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The Location Choice of Greenfield Foreign Direct Investments: Empirical Evidence from Vietnam

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Abstract: This paper examines the location choice of Greenfield foreign direct investment (GFDIs) among Vietnamese provinces from 2012 to 2021. We used economic determinants of the different provinces to explain their respective numbers of GFDI inflows using a Poisson specification. The results show that a province's population and firm density, the educational level of its residents, and the quality of the prevalent labour force positively affect GFDI inflows, while a worker's average monthly income does the opposite. However, the institutional quality of a province appears to be insignificant in this context.

Leveraging a comprehensive dataset spanning a significant timeframe, our study employs a multifaceted analytical approach to identify and analyse the key factors that impact the selection of specific locations for Greenfield FDIs. Building on existing literature, our research incorporates novel variables such as regional infrastructure development, government incentives, and local market characteristics to provide a nuanced understanding of the intricate dynamics at play. By utilising advanced econometric models, we aim to unravel the interplay between economic, regulatory, and geographical factors, shedding light on the nuanced considerations that guide MNCs in their strategic investment decisions. In conclusion, this research not only enriches the academic literature on FDI location choices but also provides practical implications for policymakers and industry practitioners navigating the complexities of attracting and managing Greenfield investments in emerging markets, with Vietnam serving as a compelling case study.

Keywords: Greenfield foreign direct investment; Vietnam, Provincial location choice, Poisson regression

JEL classification: F21, F23, P25

1. Introduction

Vietnam began its transition from a centrally planned to a market-oriented socialist economy under state leadership in 1986, when the Communist Party initiated the implementation of economic reforms, also referred to as "Doi Moi" (Were, 2017). A key component was opening the economy to foreign direct investment (FDI) and promoting inflows through policies

including financial incentives (Tran, 2008). The foundation for realising this was laid in 1987 with the enactment of the "Law on Foreign Investment", which paved the way for foreign companies to establish operations in Vietnam (Hanh et al., 2017). As Vietnam experienced a sharp increase in FDI inflows, it became an interesting case study for researchers interested in the factors driving FDI. In this regard, the studies by Ahn and Meyer (1999) and Mai (2002) were the first to investigate the location choice of foreign investors in Vietnamese provinces in the years following the new decree-law. Their employed empirical approach aimed to explain the inflows of FDI into a province using selected economic determinants. As later studies followed that also focused on Vietnam and applied the same methodology, a distinct branch of research on FDI location choice developed in the literature.

Till date, none of the studies in this context have focused solely on Greenfield Foreign Direct Investments (GFDI). We believe that GFDIs represent a more fundamental decision for investors than other forms of FDI because they involve building a foreign subsidy from the scratch. Therefore, it seems reasonable to focus on such investments when studying location decisions. In this paper, we studied the impact of a province's economic determinants on its inflows of GFDIs for the period from 2012 to 2021. To do so, we used a Poisson regression and classified the included determinants into the categories of market size, industrial agglomeration, labour market, and institutions. The dataset used contained information on all 63 provinces and came from the FDI Markets database, the Vietnamese Statistical Office, and the Vietnam Chamber of Commerce and Industry.

The remainder of the paper is structured as follows: Section 2 reviews the literature on the location choice of FDI. Section 3 describes the data set used for the analysis and the econometric methodology. Section 4 presents the results. Finally, Section 5 provides a summary and conclusions.

2. Literature Review

Within the field of research dealing with the location choice of foreign investors at the regional level of a country, a particular branch has developed that focuses on Vietnam and its provinces. The respective studies are shown in Table 1. They used economic determinants of the different provinces to explain their FDI inflows and applied the same econometric methodology. Despite the wide range of determinants used in this context, the different studies could broadly be grouped into the following five categories: market size, industrial agglomeration, infrastructure, labour market, and institutions. In the following, we provide a brief review of each category.

The first category contains determinants that account for the market size of a province. Several researchers argue that the prevailing demand potential is an important determinant of FDI inflows, as it implies higher potential profits. In this regard, most studies included economic performance measured as GDP or GDP per capita into their specifications, indicating a positive (Yang et al., 2017; Hoang & Goujon, 2014; Huynh, 2022; Dung et al., 2018; Anwar & Nguyen, 2010) or negative impact (Anh & Meyer, 1999; Hoang et al., 2022, Wang & Balasubramanyam, 2011). The studies by Meyer and Nguyen (2005) and Do and Park (2022) provided a different approach by using the number and density of residents, respectively, suggesting a positive effect.

The second category contains determinants that account for agglomeration effects caused by the density of firms located in a province. In this context, researchers argue that an agglomeration of private firms is associated with positive externalities that attract foreign investors. Most studies focused on the prevalence of foreign firms and showed that a more pronounced agglomeration of these firms positively affected a province's FDI inflows (Dung et al., 2018; Hoang et al., 2022; Tan & Meyer, 2011; Yang et al., 2017; Hoang & Goujon, 2014; Meyer & Nguyen, 2005). The only exception is the result of Hoang et al. (2022) which indicated an insignificant effect. When studying the impact of an agglomeration of domestic firms in this context, Hoang and Goujon (2014) found a positive result, in contrast to Dung et al. (2018) and Yang et al. (2017). The study by Huyhn (2022) is the only one that included the sum of private firms in the specification and suggested a positive effect. Regarding state owned enterprises, researchers argue that they influence a province's formal and informal institutions to favour their interests over those of foreign investors. As a consequence, agglomeration is expected to discourage FDI inflows in this regard. In this sense, Meyer and Nguyen (2005) presented an insignificant effect, whereas Nguyen and Diez (2017) found a negative effect for a sample that included only provinces in the Red River Delta and Southeast Vietnam.

The third category contains proxies that consider the development of a province's infrastructure since it is assumed to facilitate business operations and thus attract foreign investors. In this regard, studies by Wang and Balusubramanyam (2011), Anwar and Nguyen

(2011) and Hoang and Goujon (2014) used the number of telephones per thousand inhabitants which showed a positive effect. Although Huyhn (2022) used the same proxy as the aforementioned studies, he presented an insignificant effect, and Hoang et al. (2022) presented a negative effect when using solely the number of phones. In addition to proxies related to

the prevalence of telephones, some studies also used real development investment per capita (Do & Park, 2022), the percentage of inhabitants using electricity (Dung et al., 2018), local freight transport (Yang et al., 2017), or the percentage of paved roads (Hoang & Goujon, 2014) indicating a positive effect. The study by Meyer and Nguyen (2005) found an insignificant effect when using the volume of local passenger traffic divided by the population.

The fourth category contains determinants related to labour costs and the educational level of residents to account for a province's labour market. In this context, most studies argue that higher labour costs have a negative impact on a firm's profitability and, thus, discourage FDI. However, studies that included the monthly average wage in their respective specifications presented mixed results with some indicating a negative effect (Hoang et al., 2022; Anwar & Nguyen, 2010) and some a positive effect (Yang et al., 2017), and some indicating an insignificant effect (Dung et al., 2018; Anwar & Nguyen, 2010). Hoang and Goujon (2014) used a different approach by including the annual average wage deflated by prices and obtaining a positive effect. With respect to the educational level of residents, many studies argued that a larger stock of human capital attracted foreign investors because their established firms tend to use more technology-intensive processes. In this context, the majority of studies used the percentage of trained employees over the age of 15 (Dung et al., 2021; Yang, 2017; Anwar & Nguyen, 2010; Wang & Balusabramyan, 2011; Hoang & Goujon, 2014; Dung et al., 2018; Hoang et al., 2022) and found a positive effect. These results were consistent with those provided by Anh and Meyer (1999) when using the percentage of the literate population instead. However, the results of Meyer and Nguyen (2005) turned out to be insignificant when focusing on the density of university teachers.

The fifth category includes determinants that take into account the institutional quality of a province, as it is often argued that this reduces the risks and costs associated with business activities and thus attracts foreign investors. In this regard, studies by Hoang et al. (2022), Huyhn (2022), Do and Park (2022), and Dung et al. (2018) employed components of the Provincial Competitiveness Index (PCI) for Vietnam and showed that institutional quality positively affected FDI inflows into a province. Although they used a different approach, the results of Meyer and Nguyen (2005) and Wang and Balasubramanyam (2011) suggested a positive effect when examining the magnitude of official development assistance and the ability of institutions to facilitate access to real estate, respectively.

Although the shown studies in Table 1 form the relevant literature by studying the location choice of foreign investors at the provincial level

for Vietnam, no study has so far focused solely on Greenfield Foreign Direct Investment (GFDI). This form of investment represents a more fundamental decision for investors than other forms of FDI because it involves building a foreign subsidy from the scratch. Hence, we consider it worthwhile to focus on such investments when examining location decisions.

Table 1: Studies of the Determinants of FDI Location Decisions

Study	*Period*	*Number of provinces*
Anh and Meyer (1999)	1988-1993	44
Mai (2002)	1988-1998	61
Meyer and Nguyen (2005)	2000	61
Anwar and Nguyen (2011)	1996-2005	61
Tan and Meyer (2011)	2001	58
Wang and Balasubramanyam (2011)	2000	58
Hoang and Goujon (2014)	2001-2006 | 2007-2010	56 | 58
Yang et al. (2017)	2000-2005	64
Nguyen and Diez (2017)	2000-2014	16
Do and Park (2018)	2015-2018	63
Dung et al. (2018)	2008-2013	63
Hoang et al. (2022)	2007-2016	9
Huyhn (2022)	2005-2016	8

3. Methodology

3.1. Data

The data compiled for the analysis includes information on all 63 provinces in Vietnam for the years 2012 to 2021. The dependent variable, GFDIit, was sourced from FDI Markets and represents the number of established GFDIs in a province i during the year t. The reason for using count data is that compared to the value of total investment it is not biased by large investment projects that could increase volatility and affect the analysis. As independent variables, we included a set of economic determinants that could affect an investor's decision on which province to locate in. The relevant information comes from the Statistical Yearbook of Vietnam (SYVN) and the Provincial Competitiveness Index (PCI) provided by the General Statistics Office of Vietnam and the Vietnam Chamber of Commerce and Industry, respectively.

3.2. Variables potentially affecting the location decision for GFDI

We divided the independent variables into the categories of market size, industrial agglomeration, labour market, and institutions. In this regard,

Table 2 shows each determinant in its respective category and provides further information on its definition, source, and expected effect. The index *i* refers to the respective province, while t indicates the year. The first variable, *pop_denit*, measured population density as inhabitants per hectare and served as a proxy for market size (Meyer& Nguyen, 2005; Do & Park, 2021)**.** We hypothesised that provinces with a higher population density attracted more GFDIs, because they may offer more profitable market potential for foreign investors. The second variable, *firm_denit*, measured the number of resident firms per hectare and is thus an indicator of the prevailing agglomeration effects. As Huynh (2022) argued, a greater density of incumbent firms is attractive to foreign investors, because their business activities may have shaped existing markets for raw materials and labour, among other things, to exploit them more efficiently. Furthermore, Hoang and Goujon (2014) pointed out that industrial agglomerations provided positive externalities such as access to technology and knowledge, skilled labour, business services, production inputs, etc. The third variable, *education*, represented the level of education, measured as the percentage of students enrolled in upper secondary school. We expected that the level of human capital in a province attracted foreign investors, as their firms employed a larger share of educated workers due to their technology-intensive processes (Peluffo, 2015; Andersson et al. 2022). The fourth variable, *qual_labit*, described the percentage of firms that were satisfied with the quality of labour. In this regard, we hypothesised that higher degrees of labour quality were associated with operational efficiency and thus had a positive impact on GFDI inflows. The fifth variable, *avg_incit*, described the average monthly income per employee measured in millions of Vietnamese Dong (VND), as it was argued that higher labour costs discouraged foreign investors by lowering a firm's profitability (Hoang et al., 2022; Hoang & Goujon, 2014; Yang et al., 2017). The sixth variable, *net_migit*, indicated the net immigration rate, measured in thousands of people. Since a large inflow of people could positively contribute to labour market flexibility, we expected this determinant to positively affect the location decision of foreign investors. The last two variables captured the institutional quality of a province by measuring the percentage of firms that felt that, first, enterprises in their line of business were subject to bribe requests from provincial authorities (*bribe_rentit*) and, second, local authorities used regulations to extract rents (*reg_rentit*). We expected that the extent of corruption negatively affected GFDI inflows, because, according to the 'grabbing hand theory' by Shleifer and Vishny (1993, 1994), the pursuit of bribes might be perceived as an additional tax on a firm's profitability since it increased the costs of doing business.

Table 2: Details of the determinants of the location choice used in the study

Category	*Variable*	*Definition*	*Source*	*Expected effect*
Market size	pop_den	Number of inhabitants per hectare.	SYVN	+
Industrial agglomeration	firm_den	Number of firms per hectare.	SYVN	+
Labour market	educ	Percentage of students enrolled in upper secondary school.	SYVN	+
	qual_lab	Percentage of firms being satisfied with the quality of labour.	SYVN	+
	avg_inc	Monthly average income per employee measured in millions of Vietnamese Dong (VND).	SYVN	-
	net_mig	Net immigration rate measured in thousand people.	SYVN	+
Institutions	bribe_rent	Percentage of firms that felt that enterprises in their line of business were subject to bribe requests from provincial authorities.	PCI	-
	reg_rent	Percentage of firms that felt that provincial authorities use local regulation to extract rents.	PCI	-

Note: SYUN is the Statistical Yearbook of Vietnam and PCI is the Provincial Competitiveness Index.

3.3. Descriptive statistics

Table 3 presents descriptive statistics of the variables used. The results show that the average province recorded an annual inflow of 2.77 GFDIs during the investigation period from 2012 to 2021. Since the corresponding median is equal to an inflow of zero GFDIs, we concluded that the allocation of foreign investors' establishments among provinces followed a heterogeneous pattern. A closer look at the provincial level showed that the provinces of Cao Bang, Bac Kann, Tuyen Quang, Dien Bien, Lai Chau, and Kon Tum received no GFDI at all during the period, whereas Ho Chi Minh received the most GFDIs, followed by Ha Noi, Binh Duong and Hai Phong averaging at 56.5, 27.9, 10.4 and 10.3, respectively. Further analysis of the independent variables showed that Ho Chi Minh (4,062.30) and Ha Noi (2,242.60) have the highest population densities (measured in residents per hectare). They also have the largest industrial agglomeration with 85.58 and 35.32 firms per hectare, respectively. In contrast, the lowest density was in Lai Chau with 0.08 firms and 48.50 inhabitants per hectare. In terms

of the percentage of students attending upper secondary school, Binh Dinh (20.35) had the highest share, followed by Qang Nam (20.34) and Ha Tinh (20.20). The province with the highest percentage of firms being satisfied with the quality of labour was Dong Thap (92.23), while Lai Chau (69.12) and Cao Bang (73.72) showed the lowest. In terms of monthly average income, the data shows that workers in Ba Ria-Vung Tau (98.02) and Ho Chi Minh (89.80) received the highest wages. Looking at provincial migration rates, Binh Duong (40.22), Bac Ninh (16.01), and Ho Chi Minh (9.69) showed the highest positive net immigration, while the opposite was true for An Giang (-11.15) and Soc Trang (-11.10). The provinces with the highest share of firms believing that officials used bribes to extract rents were Cao Bang (65.10), Hoa Binh (64.55), and Hoa (63.92). However, when examining the proportion of firms perceiving that local authorities used regulations to extract rents, Ha Noi (66.36), Cao Bang (65.16), and Thanh Hoa (64.07) had the highest proportions.

Table 3: Descriptive statistics of the variables used in the location decision analysis

Variable	*Average*	*Median*	*St. dev.*	*Min*	*Max*	*Observations*
$GFDI_{it}$	2.77	0	8.43	0	81	630
pop_den_{it}	496.16	273	622.47	44	4476	630
$firm\_den_{it}$	3.41	0.67	11.93	0.05	130.23	630
$educ_{it}$	15.82	15.84	2.84	8.32	24.65	630
$qual\_lab_{it}$	84.14	90.56	16.11	21	100	630
avg_inc_{it}	59.96	57.56	16.72	28.67	119.88	630
net_mig	-1.69	-2.25	8.27	-23.8	58.6	630
$bribe\_rent_{it}$	54.91	56.11	11.82	23.07	80.80	630
reg_rent_{it}	55.38	57.14	11.75	16.30	78.31	630

Note: The variables refer to the list shown in Table 2.

The pairwise correlation coefficients of the variables used are shown in Table 4. The results showed that population density was strongly correlated with the density of firms, as indicated by a correlation coefficient of 0.86. Furthermore, the percentage of firms that believed that firms in their industry were subject to bribe requests from provincial authorities was moderately correlated with the percentage of firms that believed that local authorities used regulation to extract rents. More precisely, the correlation coefficient of the two variable pairs was 0.54. As for the empirical analysis, we included the correlated variables separately in our specification to avoid multicollinearity.

Table 4: Correlation Matrix

	GFDI	*pop_den*	*firm_den*	*educ*	*qual_lab*	*avg_inc*	*net_mig*	*bribe_rent*	*reg_rent*
GFDI	1.0								
pop_den	0.81	1.0							
firm_den	0.88	0.86	1.0						
educ	0.04	0.12	0.05	1.0					
qual_lab	0.09	0.06	-0.01	0.16	1.0				
avg_inv	0.36	0.39	0.39	-0.12	-0.31	1.0			
net_mig	0.32	0.32	0.29	-0.08	0.14	0.25	1		
bribe_rent	0.10	-0.01	0.01	0.08	0.40	-0.22	0.10	1.0	
reg_rent	0.15	0.08	0.12	0.01	-0.05	0.15	0.11	0.54	1.0

3.4. Empirical strategy

Since the dependent variable GFDIi, *t* represents count data (i.e., the number of established GFDI projects in a province), we employed Poisson regression analysis to model the relationship between GFDI and the independent variables. We argued that an investor's decision to establish a GFDI project followed a profound planning phase that spanned an extended period. As a result, our specification allowed for a one-year time lag between the independent variables and the investment project. In this way, problems of endogeneity could also be avoided. Thus, the model to be estimated can be formulated as follows:

$$GFDI_{i,t} = \alpha_i + \beta_1 \bullet pop\_den_{i,t-1} + \beta_2 \bullet firm\_den_{i,t-1} + \beta_3 \bullet educ_{i,t-1} + \beta_4 \bullet qual\_lab_{i,t-1} + \beta_5 \bullet avg\_inc_{i,t-1}$$

$$+ \beta_6 \bullet net\_mig_{i,t-1} + \beta_7 \bullet bribe\_rent_{i,t-1} + \beta_8 \bullet reg\_rent_{i,t-1} + \beta_9 \bullet \delta_t + \beta_{10} \bullet \varepsilon_{i,t} \quad (1)$$

As mentioned earlier, the subscripts *i* and *t* refer to the province and the year, respectively. The vector α_i contains the province-specific constants representing time-invariant characteristics of the included provinces. Furthermore, the vectors δ_t and $\varepsilon_{i,t}$ represent the time-specific constants and the error terms, respectively.

4. Results

We estimated different specifications of our model. Specifically, since the population density is strongly correlated with the density of firms, we included each of these variables in separate regressions. The same applies to the moderately correlated variables, i.e., the percentage of firms that believed that firms in their industry were asked for bribes by provincial authorities and the percentage of firms that believed that local authorities used regulations to extract rents. This approach avoided multicollinearity and served further as a robustness check for the estimated coefficients of the other variables. Hence, we estimated a total of four specifications. We applied a Poisson regression and excluded provinces that did not receive

GFDIs during the study period (i.e., Cao Bang, Bac Kann, Tuyen Quang, Dien Bien, Lai Chau, and Kon Tum).

Table 5 shows the estimation results in the first, third, fifth, and seventh number columns. Since an estimated coefficient β in our model is the expected logarithmic change in a province's GFDI inflows per unit change of its associated independent variable, we performed a marginal analysis to provide a clear and understandable interpretation. Therefore, for each variable in every specification, we calculated the marginal effect by including its respective coefficient in the expression $e\beta - 1$. The result obtained gives the expected percentage change in a province's GFDI inflows given a one-unit change in the underlying variable, ceteris paribus (Coxe et al., 2009; Woolridge, 2015). The transformed coefficients are presented in the second, fourth, sixth, and eighth number columns.

A closer inspection of the coefficients obtained reveals a pronounced robustness with respect to their magnitude and sign under the specifications outlined. The results for a province's population and firm density suggest that both determinants play an important role in attracting foreign investors. In this regard, Models 1 and 2 show that an increase in the density of residents and firms by one unit should increase a province's inflows of GFDIs by 0.07 and 0.81 percentage points, respectively. Therefore, we conclude that the market size and industrial agglomeration of a province are important for the location choice of foreign investors and positively influence their decision-making process. The first two variables in the category, which focus on a province's labour market conditions, show that a one percentage point increase in the share of students attending upper secondary school and firms that are satisfied with the quality of labour is expected to increase a province's GFDI inflows by 8.41 and 2.09 percentage points, respectively. The remaining two variables show that an increase in the average monthly income by one million VND decreases a province's GFDI inflows by 2.09 percentage points on average, whereas a one-unit increase in net immigration (i.e. 1,000 people) is expected to increase GFDI inflows by 2.52 percentage points. With regard to institutional quality, the results show that the percentage of firms that felt that firms in their industries were asked for bribes by provincial authorities and the percentage of firms that felt that local authorities use regulation to extract rents appear to be insignificant coefficients.

5. Conclusion

This paper examines how provincial characteristics affect Greenfield Foreign Direct Investment inflows in Vietnam. To do so, we studied the period from 2012 to 2021 and used a Poisson regression for empirical

Table 5: Estimation results for factors influencing the location choice of Greenfield Foreign Direct Investment

	Model 1		*Model 2*		*Model 3*		*Model 4*	
	Poisson	*Marginal effects*	*Poisson*	*Marginal effects*	*Poisson*	*Marginal effects*	*Poisson*	*Marginal effects*
pop_den	0.0007** (0.0003)	0.0007	-		0.0007** (0.0003)	0.0007	-	
firm_den	-		0.0081* (0.0044)	0.0081	-		0.0084** (0.0041)	0.0084
educ	0.0808** (0.0408)	0.0841	0.0859** (0.0413)	0.0896	0.0837** (0.0397)	0.0873	0.0887** (0.0403)	0.0927
qual_lab	0.0207*** (0.0075)	0.0209	0.0211*** (0.0074)	0.0213	0.0208*** (0.0074)	0.0210	0.0213*** (0.0073)	0.0215
avg_inc	-0.0212** (0.0094)	-0.0209	-0.0193** (0.0092)	-0.0191	-0.0211** (0.0092)	-0.0208	-0.0193** (0.0091)	-0.019
net_mig	0.0249*** (0.0078)	0.0252	0.0265** (0.0066)	0.0268	0.0249*** (0.0060)	0.0252	0.0265*** (0.0066)	0.0268
bribe_rent	-0.0024 (0.0060)	-0.0024	-0.0024 (0.0061)	-0.0024	-		-	
reg_rent	-		-		-0.0025 (0.0035)	-0.0025	-0.0025 (0.0035)	-0.0025
Time fixed effects	Yes		Yes		Yes		Yes	
Entity fixed effects	Yes		Yes		Yes		Yes	
Observations	570		570		570		570	
Wald Chi²	323.56		550.13		349.22		622.47	

Notes: Robust standard errors in parentheses. ***/**/* denote statistical significance and the 1%, 5% and 10% levels, respectively. The marginal effects are computed by using the formula ($e^{\hat{a}}$-1) and indicate the expected change in GFDI inflows for a one unit change in the respective variable.

analysis. The results indicate that market size and the industrial agglomeration of a province, measured as inhabitants and firms per hectare, respectively, are important factors in attracting GFDI. Regarding labour market characteristics, the results show that the education level, labour force quality and net immigration positively affect a province's GFDI inflows, whereas the opposite is the case for the average monthly income. Regarding the proxies that capture the quality of a province's institutions, it appears that neither the percentage of firms that believe that firms in their industry are asked for bribes by provincial authorities nor the percentage of firms that believe that local authorities use regulation to extract rents have a significant impact on the location decision of foreign investors. According to Gueorguiev and Malesky (2012), variables originating from surveys potentially involve a bias caused by, among other things, the respondents' respective perceptions and the uncertainty that the revealed information will not be used against them. A possible area of future research in this context would be to analyse whether the impact of a province's determinants varies by GFDI sector.

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