0.0112**	0.427***	–0.134	–0.00316	0.215***	0.0446	0.0109*
	(0.0182)	(0.0373)	(0.00548)	(0.0314)	(0.0486)	(0.00548)	(0.0402)	(0.0973)	(0.0181)	(0.0219)	(0.0388)	(0.00570)

Legal institutions	–0.00204	–0.0497**	–0.00246	0.0130	–0.0360	–0.00246	–0.00637	0.0705	–0.0210	–0.00282	–0.0502**	–0.00186
	(0.0135)	(0.0187)	(0.00391)	(0.0238)	(0.0248)	(0.00391)	(0.0340)	(0.0609)	(0.0164)	(0.0159)	(0.0188)	(0.00416)
R^2	0.31	0.1353	0.044	0.34	0.1344	0.044	0.18	0.0625	0.0082	0.31	0.1324	0.044
Observations	14,282	8,052	6,044	14,282	8,052	6,044	14,282	8,052	6,044	13,362	7,542	5,644

EJV = equity joint venture, OLS = ordinary least squares, OP = Olley=Pakes estimation, TE = technical efficiency, TFP = total factor productivity, WOS = wholly owned subsidiary.

Note: Robust standard errors in parentheses.

[a] Estimated by Instrumental variables (2SLS) regression with indulgence versus restraint index as an instrumental variable.

[b] Entry mode equals 1 if a firm selects WOS as its entry strategy and 0 otherwise.

*Mean statistically significant at 10%.

**Mean statistically significant at 5%.

***Mean statistically significant at 1%.

Source: Authors' calculation.

6.2. Robustness check using the Propensity Score Matching Method

6.2.1. General analysis

We conduct the robustness check for the results of ATT and ATU through the PSM method that is illustrated in Tables 8, 9, and 10. We apply both 'five nearest neighbours (5NN)' and 'one–nearest–neighbour (1NN)' to check whether the results from the ESR model are consistent with the PSM method. Figure B.2 (Appendix B) illustrates the balanced density distribution of the propensity scores, indicating that the condition of common support was satisfied. Hence, the PSM is well conducted in this case. In addition, a common practice is to check for imbalance between intervention groups by statistical tests of baseline characteristics. The test of baseline balanced from Table 11 suggests there is no imbalance between groups in baseline variables.

As can be seen from the tables, the implications of results are the same with those derived from the ESR model for the case of manufacturing sector. The negative and positive signs of ATT and ATU estimates by employing PSM method are similar to those from ESR. The differences are the magnitudes of those estimates. These differences could be perceived by the fact that, under our PSM estimation with the non–parametric approach, we do not fully consider the unobserved heterogeneity between treatment and control group, while the ESR does strictly account for those unobserved factors.

Table 8. Treatment Effects and Sensitivity Analysis of Entry Mode Choice on FDI Firms' Technical Efficiency in Manufacturing Sectors by PSM Method

		Outcome: Firms' TE						
		PSM			Treated		Control	
Period	Matching Algorithm	ATT	ATU	ATE	On-support	Off-support	On-support	Off-support
2002–16	One nearest neighbour match	–0.0111*	–0.0204**	–0.0149*	6,515	6	4,596	0
	Five nearest neighbour match	–0.0116**	–0.0196*	–0.0149***	6,515	6	4,596	0
2009–16	One nearest neighbour match	–0.00545**	–0.0153***	–0.00904**	6,181	6	3,556	0
	Five nearest neighbour match	–0.00952**	–0.0185*	–0.0128***	6,181	6	3,556	0

EJV = equity joint venture, WOS = wholly owned subsidiary. FDI = foreign direct investment, PSM = Propensity Score Matching, TE = technical efficiency.
Notes:
ATT: The effects of the treatment on the treated (i.e. firms took the WOS as their strategy).
ATU: The effects of the treatment on the untreated (i.e. firms took the EJV as their strategy).
ATE: Average treatment effect on the entire sample.
*Mean statistically significant at 10%.
**Mean statistically significant at 5%.
***Mean statistically significant at 1%.
Source: Authors' calculation.

Table 9. Treatment Effects and Sensitivity Analysis of Entry Mode Choice on FDI firms' Productivity (OLS approach) in Manufacturing Sectors by PSM Method

		Outcome: Firms' TFP_OLS						
		PSM			Treated		Control	
Period	Matching Algorithm	ATT	ATU	ATE	On-support	Off-support	On-support	Off-support
2002–16	One nearest neighbour match	–0.102**	0.0142*	–0.0488*	15,553	14	13,232	0
	Five nearest neighbour match	–0.0871**	0.00547**	–0.0445***	15,553	14	13,232	0
2009–16	One nearest neighbour match	–0.0549*	–0.168***	–0.0408*	14,626	16	8,603	0
	Five nearest neighbour match	–0.0525*	–0.0226*	–0.0415**	14,626	16	8,603	0

EJV = equity joint venture, FDI = foreign direct investment, OLS = ordinary least squares, PSM = Propensity Score Matching, TFP = total factor productivity, WOS = wholly owned subsidiary.

Notes:

ATT: The effects of the treatment on the treated (i.e. firms took the WOS as their strategy).

ATU: The effects of the treatment on the untreated (i.e. firms took the EJV as their strategy).

ATE: Average treatment effect on the entire sample.

*Mean statistically significant at 10%.

**Mean statistically significant at 5%.

***Mean statistically significant at 1%.

Source: Authors' calculation.

Table 10. Treatment Effects and Sensitivity Analysis of Entry Mode Choice on FDI Firms' Productivity (Olley–Pakes approach) in Manufacturing Sectors by PSM Method

		Outcome: Firms' TFP_OP						
		PSM			Treated		Control	
Period	Matching Algorithm	ATT	ATU	ATE	On-support	Off-support	On-support	Off-support
2011–16	One nearest neighbour match	-0.142***	–0.160*	–0.146*	13163	15	3553	0
	Five nearest neighbour match	–0.130*	–0.131*	–0.130*	13163	15	3553	0

EJV = equity joint venture, FDI = foreign direct investment, OP = Olley–Pakes approach, PSM = Propensity Score Matching, TFP = total factor productivity, WOS = wholly owned subsidiary.

Notes:

ATT: The effects of the treatment on the treated (i.e. firms took the WOS as their strategy).

ATU: The effects of the treatment on the untreated (i.e. firms took the EJV as their strategy).

ATE: Average treatment effect on the entire sample.

*Mean statistically significant at 10%.

**Mean statistically significant at 5%.

***Mean statistically significant at 1%.

Source: Authors' calculation.

Table 11. The Comparison of Covariates at Baselines for the Treated and Control Group in 2009

Variables	Mean		SD		Min		Max		T–stat
	Treated (WOS)	Untreated (EJV)	Treated (WOS)	Untreated (EJV)	Treated (WOS)	Untreated (EJV)	Treated (WOS)	Untreated (EJV)	
Firm's size	534.56	468.45	42.36	36.75	7	1	7,519	64,751	–1.1790
Firm's capital	166,265.7	155,082.9	18,891.58	10,032.65	1,764	176	5,885,096	8,007,380	–0.5228
Short–term assets	100,886.3	70,215.37	11,283.02	4,290.89	707	8	3,160,210	4,863,000	–2.5408
Long-term assets	65,379.37	84,867.52	8,470.18	6,949	324	13	2,724,886	7,055,360	1.7788
Investment	19,242.95	29,747.21	3,097.49	4,179.70	13	3	741,424	7,175,559	2.0191
One-business enterprise	0.74	0.98	0.022	0.0026	0	0	1	1	10.7161
Observation	382	2,239	382	2,239	382	2,239	382	2,239	

EJV = equity joint venture, WOS = wholly owned subsidiary.
Source: Authors' calculation.

6.2.2. Further analysis of those firms with the entry mode switches

The results show that, in the manufacturing sector, the choice of EJV is likely to enable firms to perform more efficiently and effectively. In order to go further into the dynamics of the behaviour of firms in this issue, we narrowed and divided firms into stayers (only those who stayed with WOS) and movers (only those who had WOS in the period t-1 and then turned to EJV in period t) during 2011–16.

In contrast to the previous assumption, in this case, the dummy treatment variable would equal 1 if firms are movers, and 0 if firms are stayers. To get the estimation of TFP_OP, we must narrow this down to the period 2011–16. We also applied the PSM method to analyse the treatment effects. Table D.1 in Appendix D shows that Taiwan, Republic of Korea, Japan, and China have the highest number of firms that changed from WOS to EJV during this period. The descriptive result from Table D.2 (Appendix D) shows that the movers have smaller size, lower capital, investment, short-term and long-term assets than the stayers. Noticeably, those FDI (movers) firms on average had the negative output at the time $t-1$. Based on these statistics, we then took the probit model to investigate the determinants of the EJV choice. Table D.3 in Appendix D indicates that those WOS firms with lower investments, higher debts, and are smaller in size have a higher probability to change from WOS to EJV mode choice. However, it should also be noted that their estimated coefficients are significant but not remarkable. Results of treatment effects (ATT) from Table D.4 indicate that a transition from WOS to EJV mode choice will have a positive impact on their performance.

In short, our findings show that those firms who are movers from WOS to EJV have lower investments, higher debts, and are smaller than those who stayed with WOS. The switch from WOS to EJV will have a positive impact on their performance. Hence, for the smaller size FDI firms with WOS in the manufacturer, EJV might be a better solution. This further analysis again reconfirms our previous conclusion on the role of EJV for FDI firms in the manufacturing sector.

7. Policy Implications and Conclusions

A joint venture is a form of strategic collaboration in which a foreign company and a local company agree to share equity in the joint execution of a partnership. From the results of ESR, IV, and PSM models, a possible suggestion for foreign firms investing in emerging economies with much uncertainty is that, in manufacturing sectors, which require more of the advantages related to local factors such as resources, human capital, and low transaction costs, a joint venture might be a better approach than a WOS.

Based on that, we might conclude that, for non-manufacturing sectors with less uncertainty that require a lower level of local involvement and have higher transaction costs, a WOS might be a better solution. This suggestion is supported by Dunning's OLI paradigm, which is mentioned in section 3.1. When a business has a lower demand for local resources and accessibility, and the transactional cost is high, a rational firm would prefer an entry in which the control system follows an internal management structure such as the WOS. With its focus on the manufacturing industries as the main sector of FDI firms in Viet Nam, this study might not have enough room to investigate non-manufacturing sectors at this research stage. Hence, we leave this for future research on this topic for the case of Viet Nam and other emerging economies.

The findings are consistent with several previous studies that found that the EJV strategy is more efficient than the WOS or greenfield investment strategies in the manufacturing industries. Indeed, our findings also contrast with those of other previous studies that showed that, as strategies become more efficient, they rely more heavily on their parent companies' productivity advantage. It might be a concern that, since WOS firms are generally larger, it could seem that economies of scale are not working well here. While we acknowledge these potential concerns and contrasting viewpoints on that issue, we believe our findings are convincing in the case of the manufacturing sector.

A joint venture has some benefits and advantages for a foreign entrant. It removes the need to start again in a new market from scratch, which could be risky and require a capital-intensive effort. The joint venture is expected to bring synergistic benefits to both parties because two firms that work together might

generate better value than if they work separately. The distribution, processing, and retailing facilities of the local company are also leveraged to the foreign firm. The foreign firm can also benefit from the local partner's management experiences and skills, which would enable the foreign firm to offer the products or services that would best match the demands of the market, based on a better understanding of the market and the ways to effectively operate, while reducing the market risks. Since the EJV is quite complex, it requires a long process of reaching an agreement with local firms and local regulation, as well as many complicated procedures. Therefore, many companies prefer WOS rather than EJV. Normally, in developing countries, regulations are made to ensure that their economy benefits from this agreement. However, too strict regulation might constrain foreign firms from selecting EJV as their main strategy. Hence, it is suggested that the Vietnamese government should provide a more favourable environment to promote EJV.

This would also be advised based on the level of capital contribution to the EJV type. Firms should consider a suitable degree of capital contribution in an EJV that will lead to the most efficiency and effectiveness in management. In our study, the higher degree of management in domestic firms as compared to foreign firms might not be the best option to increase productivity and technical efficiency. Hence, depending on the sectors and industries that a firm is in, it should consider the capital contribution carefully.

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Appendices

Appendix A: Conceptual framework

Appendix A.1: Firms' technical efficiency

Technical efficiency is based on the premise that, if an efficient production function is assumed to be present (Aigner, Lovell, and Schmidt, 1977; Farrell, 1957), we employ either parametric or non-parametric approaches. One of the most popular methods to estimate the efficient production function is to make use of the stochastic frontier production function, as suggested by Aigner, Lovell, and Schmidt (1977) and Meeusen and Broeck (1977). The method is mainly based on the viewpoint that the real production outputs can only be on or under the optimal production frontier.

A stochastic production frontier model could be written in the form:

$$lny_i = \beta_0 + \sum_n \beta_n \, lnx_{ni} + v_i - u_i \qquad \text{(A.1)}$$

where y_i represents the output of firm i, x_i is the vector of n production inputs used by firm i, v_i is the noise component of the error term and it has the identically distributed N(0, σ_v^2); u_i represents the positive component of technical inefficiency of the error term, where u_i is an exponential distribution. Both v_i and u_i are assumed to be independent of each other and the input variables.

From (1), the equation is equal to the following model:

$$y_i = exp\left(\beta_0 + \sum_n \beta_n \, lnx_{ni} + v_i - u_i\right) \qquad \text{(A.2)}$$

$$= exp\left(\beta_0 + \sum_n \beta_n \, lnx_{ni}\right). \exp(v_i) \, . \exp\,(-u_i) \qquad \text{(A.3)}$$

where $exp(\beta_0 + \sum_n \beta_n \, lnx_{ni})$ denotes the deterministic component and $\exp(v_i)$ and $\exp(v_i)$ are the noise and inefficiency components of the frontier model, respectively. The technical efficiency of a firm is defined as the ratio of the real outputs of firm i to the optimal outputs that a firm could produce, excluding any production inefficiency, conditional on the stochastic factor $exp(v_i)$ (Kumbhakar and Lovell, 2000). Thus, we can have the technical efficiency of the firm i as follows:

$$TE_i = \frac{y_i}{exp(\beta_0 + \sum_n \beta_n \, lnx_{ni} + v_i)} \tag{A.4}$$

$$= \frac{exp(\beta_0 + \sum_n \beta_n \, lnx_{ni}).\exp(v_i).\exp(-u_i)}{exp(\beta_0 + \sum_n \beta_n \, lnx_{ni} + v_i)} \tag{A.5}$$

$$= \exp(-u_i) \tag{A.6}$$

Equation (1) can be estimated using the maximum likelihood (ML) method. From that, the standard deviation of the frontier function σ^2 follows the form:

$$\sigma^2 = \sigma_v^2 + \sigma_u^2 \tag{A.7}$$

where σ_v^2 and σ_u^2 represent the variances of v_i and u_i, respectively. Let φ be the ratio between σ_u^2 and σ^2: $\varphi = \frac{\sigma_u^2}{\sigma^2}$; $\varphi \in [0,1]$. The smaller the value of φ, the lower the effects from the technical inefficiency component.

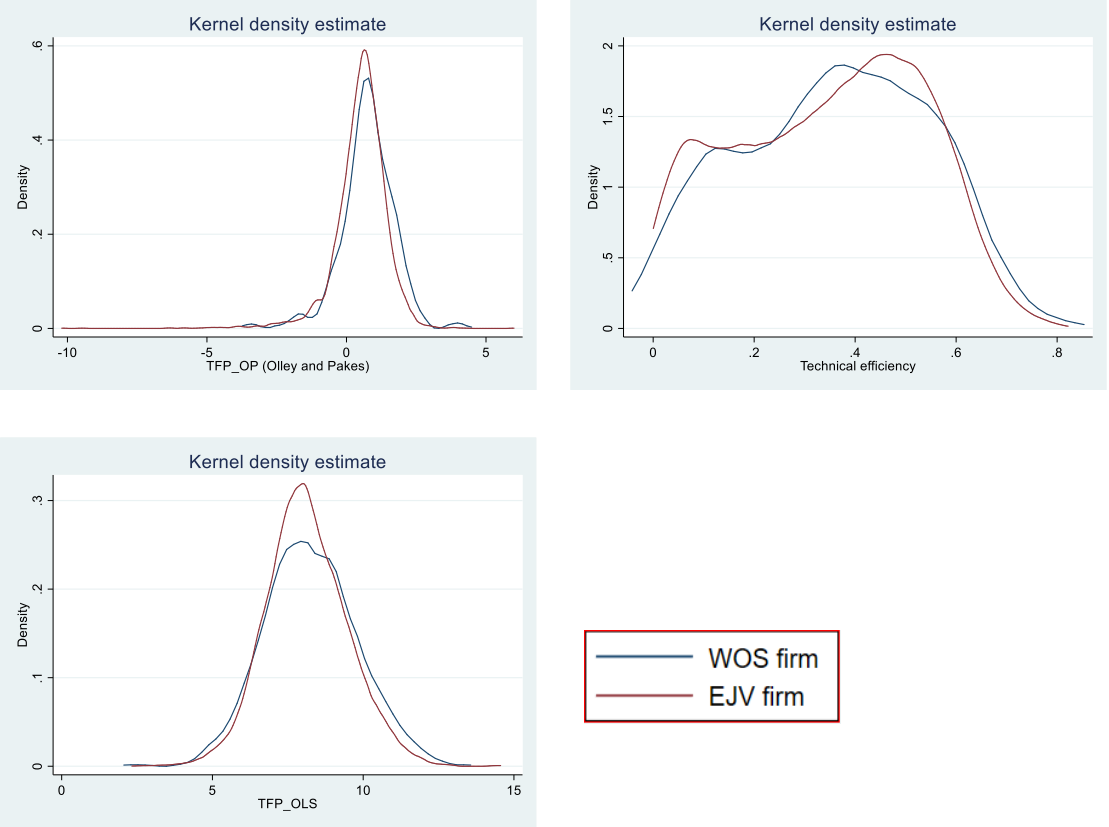
Appendix A.2: Firms' productivity

Productivity is typically measured as the deviation between observed and predicted outputs; it is generated from the Cobb–Douglas production function in OLS estimation. However, this approach suffers from considerable estimation biases and shortcomings. These biases are key issues of production function estimation when there is a correlation between input levels and unobservable productivity shocks. Hence, to conduct a more comprehensive analysis of firm performance, we applied a different approach to measuring firm productivity, namely, the productivity estimation using Olley and Pakes's 1996 method. The comparison of results from different productivity estimations (Olley-Pakes and OLS) would enable a broader and deeper insight into the evaluation of firm performance. Productivity estimation under the Olley-Pakes method is based on the grounds that it uses investment as a proxy for unobservable estimations. This method is aimed at correcting the problems of simultaneity and selection bias when approximating the weighted sum of inputs from an estimation derived using the Cobb–Douglas production function. In this case, simultaneity happens because firms are profit-maximisation agents. They select their input levels and increase their inputs under positive productivity shocks (Olley and Pakes, 1996). Furthermore, selection bias occurs owing to the correlation between productivity shocks and their probability of exit from the market. Firms that experience considerable capital stocks will be more likely to remain in the market than those encountering small capital stocks, even in cases wherein they may have low productivity. The Olley-Pakes method corrects simultaneity by employing investment as a proxy for an unobserved time-varying productivity shock, and it addresses selection bias by considering survival probabilities. More detail of how the TPF_OP is constructed can be found in Olley and Pakes (1996).

In our study, considering both technical efficiency and TFP_OP would yield a more comprehensive picture of firm performance. Technical efficiency reflects the effectiveness of which a firm could produce the maximum or optimal output given the minimum possible quantity of inputs, such as capital, labour, and technology. From another perspective, TFP_OP refers to the firms' productivity in terms of how efficiently firms can convert inputs (labour, capital, and raw materials) into output. In other words, it indicates when output grows faster than inputs; it aspires to make the given inputs more productively efficient. The positive impacts of the EJV strategy on both the technical efficiency and TFP_OP for those firms in the manufacturing sector indicate the more effective and efficient performance of EJV manufacturing firms compared to WOS manufacturing firms.

Appendix B: Additional graphs

Figure B.1. The Kernel Density Estimates of the Firms' Performance in Manufacturing Sectors (WOS Firm vs EJV Firm) in 2012

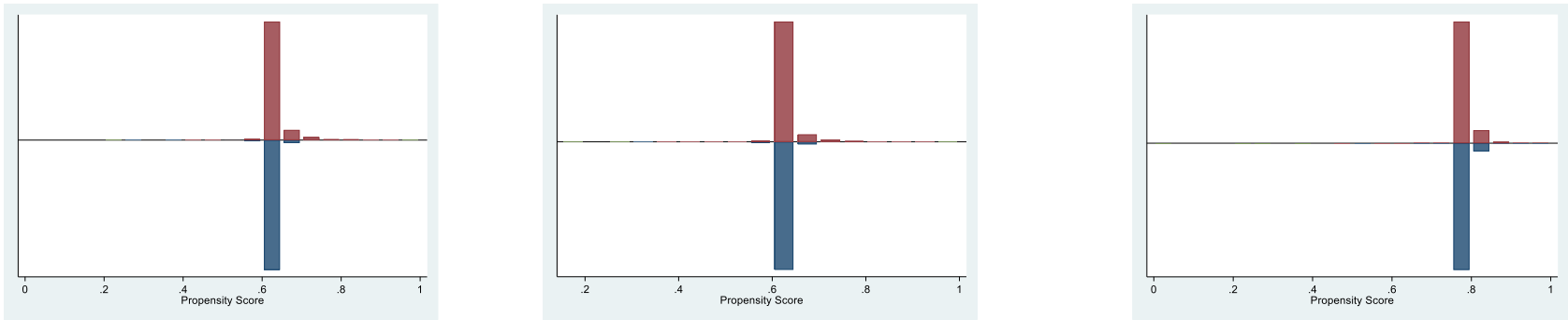


EJV = equity joint venture, OLS = ordinary least squares, TFP = total factor productivity, WOS = wholly owned subsidiary.
Source: Author's calculation.

Figure B.2. Distribution of Propensity Scores

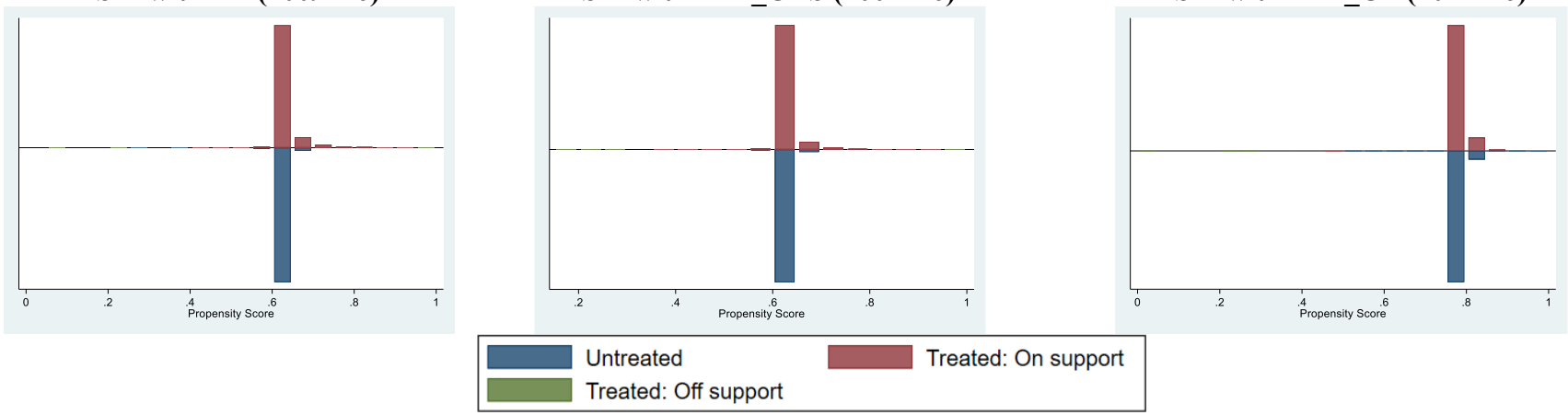
One nearest neighbour match

PSM with TE (2009–16) | **PSM with TFP_OLS (2002–16)** | **PSM with TFP_OP (2011–16)**



Five nearest neighbour match

PSM with TE (2009–16) | **PSM with TFP_OLS (2002–16)** | **PSM with TFP_OP (2011–16)**



OLS = ordinary least squares, PSM = Propensity Score Matching, TE = technical efficiency, TFP = total factor productivity.
Source: Author's calculation.

Appendix C: Production function estimates

Table C. OLS, stochastic frontier production (SFP) and Olley and Pakes estimation

Variable	TFP_OLS[a]	SFP[b]	TFP_OP[c]
Labour	0.117***	0.111***	0.367***
	(0.00715)	(0.00675)	(0.00687)
Capital	0.729***	0.70***	0.718***
	(0.00629)	(0.00578)	(0.0224)
Electricity			0.0495***
			(0.00578)
Trend			0.0473***
			(0.00472)
Constant	-0.478***	1.507***	
	(0.0539)	(0.052)	
Observation	26840	26846	39019

Note:

[a] Total factor productivity under ordinary least squares approach (TFP_OLS) is estimated from 2002 to 2016

[b] The value of technical efficiency indicator (TE) is generated from stochastic frontier production (SFP). TE is estimated from 2009 to 2016.

[c] Standard errors in the Olley and Pakes model are bootstrapped using 50 replications. We use the investment variable as the proxy variable. In this study, the Olley and Pakes model is estimated with the dataset from 2011 to 2016 since the information of investment has been only collected since 2011 in Viet Nam's annual Enterprise Survey dataset.

*Mean statistically significant at 10%.

**Mean statistically significant at 5%.

***Mean statistically significant at 1%.

Source: Authors' calculation.

Appendix D: Further Analysis of FDI firms with the Entry Mode Switches (Movers vs Stayers)

Table D1. List of countries that had firms change from WOS to EJV (2011–16)

Country	Number of firms
Taiwan	36
Republic of Korea	34
Japan	22
China	18
Malaysia	9
Singapore	8
U.S.	8
Australia	6
Thailand	5
Great Britain	4
Belgium	3
France	3
Germany	3
Denmark	2
Italy	2
The Netherlands	2
New Zealand	2
Brazil	1
Canada	1
Iceland	1
Israel	1
Philippines	1
Poland	1
Romania	1
Russia	1
Sweden	1
Switzerland	1
Other	15
Total	**192**

EJV = equity joint venture, FDI = foreign direct investment, WOS = wholly owned subsidiary.
Source: Author's calculation.

Table D2. Descriptive statistics of Movers and Stayers

	2011–16	
	Movers[a]	**Stayers[b]**
	Mean	Mean
Firms' size	421.795	544.781
	(1,053.85)	(1,612.733)
$Capital_{t-1}$	256,365.7	266,686.8
	(635,226.5)	(1,786,331)
Investment $_{t-1}$	42,270.84	44,158.6
	(119,542.4)	363,497.1
Short-term assets $_{t-1}$	138,323.4	145,542.7
	(323,117.4)	(1,312,120)
Long-term assets $_{t-1}$	109,246.3	96,279.87
	(361,725.2)	(488,397)
Output $_{t-1}$	**-3,316.717**	**11,079.05**
	(69,292.47)	**(691,830.5)**
Total wage $_{t-1}$	37,673.5	43,057.5
	(93,542.19)	(147,007.5)
No. of observations	**190**	**13,159**

EJV = equity joint venture, FDI = foreign direct investment, WOS = wholly owned subsidiary.
Note:
[a]Movers refer to those FDI firms that had WOS in the period t-1 and then turned to EJV in period t.
[b]Stayers are those firms which stayed with WOS.
Standard deviations are in blankets.
Source: Authors' calculation.

Table D3. Determinants of EJV decision (2011–16)

	EJV decision			
	(1)	(2)	(3)	(4)
Firms' size	-0.0000153	-0.0000105	**-0.00000370***	**-0.000142****
	-0.0000323	-0.0000332	-0.0000466	-0.0000657
$Capital_{t-1}$	$-1.62.10^{-8}$	-0.00000021	-0.00000808	-0.00000667
	$-1.82.10^{-8}$	-0.000000345	-0.00000515	-0.00000513
Investment $_{t-1}$	$-8.321.10^{-8}$	$-7.07.10^{-8}$	**-0.000000104***	**-0.0000137****
	-0.00000022	-0.000000162	-0.00000084	-0.0000068
Short-term assets $_{t-1}$		0.000000217	0.00000852	0.00000752
		-0.000000344	-0.00000518	-0.00000527
Long-term assets $_{t-1}$		0.000000254	0.00000794	0.00000679
		-0.000000349	-0.00000515	-0.00000512
Debt $_{t-1}$			-0.000000125	**0.0000128***
			-0.000000848	-0.00000674
Output $_{t-1}$			-0.000000192	-0.000000178
			-0.000000351	-0.00000033
Revenue $_{t-1}$			$-4.05.10^{-8}$	-0.000000104
			$-7.43.10^{-8}$	-0.000000174
Total wage $_{t-1}$				0.00000173
				-0.00000143
Capital per worker $_{t-1}$				-0.0000764
				-0.0000725
_cons	-2.136***	-2.140***	-2.106***	-1.991***
	-0.156	-0.154	-0.25	-0.395
Year fixed effects	✓	✓	✓	✓
No. of observations	8,297	7,357	3,190	1,958

EJV = equity joint venture.
Note: Standard errors in parentheses.
* p<0.10, ** p<0.05, *** p<0.01.
Source: Authors' calculation.

Table D4. Treatment Effects of FDI firms with Entry Mode Switching (Movers) in Manufacturing Sectors by PSM Method during the Period 2011–16

		Matching Algorithm	PSM			Movers (Treated)[a]		Stayers (Control)[b]	
			ATT	ATU	ATE	On-support	Off-support	On-support	Off-support
					Firms' TE				
	(1)	One nearest neighbour match	0.0436	-0.0305	-0.0289	12	0	528	354
Panel A	(2)	Five nearest neighbour match	0.00302	0.00921	0.00907	12	0	528	354
					Firms' TFP_OP				
	(3)	One nearest neighbour match	0.209	0.196	0.196	31	0	1396	438
Panel B	(4)	Five nearest neighbour match	0.282	0.194	0.196	31	0	1396	438
					Firms' TFP_OLS				
	(5)	One nearest neighbour match	0.116	-0.0254	-0.0225	31	0	1468	457
Panel C	(6)	Five nearest neighbour match	0.0173	0.151	0.148	31	0	1468	457

EJV = equity joint venture, FDI = foreign direct investment, PSM = Propensity Score Matching, TE= technical efficiency, WOS = wholly owned subsidiary.

Notes:

ATT: The effects of the treatment on the treated (i.e. movers [only those FDI firms who had WOS in the period t-1 and then turned to EJV in period t]);

ATU: The effects of the treatment on the untreated (i.e. stayers [only those who stayed with WOS]);

ATE: Average treatment effect on the entire sample.

[a] Movers refer to those FDI firms that had WOS in the period t-1 and then turned to EJV in period t.

[b] Stayers are those firms which stayed with WOS.

*Mean statistically significant at 10%.

**Mean statistically significant at 5%.

***Mean statistically significant at 1%

Source: Authors' calculation.

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