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Multinational firms and their internationalization processes: An analysis  
of the determinants of foreign direct investment

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# 1 Introduction

When an enterprise wants to internationalize its operations, it has the possibility to engage in foreign direct investment by acquiring more than ten percent of a foreign company's equity, buy it outright or establish a subsidiary from scratch. Whereas the first two options are referred to as "brownfield" foreign direct investment, the third is referred to as "greenfield" foreign direct investment. Since several researchers started to investigate the economic determinants that affect a foreign investor's location choice, a research field emerged in the literature containing the following two streams of research. The first stream puts the focus on the country-level and examines the impact of a country's economic determinants on its respective inflows of foreign direct investment. In this regard, researchers account for, among other things, a country's gross domestic product, population size, exchange rate and corporate tax rate (see e.g., Bruno et al., 2021; Dhingra et al., 2016). Furthermore, this approach allows to study the impact of changes in the macroeconomic environment that leave a country's economic determinants unaffected. In this regard, researchers investigated, among other things, whether the United Kingdom's held referendum over a withdrawal from the European Union affected its inflows of foreign direct investment (see e.g., Serwicka and Tamberi, 2018; Breinlich et al., 2020). Although the economic characteristics of the United Kingdom were not affected by the sole publication of the election results, uncertainty arose regarding the future economic relationship of the United Kingdom with the European Union (see e.g., Bloom et al., 2018). In sum, this stream analyzes the impact of economic determinants at the country-level and, further, macroeconomic changes on a country's inflows of foreign direct investment. However, the vast amount of foreign direct investment is not distributed homogenously among a country's regions but is solely attracted by a small number. As a consequence, the second stream puts the focus on the regional-level and investigates the impact of a region's economic determinants on its respective inflows of foreign direct investment. In this regard, researchers partly account for determinants that overlap with those used when focusing on the country-level. More precisely, they use, among other things, a province's gross domestic product and population size (see e.g., Hoang et al., 2022; Huynh, 2022). However, there exists a larger variety regarding the selected economic determinants since the studies investigate solely one country. As a consequence, this feature allows for a supplementary and deeper analysis.

Although the aforementioned research field contains a large number of studies, it allows for additional contributions. The reason is that many unexplored economic determinants at the county- and regional-level exist that might influence a foreign investor's location choice. Therefore, I contribute to both research streams with four chapters that are authored with Prof. Dr.

Michael Frenkel.

In the second chapter, we investigate whether the political uncertainty that followed the held referendum on a withdrawal from the European Union had an impact on the number greenfield foreign direct investment which were announced from 2016 to 2019 to materialize in the United Kingdom. We assume that the emergence of uncertainty started already in the beginning of the referendum year and lasted during the transition period until 2020 when the withdrawal agreement was finally implemented. Since it was unclear whether the United Kingdom would stay in the European Single Market, we assume that foreign investors abstained from announcing investments and adopted either a 'wait-and-see' attitude or shifting their investments to other countries. Furthermore, we distinguish the announcements made according to whether an investor is located in- or outside the European Single Market to analyze the impact for each group separately.

In the third chapter, we build upon the former by taking on a different perspective regarding the impact of the held referendum over a withdrawal from the European Union on the inflows of greenfield foreign direct investment in the United Kingdom. In this regard, we focus on the county-level and study whether a county's average inflows of greenfield foreign direct investment declined as 2016 compared to the period up to and including 2015. We assume that investors decreased as of the referendum year their investments in the counties of England, Scotland and Wales.

In the fourth chapter, we study the location choice of greenfield foreign direct investment among provinces in Vietnam for the years 2010 to 2021. In this regard, we select a number of economic determinants that might affect a foreign investor's location choice. Although several studies exist that focus on Vietnam in this regard, there is up until now no one focusing particular on greenfield foreign direct investment.

In the fifth chapter, we study the location choice of foreign direct investment among the provinces of Indonesia from 2015 to 2021. Although a number of studies have been conducted examining the effect of a province's economic determinants on its respective inflows of foreign direct investment, there exist several that have not been investigated yet. In this regard, we use the percentage of villages that have base transceiver stations, the percentage of households that have a certain level of hygienic standards, which is measured by whether a handwashing facility with soap and water is present, the percentage of the population being employed in the informal sector and the percentage of ten years of age and older who have never attended school.

## 2 The Heterogenous Impact of the Brexit Referendum on Announced Greenfield Foreign Direct Investments <sup>1</sup>

### 2.1 Background of the Study

This chapter takes on a country-perspective and focuses on the held referendum over the withdrawal from the European Union (EU) in the United Kingdom (UK). Therefore, it contributes to the first research stream that analyzes, among other things, the impact of macroeconomic changes on a country's inflows of foreign direct investment (FDI). When we examine the respective literature that investigates this particular topic, it becomes clear that several studies aim at estimating the impact of the UK's loss of the EU membership on its inflows of FDI in the long-term. In this regard, the study by Dhingra et al. (2016) provides the first serious discussion using a gravity model containing bilateral FDI flows among 34 OECD countries for the period 1985-2013. In case of a withdrawal from the EU on the part of the UK, they expect a 22 percent decline in FDI inflows for the UK. Bruno et al. (2021) build upon the former study by also using a gravity model but including data on bilateral FDI flows from almost all countries in the world for the period 1985-2018. In contrast, their respective results suggest that being a member of the EU leads to about 60 percent higher FDI inflows, which is a mirror image of a more pronounced negative impact for the UK. Further studies support the results by using different methodological approaches in this context (see e.g., McGrattan and Waddle, 2020; Driffield and Karoglou, 2019).

Besides this stream of research, a small but related branch developed focusing on the immediate short-term impact as of the held referendum in this context. In this regard, Breinlich et al. (2020) show that the FDI inflows of the UK from the EU already declined by 9 percent by the time of the referendum, emphasizing the immediate economic disintegration. By using a synthetic control method Serwicka and Tamberi (2018) find that the UK's inflows of FDI decreased by 16 to 20 percent when compared to a counterfactual in which the referendum would not have happened.

However, there exists no study within the latter branch which has studied whether the announced number of greenfield foreign direct (GFDIs) to materialize in the UK decreased as of the referendum year and, if this holds true, whether the decrease is more pronounced for announcements made by investors outside the European Single Market (ESM) when compared to

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<sup>1</sup> This chapter is based on a paper which is co-authored with Michael Frenkel, WHU - Otto Beisheim School of Management. The respective paper has been published in the journal "Applied Economics Letters" in February 2023. The reference is as follows: Frenkel, M. and Stefan, H. (2023a). "*The impact of the brexit referendum on greenfield foreign direct investments from countries within and outside the European single market*". Applied Economics Letters, DOI: 10.1080 /13504851.2023.2176437.

those made by investors inside. In this regard, we hypothesize in the first place that the rise in uncertainty regarding the UK’s future economic relationship with the EU started from the beginning of the referendum year which led foreign investors to reduce the amount of planned GFDIs in the UK and, thus, the announced number of GFDIs to materialize in the UK to decrease. In the second place, we hypothesize that investors outside the ESM are more affected by the uncertainty. A potential reason might be, among other things, that not following the ‘Norwegian Model’ after the withdrawal agreement’s implementation might represent a more detrimental threat for them since they tend to target the UK more often as an export platform (Oyamada, 2020).

In this chapter, we investigate the aforementioned hypotheses and structure the remainder as follows: Section 2.2 describes the data used for the analysis. Section 2.3 describes the methodology. Section 2.4 presents the results. Finally, Section 2.5 summarizes the findings and provides some conclusions.

## 2.2 Data

The data compiled for the analysis includes information on 185 countries for the years from 2005 to 2019. The dependent variable ( $GFDI_{i,j,t}$ ) is sourced from fDi Markets and represents the number of GFDIs which are in period  $t$  announced by investors in country  $j$  to materialize in country  $i$  in the near future. 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. We source the used independent variables from the World Bank and the Tax Foundation. Regarding the host country, we include its GDP per capita adjusted for purchasing power parity ( $gdp\_pc\_host_{i,t}$ ), its population size ( $pop\_host_{i,t}$ ) measured as the logarithm of the population (in thousands) and the level of its corporate income tax ( $corp\_tax_{i,t}$ ). Regarding the home country, we include its GDP per capita adjusted for purchasing power parity ( $gdp\_pc\_home_{j,t}$ ) and its population size ( $pop\_home_{j,t}$ ) measured as the logarithm of the population (in thousands).

Table 1: Correlation matrix

	$gdp\_pc\_host_{i,t}$	$gdp\_pc\_home_{j,t}$	$gdp\_host_{i,t}$	$gdp\_home_{j,t}$	$pop\_host_{i,t}$	$pop\_home_{i,t}$	$corp\_tax_{i,t}$
$gdp\_pc\_host_{i,t}$	1.0						
$gdp\_pc\_home_{j,t}$	-0.01	1.0					
$gdp\_host_{i,t}$	0.27	0.01	1.0				
$gdp\_home_{j,t}$	0.01	-0.28	0.01	1.0			
$pop\_host_{i,t}$	-0.27	0.00	0.64	-0.00	1.0		
$pop\_home_{i,t}$	0.01	-0.27	-0.00	0.65	-0.00	1.0	
$corp\_tax_{i,t}$	-0.15	-0.01	0.03	-0.01	0.23	-0.01	1

The pairwise correlation coefficients of the variables are presented in Table 1. The results show that a country's population density is moderately correlated with its GDP. In this regard, the correlation coefficient for the variables  $pop\_host_{i,t}$  and  $gdp\_host_{i,t}$  amounts to 0.64, whereas that of the variables  $pop\_home_{i,t}$  and  $gdp\_home_{j,t}$  equals 0.65. We measure the strength of the correlation between the independent variables by calculating the variance inflation factor for each. The results obtained indicate that the mean of the variance inflation factor is equal to 3.78. Therefore, a moderate correlation is present but multicollinearity does not pose a problem for the empirical analysis.

A closer investigation of the data unveils that the United Kingdom, Germany and France attracted the largest number of announced investments during the study period amounting to 14 244, 11 730 and 7 598, respectively. However, Slovenia, Malta, Cyprus, Iceland and Liechtenstein received the lowest number of announcements from foreign investors amounting to 209, 175, 128, 38 and 15, respectively. Regarding the GDP per capita adjusted for purchasing power parity (measured in thousands of dollars) of the countries inside the ESM, the database shows that in 2019 Liechtenstein (183.01), Luxembourg (114.70) and Switzerland (81.99) exhibited the highest levels, whereas the reverse was true for Bulgaria (9.82) and Romania (12.90). However, when focusing instead on the GDP per capita adjusted for purchasing power parity (measured in thousands of dollars) of the countries being outside the ESM, those with the highest levels were Bermuda (117.08), the Cayman Islands (91.39) and Macau (84.09), whereas the lowest values were in Burundi (0.26), Malawi (0.41) and the Central African Republic (0.46). Furthermore, a more detailed analysis shows that in 2019 Germany (83.13) and France (67.05) had the highest population (in millions of inhabitants) among the countries inside the ESM, whereas Liechtenstein (0.038) and Iceland (0.36) had the lowest in this regard. The results for the countries outside the ESM show that China (1 398), India (1 366) and the US (328) had the highest population. In contrast, Saint Kitts and Nevis (0.052) and Bermuda (63.91) boast the lowest population in this regard. The data shows further that Hungary (9) and Bulgaria (10) have the lowest corporate tax rate, whereas Malta (35), France (34.43) and Portugal (31.5) have the highest.

### 2.3 Methodology

Since the dependent variable  $GFDI_{i,j,t}$  is count data, we employ a Poisson Pseudo Maximum Likelihood (PPML) specification that follows a gravity framework. For the analysis, we restrict



the sample to country pairs that show the announced number of GFDIs from investors inside or outside the ESM to materialize in countries inside the ESM. We include fixed effects for the included country pairs (i.e., dyadic fixed effects) and for each year (i.e., time fixed effects). While time fixed effects control for factors that are constant across countries but vary over time, dyadic fixed effects capture all time-invariant characteristics that are common to a country pair. Since the announcement of an investor follows a profound construction phase that spans an extended period until the respective establishment can commence operations, there is no need to incorporate a time lag in our specification as the pure announcement does not affect the host country's characteristics.

Our analysis focuses on the following hypotheses:

**Hypothesis 1:** The number of announced GFDIs to materialize in the UK decreased from 2016 onwards.

**Hypothesis 2:** The number of announced GFDIs to materialize in the UK from investors outside the ESM decreased more than that from investors inside from 2016 onwards.

We examine the first hypothesis (H1) by including a dummy variable ( $Brexit_{ij,t}$ ) in the specification that equals unity for years starting in 2016 for country pairs indicating the UK as a host country and zero otherwise. This approach allows us to compare the change in announced GFDIs to materialize in the UK with the change in announced GFDIs to materialize in other countries inside the ESM as of the referendum year. The specification can be formulated as follows:

$$\begin{aligned}
 GFDI_{ij,t} = & \beta_1 \cdot gdp\_pc\_host_{i,t} + \beta_2 \cdot gdp\_pc\_home_{j,t} + \beta_3 \cdot pop\_host_{i,t} + \beta_4 \cdot pop\_home_{j,t} \\
 & + \beta_5 \cdot corp\_tax_{i,t} + \beta_6 \cdot Brexit_{ij,t} + \beta_7 \cdot year\_dummy_t \\
 & + country\_pair\_dummy_{ij} + error\_term_{ij,t}
 \end{aligned}$$

Thereafter, we examine the second hypothesis (H2) by splitting the earlier dummy variable ( $Brexit_{ij,t}$ ) into two separate variables, specified in the following way: the first variable described ( $Brexit\_ESM_{ij,t}$ ) equals unity for the years starting in 2016 for country pairs that have the UK as the host and a country within the ESM as the home country, and zero otherwise. As a consequence, the second variable ( $Brexit\_non\_ESM_{ij,t}$ ) represents the counterpart of the

former and equals unity for the years starting in 2016 for country pairs that have the UK as host country and a country outside the ESM as home country, and zero otherwise. This approach allows us to compare, first, the change of announced GFDIs to materialize in the UK from investors inside the ESM with the change of their announced GFDIs to materialize in countries inside the ESM. Second, it allows us to compare the change of announced GFDIs to materialize in the UK from investors outside the ESM with the change of their announced GFDIs to materialize in countries inside the ESM.

$$\begin{aligned}
GFDI_{ij,t} = & \beta_1 \cdot gdp\_pc\_host_{i,t} + \beta_2 \cdot gdp\_pc\_home_{j,t} + \beta_3 \cdot pop\_host_{i,t} + \beta_4 \cdot pop\_home_{j,t} \\
& + \beta_5 \cdot corp\_tax_{i,t} + \beta_6 \cdot Brexit\_ESM_{ij,t} + \beta_7 \cdot Brexit\_non\_ESM_{ij,t} \\
& + \beta_8 \cdot year\_dummy_t + country\_pair\_dummy_{ij} + error\_term_{ij,t}
\end{aligned}$$

## 2.4 Results

Table 2 represents the baseline models in the first and third number columns aiming at examining the first and second hypothesis, respectively. As a robustness check for the results, we insert in the second and fourth number columns, instead of the GDP per capita, the GDP, which is measured in millions and adjusted for purchasing power parity, in logarithms for the host ( $gdp\_host_{i,t}$ ) and the home country ( $gdp\_home_{j,t}$ ). The results appear to be robust and suggest that the announced number of GFDIs to materialize in the host country is expected to increase with its population size, whereas the opposite is the case for GDP per capita, GDP and the corporate income tax. With respect to the home country, the results show that population size and GDP is expected to affect the announced number of GFDIs to materialize in the host country positively, whereas the GDP per capita turns out to be insignificant. As we employ a PPML regression for the analysis, an estimated coefficient  $\beta$  represents the expected log change in the number of GFDIs announced to materialize in the host country per unit change of the associated independent variable. Therefore, a transformation with the expression  $(e^\beta - 1)$  is necessary for determining the exact magnitude of a variable's impact (Woolridge, 2015). Since the variables of interest are the included count dummy variables, we will solely transform them with the aforementioned formula and provide an interpretation. In doing so, the dummy in the first model ( $Brexit_{ij,t}$ ) shows that the announced number of GFDIs to materialize in the UK changed, when compared to the change of the announced number of GFDIs to materialize in other countries inside the ESM, by 22.94 percentage points more as of the referendum year. When focusing on the third model, the result of the first dummy

$(Brexit\_ESM_{ij,t})$  shows that the announced number of GFDIs to materialize in the UK from investors inside the ESM changed, when compared to the change of their announced number of GFDIs to materialize in countries inside the ESM, by 17.44 percentage points more as of the referendum year. The second dummy  $(Brexit\_non\_ESM_{ij,t})$  shows that the announced number of GFDIs to materialize in the UK from investors outside the ESM changed, when compared to the change of their announced number of GFDIs to materialize in other countries inside the ESM, by 26.14 percentage points more as of the referendum year. Further statistical analysis of the coefficients confirms that their size differs significantly from each other.

Table 2: Estimation results

Dependent variable: $GFDI_{i,t}$   PPML regression				
	Specification 1		Specification 2	
	Model 1	Model 2	Model 3	Model 4
$gdp\_pc\_host_{i,t}$	-0.0043** (0.0019)	-	-0.0043** (0.0019)	-
$gdp\_pc\_home_{j,t}$	0.0023 (0.0015)	-	0.0027 (0.0015)	-
$pop\_host_{i,t}$	2.4397*** (0.2997)	2.0511*** (0.2847)	2.4335*** (0.2993)	2.0433*** (0.2842)
$pop\_home_{j,t}$	1.8579*** (0.2471)	1.2685*** (0.2496)	1.8891*** (0.2467)	1.2998*** (0.2490)
$corp\_tax_{i,t}$	-0.0463*** (0.0035)	-0.0427*** (0.0034)	-0.0463*** (0.0035)	-0.0426*** (0.0033)
$gdp\_host_{i,t}$	-	-0.6651*** (0.0789)	-	-0.6658*** (0.0780)
$gdp\_home_{j,t}$	-	0.4575*** (0.0651)	-	0.4766*** (0.0654)
$Brexit_{ij,t}$	-0.2607*** (0.0388)	-0.2694*** (0.0397)	-	-
$Brexit\_ESM_{ij,t}$	-	-	-0.1917*** (0.0508)	-0.1646*** (0.0508)
$Brexit\_non\_ESM_{ij,t}$	-	-	-0.3030*** (0.0454)	-0.3324*** (0.0445)
<i>Constant</i>	-41.3105*** (4.0458)	-28.5163*** (4.0316)	-41.6058*** (4.0355)	-29.0550*** (4.0193)
Time fixed effects	Yes	Yes	Yes	Yes
Dyadic fixed effects	Yes	Yes	Yes	Yes
Observations	24 870	24 870	24 870	24 870
Pseudo R <sup>2</sup>	0.8244	0.8255	0.8245	0.8256

Note: Robust standard errors in parentheses. \*\*\*/\*\* denote statistical significance at the 1% and 5% levels, respectively.

## 2.5 Discussion

This chapter shows, first, that the announced number of GFDIs to materialize in the UK decreased as of the referendum year. In this regard, the obtained results confirm the findings of related studies in the literature. A reason for this result might be the rise in uncertainty regarding the UK's future economic relationship with the EU. As argued by several researchers, this uncertainty emerged already at the start of the referendum year and affected the decisions of foreign investors (Bloom et al., 2018). With regard to the empirical analysis, we use data that is sourced from fDi Markets, the World Bank and the Tax Foundation. Second, the decrease of the announced number of GFDIs to materialize in the UK from investors outside the ESM is more pronounced than that of the investors inside. Although we argue that a potential reason for this result might be, among other things, a more pronounced decrease in the number of GFDIs announced by investors outside the ESM targeting the UK as an export platform, the employed methodological approach does not allow for a verification in this regard. Therefore, future research on the exact reasons behind the presented findings in this study are recommended. In this regard, it is important to understand investors' motives that make them either adopting a 'wait-and-see' attitude or shifting their investments to another country. As a consequence, large-scale standardized interviews with investors might be an option to collect this particular data. Future research could further aim at verifying the results by using a different methodology. In this regard, an analysis with a synthetic control method, as employed by Serwicka and Tamberi (2018), might be an appropriate approach to contribute to the respective literature. Furthermore, there is abundant room for further progress in studying the impact of the UK's withdrawal from the EU on other countries' inflows of GFDIs since investors might have shifted their establishments somewhere else. As a consequence, it would be a valuable contribution within this field of research to investigate which countries benefitted, which did not, and why.

# 3 The Impact of the Brexit Referendum on UK Greenfield Foreign Direct Investment Inflows - Insights from a County Perspective <sup>2</sup>

## 3.1 Introduction

This chapter focuses, as the previous one, on the held referendum over a withdrawal from the European Union (EU) in the United Kingdom (UK). When investigating the respective impact on the inflows of greenfield foreign direct investment (GFDI), it takes on a different perspective since it focuses solely on the counties of England, Scotland and Wales. Although the focus remains on the sudden change in the macroeconomic environment, we allocate this study to the second research stream since the economic determinants of the counties feature a significant role. By means of this shift in perspectives, it is possible to verify whether the results of the former chapter hold also in a different setting. When examining the literature in this regard, Alabrese et al. (2019) shows that a slim majority of 51.9 percent of voters tipped the scales in favor of the 'Leave' campaign, thus, sealing the UK's termination of its membership in the EU. As a considerable number of studies in the literature have shown (see e.g., Bloom et al., 2019), the announcement of the result was followed by an unprecedented increase in economic policy uncertainty, as the upcoming negotiations within a mandated two-year transition period that began on March 29, 2017, would determine the UK's future economic relationship with the EU. As Van Reenen (2016) points out, this period of uncertainty, which ultimately ended with the delayed implementation of the withdrawal agreement on January 31, 2020, may have already had an immediate economic impact on the UK, despite the fact that it was treated as an EU member state throughout the transition period.

For foreign investors considering establishing a subsidiary in the UK by means of a GFDI, the main uncertainty was whether the UK would remain part of the European Single Market (ESM). In this context, a potential exit from the ESM posed a detrimental threat, as established subsidiaries in the UK were suddenly no longer entitled to exploit its four freedoms (i.e., the free movement of goods, services, labor, and capital) to their advantage. The only way to continue membership in the ESM after leaving the EU would have been to follow the 'Norwegian model' and join the European Free Trade Area (EFTA) and the European Economic Agreement (EEA) (Fossum, 2016). However, this outcome seemed rather unlikely, because it would have meant

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<sup>2</sup> This chapter is based on an unpublished working paper which is co-authored with Michael Frenkel, WHU - Otto Beisheim School of Management. The respective paper was presented at the Global Finance Conference in Braga (Portugal) in June 2022 and received a "Best Paper Award". The reference is as follows: Frenkel, M. and Stefan, H. (2022). *"The Impact of the Brexit Referendum on UK Greenfield Foreign Direct Investment Inflows - Insights from a County Perspective"*. Unpublished working paper.

a continuation of the EU free movement, which would have contradicted the Leave campaign's central slogan of "take back control" on immigration (Chang, 2018; Vasilopoulou, 2016).

According to economic theory (see e.g., Figueira-de-Lemos and Hadjikhani, 2014, for a theory of internationalization decisions under uncertainty), it may be that this mere state of uncertainty after the Brexit referendum has already affected GFDI inflows to the UK, mainly due to their rather long-term nature and high fixed costs. As a result, foreign investors may have either adopted a 'wait-and-see' attitude or started establishing the planned subsidiary in another country.

Serwicka and Tamberi (2018) were the first to conduct an empirical study to examine the uncertainty triggered by the referendum on the number of GFDI inflows in the UK using a structured control method at the country-level. However, to our knowledge, their study remains the only one to address this specific issue, thus establishing a new branch in the literature that needs to be further explored. In this chapter, we extend the analysis by using a unique dataset to further explore the impact of Brexit on GFDI inflows at the county-level. More specifically, we use data from the fDi Markets database and the Office for National Statistics. The compiled dataset covers 102 UK counties for the period from 2010 to 2019. In our empirical analysis, we use a Poisson regression to examine the effect of investors' uncertainty on the number of inward GFDIs in the UK. In this context, we argue that the rise in uncertainty for foreign investors began in early 2016, when opinion polls pointed to a close outcome of the referendum (Hobolt, 2016).

The remainder of the chapter is structured as follows: Section 3.2 and 3.3 briefly review the respective literature and describe the underlying methodology, respectively. Section 3.4 provides descriptive statistics on the provinces' economic determinants. Sections 3.5 and 3.6 formulate the hypothesis and the empirical strategy, respectively. Finally, Section 3.7 presents the estimation results and Section 3.6 provides the conclusion.

## **3.2 Literature Review**

### **3.2.1 The long-term effect**

There seems to be consensus in the literature that the UK's withdrawal from the EU will give rise to an erection of new barriers that will limit or weaken the country's economic integration in the future (Sampson, 2017). In this regard, there are several studies that examine the impact the UK's future non-membership in the EU might have on long-term foreign direct investment (FDI) inflows from the implementation of the withdrawal agreement. Most studies in this field of research employ gravity models for the analysis and use historical data to examine the impact

of a country's EU membership on FDI inflows. They then use this result in a mirror image as an estimate for the respective reduction that can be expected in the future.

The study by Dhingra et al. (2017) was the first to explore the potential long-term impact of the UK's non-membership in the EU on its FDI inflows. The researchers used a gravity model for their study and considered bilateral FDI flows among 34 OECD countries for the period 1985-2013. Their results show that a country's EU membership is expected to increase FDI inflows by 14 to 18 percent, depending on the underlying model specification. In the context of the UK leaving the EU, they predict a 22 percent decline in FDI inflows in the long run, consistent with the results of Dorakh (2020). Bruno et al. (2021) build on the former study by also using a gravity model but including data on bilateral FDI flows from almost all countries in the world for the period 1985-2018. In contrast, their respective results suggest that an EU membership leads to about 60 percent higher FDI inflows, which is a mirror image of a more pronounced negative impact for the UK.

A serious weakness of the described methodological approach is that it focuses exclusively on the effect of the deepest possible economic integration (i.e., a membership in the EU), neglecting the variety of economic policies implemented by non-EU members that could amplify or mitigate the respective negative effects. Welfens and Baier (2018) take a first step in this direction by distinguishing non-EU members according to whether they are EFTA countries and, therefore, eligible to access the ESM. The findings show that the UK's withdrawal from the ESM would lead to a 42 percent reduction in its FDI inflows. However, the impact of terminating EU membership in this regard was found to be insignificant, which is in strong contrast to the results of other studies. The study by Carril-Caccia (2020) follows this line of research by investigating the moderating effect of various economic policies that could be enforced after the UK finally leaves the EU. The results presented show that the expected decline in FDI would be in the range of 7.2 to 11 percent if the UK followed the "Norwegian model", which is consistent with the findings of Ebell and Warren (2016), who indicate a potential decline in the range of 8 to 11 percent. In contrast, a future economic relationship with the EU under WTO rules is expected to result in a 49.2 to 53.9 percent decline in FDI inflows.

However, most studies in this field of research focus on FDI, thereby neglecting the specific role of GFDI. In this regard, the study by Christen et al. (2020) is the first to investigate the impact of a discontinued EU membership on GFDI inflows suggesting that termination will reduce them by 50 percent in the long run.



### **3.2.2 The short-term effect**

In addition to the field of research described in the previous section, a small but related branch has emerged that focuses on the short-term effect. In this context, researchers argue that the surge in uncertainty, first, regarding the outcome of the referendum and, second, regarding future economic policy after the implementation of the withdrawal agreement, was already having a negative impact on foreign investors' decisions to engage in FDI in the UK. By investigating quarterly data for the years 2010-2018, Breinlich et al. (2020) show that the FDI inflows of the UK from the EU already declined by 9 percent by the time of the referendum, confirming the immediate economic disintegration. The study by Cieslik and Ryan (2021) supports the former findings by showing that FDI from Japan also declined in the transition period before the UK finally left the EU.

Within this field of research, only Serwicka and Tamberi (2018) studied whether GFDI were affected by the rise in uncertainty. The authors argue that GFDI may be particularly sensitive to risk perceptions due to their long-term nature and high costs they incur. For their analysis, they employ a structural control method to estimate the change in the number of GFDI inflows in the UK on a monthly basis from the June 2016 referendum to November 2017. Using this method, they construct a 'synthetic' UK (i.e., the counterfactual for the analysis) as a weighted average of other similar countries and compare its GFDI inflows with the actual UK inflows. According to their results, the number of GFDI inflows to the UK decreased significantly by 16 to 20 percent compared to the estimated counterfactual case scenario.

However, to our knowledge, the study of Serwicka and Tamberi (2018) remains the only one in the literature that investigates the effect on GFDI. In this context, further research taking into account additional approaches seems to be needed. Therefore, in this chapter, we investigate the impact of uncertainty on county-level GFDI inflows using a Poisson regression.

## **3.3 Data**

### **3.3.1 Data on English, Scottish and Welsh Counties**

The data compiled for the analysis comes from the following two sources and covers the years from 2010 to 2019. The investigation period does not include the years after 2019 due to the onset of the COVID-19 pandemic in 2020 and its impact on the UK economy. First, we use the fDi Markets database, which tracks GFDI inflows into new physical projects in each country since 2003 and provides further a wide range of detailed information on each single establishment. The relevant data are compiled by fDi Intelligence, a specialist division of the Financial Times. It uses primarily media reports, but also purchases data from market research and publication

companies, as well as project data from industry organizations and investment agencies. Second, we employ data from the Office for National Statistics, the UK's recognized national statistics institute, which provides a wide range of economic information on the UK economy. For the period of our study, it also provides economic information on the labor market, transportation infrastructure and land area of each county in the UK, except for counties of Northern Ireland. After collecting data from both sources, we exclude the Northern Ireland counties due to missing information, thus leaving a very balanced panel containing 47 British<sup>3</sup>, 22 Welsh, and 32 Scottish counties (see Table 3). Furthermore, we perform a Levin-Lin-Chu unit root test (Levin et al., 2002) for our used panel which shows that the underlying data is stationary.

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<sup>3</sup> Since we include the county 'City of London' into 'Greater London', we are left with 47 counties for England.

Table 3: The counties used in this study

England			
Bedfordshire	East Sussex	Merseyside	Surrey
Berkshire	Essex	Norfolk	Tyne and Wear
Bristol	Gloucestershire	North Yorkshire	Warwickshire
Buckinghamshire	Greater London	Northamptonshire	West Midlands
Cambridgeshire	Greater Manchester	Northumberland	West Sussex
Cheshire	Hampshire	Nottinghamshire	West Yorkshire
Cornwall	Herefordshire	Oxfordshire	Wiltshire
Cumbria	Hertfordshire	Rutland	Worcestershire
Derbyshire	Isle of Wight	Shropshire	
Devon	Kent	Somerset	
Dorset	Lancashire	South Yorkshire	
Durham	Leicestershire	Staffordshire	
East Riding of Yorkshire	Lincolnshire	Suffolk	
Scotland			
Aberdeen	East Dunbartonshire	Highlands	Renfrewshire
Aberdeenshire	East Lothian	Inverclyde	Scottish Borders
Angus	East Renfrewshire	Midlothian	Shetland Islands
Argyll and Bute	Edinburgh	Moray	South Ayrshire
Clackmannanshire	Eileanan Siar	North Ayrshire	South Lanarkshire
Dumfries and Galloway	Falkirk	North Lanarkshire	Stirling
Dundee	Fife	Orkney Islands	West Dunbartonshire
East Ayrshire	Glasgow	Perth and Kinross	West Lothian
Wales			
Blaenau Gwent	Conwy	Monmouthshire	Swansea
Bridgend	Denbigshire	Neath Port Talbot	Torfaen
Caerphilly	Flintshire	Newport	Vale of Glamorgan
Cardiff	Gwynedd	Pembrokeshire	Wrexham
Carmarthenshire	Isle of Anglesey	Powys	
Ceredigion	Merthyr Tydfil	Rhondda Cynon Taff	

### 3.3.2 Variables

We collect the number of GFDIs entered in each county from the fDi Markets database and use the information obtained as the dependent variable ( $GFDI_{i,t}$ ) in our analysis. As independent variables, we include a set of economic determinants that could influence the location choice of

foreign investors and, thereby, the number of GFIs located in a county. We collect the relevant information for these variables from the Office for National Statistics. The first variable in this context captures the unemployment rate ( $unemp\_rate_{i,t}$ ) and is defined as the percentage of unemployed people in the labor force. We hypothesize that a larger pool of unemployed people has a deterrent effect on the decision to establish a GFI, as it could be a sign of rigidities in the labor market, such as a low mobility through regional migration (Langella and Manning, 2022; McCormick, 1997), unfavorable factor costs (Guerrazzi and Meccheri, 2012), and a less efficient search-and-matching process between firms and the unemployed (Haan et al. 2021; Kuo and Smith, 2009). The second variable describes the number of inhabitants per hectare ( $population_{i,t}$ ). In this context, the literature review of Li et al. (2018) shows that a considerable number of studies conclude that higher population density attracts FDI. As Boudier-Bensebaa (2005) argues, this result could be due to, among other things, a more profitable market potential that allows for economies of scale in production.

The third variable measures the proportion of residents in the labor force who hold an academic degree ( $high\_qual_{i,t}$ ) that qualifies them for the fourth or a higher level of the UK's National Vocational Qualification System (NVQS). As a considerable number of studies in the literature show (see e.g., Navaretti et al., 2003; Buckley and Dunning, 1976; Markusen, 1995; Fu et al., 2021), established foreign affiliates attract a higher proportion of technical and professional workers than domestic firms because they tend to incorporate more technology-intensive processes into their operations. Based on these findings, we hypothesize that a larger stock of human capital in the labor force could attract more GFI. The fourth variable measures the number of resident firms per hectare ( $industry_{i,t}$ ) and is thus an indicator of the prevailing agglomeration effect, which, according to the literature review of Hutzschenreuter et al. (2020), is an important determinant in the location choice of foreign investors. As Puga (2010) points out in this context, these results are the economic arguments that greater firm density can lead to favorable knowledge transfer and more efficient labor matching, among others. The last variable measures the length of highways in kilometers ( $infra_{i,t}$ ), as research suggests that transport infrastructure leads to better economic integration (Gibbons et al., 2019) and thus attracts more investments from abroad (see e.g., Khadaroo and Seetanah, 2010; Halaszovich and Kinra, 2020).

### 3.4 Descriptive Statistics

For the descriptive statistics in Table 4, we exclude those counties that did not receive GFI during the examined period because the employed Poisson regression would exclude them. Therefore, we remove the three Scottish counties East Dunbartonshire, East Lothian, and East Ren-

frewshire from our panel data, leaving 98 counties for further analysis.

Table 4: Descriptive statistics

Variable	Average	Median	St. dev.	Min	Max.	Obs.
$GFDI_{i,t}$	9.94	3.00	44.76	0	626	980
$unemp_{i,t}$	5.57	5.20	2.12	1.10	14.40	980
$high\_qual_{i,t}$	35.19	34.68	6.86	15.31	59.29	980
$infra_{i,t}$	301.46	263.50	244.16	21.70	1 463.10	980
$industry_{i,t}$	0.18	0.09	0.34	0.01	3.32	980
$population_{i,t}$	5.72	3.06	9.03	0.08	57.00	980

The results presented show that the average county experienced an annual inflow of 9.94 GFDIs during the examined period. However, a closer inspection reveals that the corresponding median is equal to an inflow of only 3 GFDI projects, indicating a left skewed distribution. The reason for this difference is based on a heterogenous allocation of GFDIs across the underlying counties. In this context, the largest recipients are Greater London, Greater Manchester, and the West Midlands with an average annual inflow of 432.5, 39.5 and 35.2 GFDIs, respectively. A more detailed analysis at the country level shows that England received the largest average share of inflows amounting to 86.42%, followed by Scotland and Wales with 10.40% and 3.18%, respectively. As for the unemployment rate, the results point to an average level of 5.57%. In this regard, Blaenau Gwent (9.63%) and North Ayrshire (9.13%) have the highest average unemployment rate among all counties during the examined period, while the Orkney Islands (2.83%) and the Shetland Islands (2.83%) have the lowest rate. In terms of the percentage of people in a county's labor force who qualify for the fourth or a higher level of the NVQS in the UK based on their qualifications, the average share is 35.19%. A closer examination at the county level reveals that Blaenau Gwent (19.77%) and Merthyr Tydfil (24.01%) have the lowest average share of qualified workers. As for the density of firms and residents, the results indicate that their respective averages are 0.18 and 5.72, respectively. Greater London (2.70) has the highest firm density in our sample, followed by Bristol (1.43) and Glasgow City (0.92). The same counties also have the highest population densities with 54.48, 40.68 and 34.76 per hectare, respectively. In contrast, the lowest density in this regard is observed in Eilean Siar with 0.0036 firms and 0.08 inhabitants per hectare. <sup>4</sup>

<sup>4</sup> Appendix 3.A. provides further information on the averages of the variables used for each county for the investigation period. Furthermore, Appendix 3.B. provides an illustration of the countys' respective location in England, Scotland and Wales.

Table 5: Correlation matrix

	$GFDI_{i,t}$	$unemp_{i,t}$	$high\_qual_{i,t}$	$infra_{i,t}$	$industry_{i,t}$	$population_{i,t}$
$GFDI_{i,t}$	1.0					
$unemp_{i,t}$	0.04	1.0				
$high\_qual_{i,t}$	0.20	-0.46	1.0			
$infra_{i,t}$	0.36	-0.19	-0.01	1.0		
$industry_{i,t}$	0.81	0.14	0.28	0.18	1.0	
$population_{i,t}$	0.61	0.29	0.20	0.05	0.93	1.0

The pairwise correlation coefficients of the variables used are shown in Table 5. The results show that population density is strongly correlated with the density of firms, as indicated by a correlation coefficient of 0.93. For the further analysis, we consider the aforementioned correlation and include the respective variables separately in our specification.

### 3.5 Hypothesis Development

Even before the referendum on the UK's withdrawal from the EU on June 23, 2016, there was great uncertainty among foreign investors about the outcome. Although the result was announced the following day, the prevailing uncertainty remained, but changed its character, as foreign investors could not be sure from then on which economic policy would be pursued after the withdrawal agreement was implemented. In this context, De Ville and Siles-Brügge (2019) point out that it was widely known that the future economic policies that would replace EU membership would be considerably less liberal. As suggested by Bloom et al. (2018) was a main concern for foreign investors whether the UK would maintain its access to the ESM. A possible exit from the ESM by refusing to join the EFTA was seen as a detrimental threat, as it would terminate the claim of the subsidiaries already established and planned to make use of the four freedoms (i.e., the free movement of goods, services, labor, and capital) to their advantage. The threatened effects of this scenario for any UK-based company would include the following three ways. First, the so-called 'passporting right', which entitles UK companies to produce or offer services in every member state of the ESM without being incorporated there, becomes withdrawn. As pointed out by Erken et al. (2018), this change would have negative consequences for foreign subsidiaries in the UK as higher costs would be incurred and operations would become more complicated, leading to weakened economic ties with the EU.

Second, UK-based companies must meet the rules of origin requirements to receive preferential tariff treatment, which allows them to ship their produced goods to members of the ESM at zero tariffs. This is achieved by adding a certain percentage (often 50% or more) of value to a product

during the production process. Against the background that many firms are involved in global and diversified supply chains (Oyamada, 2020), reaching these thresholds represents a difficult task as it requires re-calibration of coordinated supply chains leading to severe disruptions in terms of increased costs and delays, and more required resources to take care of accurate custom documentation issues. As argued by Nicolaides and Roy (2017) in this regard will these enforced requirements most likely lead to a severe trade and investment distortion.

Third, it will become more difficult to find and hire highly qualified workers from abroad as the termination of the free movement of persons leads to profound labor market dislocations (e.g., through visa uncertainty). As a result, sought-after workers may be more attracted to other countries, leading to a brain drain and a less favorable labor market (Dhingra et al., 2018).

We hypothesize that the increase in uncertainty faced by investors since the beginning of 2016 led them to adjust their investments either temporarily by adopting a 'wait and see' attitude or permanently by shifting the planned investment to another county (Figueira-de-Lemos and Hadjikhani, 2014). This leads to the following hypothesis:

**Hypothesis:** GFDI inflows to UK counties for 2016 onwards are lower compared to the preceding years up to and including 2015.

### 3.6 Empirical Strategy

Since the dependent variable  $GFDI_{i,t}$  represents count data (i.e., the number of a county's attracted GFDI), we employ a Poisson regression to model its economic relationship with the independent variables ( $unemp_{i,t}$ ,  $high\_qual_{i,t}$ ,  $industry_{i,t}$ ,  $population_{i,t}$  and  $infra_{i,t}$ ). We argue that the decision of a foreign investor to establish a GFDI in a county is separated in time from the start of the respective construction works based on bureaucracy, planning and negotiation problems that lead to delays. Therefore, we follow the approach of Boudier-Bensebaa (2005) and incorporate a one-year time lag between the independent variables and GFDI, which also avoids endogeneity problems in our model. In addition, we include dummies for counties to capture the time-invariant heterogeneity between counties.

To investigate the stated hypothesis, we include a dummy  $\tau_t$  which is equal to one for the years from and including 2016 and zero otherwise. This method allows us to compare the average GFDI inflows in the years beginning with the referendum with the average of the years up to and including 2015. Thus, the model to be estimated can be formulated as follows:

$$GFDI_{i,t} = \beta_1 \cdot unemp_{i,t-1} + \beta_2 \cdot high\_qual_{i,t-1} + \beta_3 \cdot infra_{i,t-1} + \beta_4 \cdot industry_{i,t-1}$$

$$+ \beta_5 \cdot population_{i,t-1} + \beta_6 \cdot \tau_t + C_i + \epsilon_{i,t}$$

Here, the subscripts  $i$  and  $t$  refer to the county and the period, respectively. The vector of county dummies is represented by  $C$ . The component  $\epsilon$  represents the error term.

### 3.7 Results

Since the two variables indicating a county's population and firms per hectare are highly correlated, we include only one of the two variables in the regression to avoid multicollinearity. However, we run the regression with both variables separately, which also serves as a robustness check for the other estimated coefficients. Hence, we use two specifications (Model 1 and Model 2) whose results are shown in Table 6. More specifically, the first and the third number columns show the estimation results of the two specifications. The results suggest that a county's unemployment rate negatively affects GFDI inflows. However, the share of higher-skilled individuals in the labor force has a positive and significant coefficient, while the length of highways turns out not to be significant. The estimated coefficient of the dummy for the years after the Brexit is significant and negative in both models, indicating that a county's average GFDI inflows as of 2016 were significantly affected downwards by the EU referendum. This finding implies that this negative effect was not caused by county-level economic developments, thus, strongly supporting our hypothesis.

Since an estimated coefficient  $\beta$  in our model is the expected logarithmic change in a county's GFDI inflows per unit change of its associated independent variable, we perform a marginal analysis for a clear and comprehensible interpretation. Therefore, we employ the expression  $(e^\beta - 1)$ , which gives us the expected change (in percentage points) of a county's inflows of GFDI for a one-unit change of the respective coefficient variable (Coxe et al., 2009; Woolridge, 2015). Models 1 and 2 include their transformed coefficients, i.e., their marginal effects, in the second and fourth number column, respectively. As shown in Model 1, a one percentage point increase in the unemployment rate is expected to reduce GFDI by 6.52 percentage points. With respect to the share of individuals in the labor force who have an academic qualification that qualifies them for the fourth or higher level of the NVQS in the UK, an increase of one percentage point is expected to increase GFDI inflows by 1.83 percentage points. The results for the density of firms and inhabitants indicate that a 1-unit increase should increase GFDI inflows by 20.34 and 3.40 percentage points, respectively. The results for the dummy variable suggest that a county's average GFDI inflows as of 2016 decreased by 8.87 to 10.23 percentage points, depending on the specification, compared with the average inflows of the previous period.



Table 6: Estimation results

Dependent variable: $GFDI_{i,t}$   Poisson regression				
	Model 1		Model 2	
	Poisson	Marginal effect	Poisson	Marginal effect
$unemp_{i,t-1}$	-0.0675*** (0.0195)	-0.0652	-0.0700*** (0.0197)	-0.0676
$high\_qual_{i,t-1}$	0.0182*** (0.0047)	0.0183	0.0174*** (0.0055)	0.0175
$infra_{i,t-1}$	-0.0016 (0.0014)	-0.0015	-0.0014 (0.0014)	-0.0013
$industry_{i,t-1}$	0.1852*** (0.0598)	0.2034	-	-
$population_{i,t-1}$	-	-	0.0335*** (0.0146)	0.0340
$\tau_t$	-0.1080*** (0.0466)	-0.1023	-0.0929*** (0.0436)	-0.0887
Entity fixed effects	Yes	Yes	Yes	Yes
Observations	882		882	
Groups	98		98	
Wald Chi <sup>2</sup>	13 202.84		3 825.94	

Note: Robust standard errors in parentheses. \*\*\*/\*\* denote statistical significance at the 1% and 5% levels, respectively.

### 3.8 Conclusion

This chapter examines whether the referendum over the UK's withdrawal from the EU had an impact on the UK's GFDI inflows from the beginning of 2016 onwards. Therefore, we focus on the county-level and employ a Poisson regression for the analysis. We hypothesize that the uncertainty about the outcome of the EU referendum and upcoming economic policies following the UK's final exit from the EU may have caused foreign investors to adopt a 'wait-and-see' attitude or shift their investments to another country.

The entire analysis leads to two main contributions. First, we find that a county's average GFDI inflows as of 2016 declined by 8.87 to 10.23 percentage points compared to the average inflows in previous years, depending on the specification of the model. This finding supports the hypothesis of a negative Brexit effect on GFDI inflows and may also imply that foreign

investors already anticipated that the UK will terminate its membership in the ESM by not joining the EFTA after the withdrawal agreement was implemented. Second, the more detailed approach compared to Serwicka and Tamberi (2018) confirms their negative Brexit effect of the EU referendum on GFDI inflow to the UK. Furthermore, we confirm that GFDI inflows are very sensitive to uncertainty, which adds to the existing evidence in the literature.

The finding provides implicit evidence that foreign investors consider the UK's exit from the EU as a detrimental threat to the operations of a potential subsidiary in the UK. Therefore, the UK became a less attractive location for foreign investors as of 2016. It follows that GFDIs are attracted to an environment that facilitates settlement and future operations in addition to economic location factors. One possible area of future work in this regard is to identify which legal and regulatory determinants influence a foreign investor's decision to establish a foreign subsidiary and, if they do so, to what extent. Furthermore, it would be interesting to identify which other countries investors are looking to relocate their investments to when refraining to invest in the UK.

## 4 The Location Choice of Greenfield Foreign Direct Investments: Empirical Evidence from Vietnam<sup>5</sup>

### 4.1 Motivation

This chapter investigates the impact of a province's economic determinants on its respective inflows of greenfield foreign direct investment (GFDI). In this regard, we focus on the provinces of Vietnam and, thus, contribute to the second research stream. Vietnam represents an interesting case which is worth studying since it 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 the inflows through policies including financial incentives (Tran, 2008). The foundation for realizing 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 Anh 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 aims at explaining 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.

To date, none of the studies in this context have focused solely on GFDI. We believe that GFDI represent a more fundamental decision of investors than other forms of FDI may be because they involve building a foreign subsidiary from the scratch. Therefore, it seems reasonable to focus on such investments when studying location decisions. In this paper, we study the impact of a province's economic determinants on its inflows of GFDI for the period from 2012 to 2021. To do so, we use a Poisson regression and classify the included determinants into the categories market size, industrial agglomeration, labor market and institutions. The dataset used contains information on all 63 provinces and comes from the fDi Markets database, the Vietnamese Statistical Office, and the Vietnam Chamber of Commerce and Industry.

The remainder of the chapter is structured as follows: Section 4.2 reviews the respective liter-

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<sup>5</sup> This chapter is based on a paper which is co-authored with Michael Frenkel, WHU - Otto Beisheim School of Management. The respective paper has been published in the journal "Asian Journal of Economics and Finance" in December 2023. The reference is as follows: Frenkel, M. and Stefan, H. (2023b). "The Location Choice of Greenfield Foreign Direct Investments: Empirical Evidence from Vietnam". Asian Journal of Economics and Finance, Vol. 5 (4), pp. 409-421.

ature. Section 4.3 describes the underlying estimation methodology. Sections 4.4 and 4.5 provide information on the province's economic determinants and the empirical strategy, respectively. Section 4.6 explains the estimation results and Section 4.7 provides the conclusion.

## 4.2 A Brief Review of the Literature

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 6. They use economic determinants of the different provinces to explain their FDI inflows and apply the same econometric methodology. Despite the wide range of determinants used in this context, the different studies can be broadly grouped into the following five categories: market size, industrial agglomeration, infrastructure, labor market and institutions. In the following, we provide a brief review for 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 include economic performance measured as GDP or GDP per capita into their specifications, indicating a positive (Yang et al., 2017; Hoang and Goujon, 2014; Huynh, 2022; Dung et al., 2018; Anwar and Nguyen, 2010) or negative impact (Anh and Meyer, 1999; Hoang et al., 2022, Wang and Balasubramanyam, 2011). The studies by Meyer and Nguyen (2005) and Do and Park (2022) provide 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 attracting foreign investors. Most studies focus on the prevalence of foreign firms and show that a more pronounced agglomeration of these firms positively affects a province's FDI inflows (Dung et al., 2018; Hoang et al., 2022; Tan and Meyer, 2011; Yang et al., 2017; Hoang and Goujon, 2014; Meyer and Nguyen, 2005). The only exception is the result of Hoang et al. (2022) which indicates an insignificant effect. When studying the impact of an agglomeration of domestic firms in this context, Hoang and Goujon (2014) find a positive result, in contrast to Dung et al. (2018) and Yang et al. (2017). The study by Huynh (2022) is the only one that includes the sum of private firms in the specification and suggests a positive effect. Regarding state-owned enterprises, researchers argue that they influence a province's formal and informal institutions to favor 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) present an insignificant effect, whereas Nguyen and Diez (2017) find a negative effect for a sample that includes only provinces on 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, the studies by Wang and Balusubramanyam (2011), Anwar and Nguyen (2011) and Hoang and Goujon (2014) use the number of telephones per thousand inhabitants which show a positive effect. Although Huynh (2022) uses the same proxy as the aforementioned studies, he presents an insignificant effect, and Hoang et al. (2022) present a negative effect when using solely the number of phones. In addition to proxies related to the prevalence of telephones, some studies also use real development investment per capita (Do and 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 and Goujon, 2014) indicating a positive effect. The study by Meyer and Nguyen (2005) finds an insignificant effect when using the volume of local passenger traffic divided by the population.

The fourth category contains determinants related to labor costs and the educational level of residents to account for a province's labor market. In this context, most studies argue that higher labor costs have a negative impact on a firm's profitability and, thus, discourage FDI. However, the studies that include the monthly average wage in their respective specifications present mixed results with some indicating a negative effect (Hoang et al., 2022; Anwar and Nguyen, 2010) and some a positive effect (Yang et al., 2017), and some indicating an insignificant effect (Dung et al., 2018; Anwar and Nguyen, 2010). Hoang and Goujon (2014) use a different approach by including the annual average wage deflated by prices and obtain a positive effect. With respect to the educational level of residents, many studies argue that a larger stock of human capital attracts foreign investors because their established firms tend to use more technology-intensive processes. In this context, the majority of studies use the percentage of trained employees over the age of 15 (Dung et al., 2021; Yang, 2017; Anwar and Nguyen, 2010; Wang and Balusabramyan, 2011; Hoang and Goujon, 2014; Dung et al., 2018; Hoang et al., 2022) and find a positive effect. These results are consistent with those provided by Anh and Meyer (1999) when using the percentage of literate population instead. However, solely the results of Meyer and Nguyen (2005) turn 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, the studies by Hoang et al. (2022), Huynh (2022), Do and Park (2022) and Dung et al. (2018) employ components of the Provincial Competitiveness Index (PCI) for Vietnam and show that the institutional quality positively affects FDI inflows into a province. Although they use a different approach, the results of Meyer and Nguyen (2005) and Wang and Balasubramanyam (2011) suggest a positive effect when examining the magnitude of the official development assistance and the ability of institutions to facilitate access to real estate, respectively.

Although the shown studies in Table 7 represent 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 GFDI. This form of investment represents a more fundamental decision of 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 7: Studies focusing on Vietnam

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 (2022)	2015-2018	63
Dung et al. (2018)	2008-2013	63
Hoang et al. (2022)	2007-2016	9
Huynh (2022)	2005-2016	8

### 4.3 Data description

#### 4.3.1 The Data Set for Vietnam

The data compiled for the analysis includes information on all 63 provinces in Vietnam for the years from 2012 to 2021. The dependent variable,  $GFDI_{i,t}$ , is sourced from fDi Markets and represents the number of established GFDI in province  $i$  during year  $t$ . Since the capital expenditures related to a province's received projects might be biased, thus, affecting the analysis,

we use count data instead. As independent variables, we include 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.

### 4.3.2 Economic Determinants

We divide the independent variables into the categories market size, industrial agglomeration, labor market, and institutions. In this regard, Table 8 shows for each determinant the respective category and provides further information on the definition, source, and expected effect. The index  $i$  refers to the respective province, while  $t$  indicates the year. The first variable,  $pop\_den_{i,t}$ , measures the population density as inhabitants per hectare and serves as a proxy for the market size (Meyer and Nguyen, 2005; Do and Park, 2022). We hypothesize that provinces with a higher population density attract more GFDIs, because they may offer a more profitable market potential for foreign investors. The second variable,  $firm\_den_{i,t}$ , measures the number of resident firms per hectare and is thus an indicator of the prevailing agglomeration effects. As Huynh (2022) argues, a greater density of incumbent firms is attractive to foreign investors, because their business activities may have shaped existing markets for raw materials and labor, among other things, to exploit them more efficiently. Furthermore, Hoang and Goujon (2014) point out that industrial agglomeration provides positive externalities such as access to technology and knowledge, skilled labor, business services, production inputs etc. The third variable,  $educ_{i,t}$ , represents the level of education, measured as the percentage of students enrolled in upper secondary school. We expect that the level of human capital in a province attracts foreign investors, as their firms employ a larger share of educated workers due to their technology-intensive processes (Peluffo, 2015; Andersson et al. 2022). The fourth variable,  $qual\_lab_{i,t}$ , describes the percentage of firms that are satisfied with the quality of labor. In this regard, we hypothesize that higher degrees of labor quality are associated with operational efficiency and thus have a positive impact on GFDI inflows. The fifth variable,  $avg\_inc_{i,t}$ , describes the average monthly income per employee measured in millions of Vietnamese Dong (VND), as it is argued that higher labor costs discourage foreign investors by lowering a firm’s profitability (Hoang et al., 2022; Hoang and Goujon, 2014; Yang et al., 2017). The sixth variable,  $net\_mig_{i,t}$ , indicates the net immigration rate, measured in thousand people. Since a larger inflow of people could positively contribute to the labor market flexibility, we expect this determinant to positively affect the location decision of foreign investors. The last two variables capture 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 ( $bribe\_rent_{i,t}$ ) and, second, local authorities use regulations to extract rents ( $reg\_rent_{i,t}$ ). We expect that the extent of corruption negatively affects GFDI inflows, because, according to the 'grabbing hand theory' by Shleifer and Vishny (1993, 1994), the pursuit of bribes may be perceived as an additional tax on a firm's profitability since it increases the costs of doing business.

Table 8: Information on the determinants used

Category	Variable	Definition	Source	Expected effect
Market size	$pop\_den_{i,t}$	Number of inhabitants per hectare.	SYVN	+
Agglomeration	$firm\_den_{i,t}$	Number of firms per hectare.	SYVN	+
Labor market	$educ_{i,t}$	Percentage of students enrolled in upper secondary school.	SYVN	+
	$qual\_lab_{i,t}$	Percentage of firms being satisfied with the quality of labor.	SYVN	+
	$avg\_inc_{i,t}$	Monthly average income per employee measured in millions of Vietnamese Dong (VND).	SYVN	-
	$net\_mig_{i,t}$	Net immigration rate measured in thousand people.	SYVN	+
Institutions	$bribe\_rent_{i,t}$	Percentage of firms that felt that enterprises in their line of business were subject to bribe requests from provincial authorities.	PCI	-
	$reg\_rent_{i,t}$	Percentage of firms that felt that provincial authorities use local regulation to extract rents.	PCI	-

#### 4.4 Summary Statistics

Table 9 presents further information on 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 conclude that the allocation of foreign investors' establishments among provinces follows a heterogenous pattern. A closer look at the provincial level shows that the provinces of Cao Bang, Bac Kanh, 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 show 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 is 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) has the highest share, followed by Quang Nam (20.34) and Ha Tinh (20.20). The province with the highest percentage of firms being satisfied with the quality of labor is Dong Thap (92.23), while Lai Chau (69.12) and Cao Bang (73.72) show the lowest. In terms of monthly average income, the data show that workers in Ba Ria-Vung Tau (98.02) and Ho Chi Minh (89.80) receive the highest wages. Looking at provincial migration rates, Binh Duong (40.22), Bac Ninh (16.01) and Ho Chi Minh (9.69) show the highest positive net immigration, while the opposite is true for An Giang (-11.15) and Soc Trang (-11.10). The provinces with the highest share of firms believing that officials use bribes to extract rents are Cao Bang (65.10), Hoa Binh (64.55), and Thanh Hoa (63.92). However, when examining the proportion of firms perceiving that local authorities use regulations to extract rents, Ha Noi (66.36), Cao Bang (65.16) and Thanh Hoa (64.07) have the highest proportions.<sup>6</sup>

Table 9: Descriptive statistics

Variable	Average	Median	St. dev.	Min	Max.	Obs.
$GFDI_{i,t}$	2.77	0	8.43	0	81	630
$pop\_den_{i,t}$	496.16	273	622.47	44	4476	630
$firm\_den_{i,t}$	3.41	0.67	11.93	0.05	130.23	630
$educ_{i,t}$	15.82	15.84	2.84	8.32	24.65	630
$qual\_lab_{i,t}$	84.14	90.56	16.11	21	100	630
$avg\_inc_{i,t}$	59.96	57.56	16.72	28.67	119.88	630
$net\_mig_{i,t}$	-1.69	-2.25	8.27	-23.8	58.6	630
$bribe\_rent_{i,t}$	54.91	56.11	11.82	23.07	80.80	630
$reg\_rent_{i,t}$	55.38	57.14	11.75	16.30	78.31	630

The pairwise correlation coefficients of the variables used are shown in Table 10. The results show that population density is strongly correlated with the density of firms, as indicated by a correlation coefficient of 0.86. Furthermore, the percentage of firms that believe that firms in their industry were subject to bribe requests from provincial authorities is moderately correlated with the percentage of firms that believe that local authorities use regulation to extract rents. More precisely, the correlation coefficient of the two variable pairs is 0.54. As for the

<sup>6</sup> Appendix 4.A. provides information on the averages of the variables used for each province for the investigation period. Furthermore, Appendix 4.B. provides an illustration of the provinces' respective location in Vietnam.

empirical analysis, we include the correlated variables separately in our specification to avoid multicollinearity.

Table 10: Correlation matrix

	$GFDI_{i,t}$	$pop\_den_{i,t}$	$firm\_den_{i,t}$	$educ_{i,t}$	$qual\_lab_{i,t}$	$avg\_inc_{i,t}$	$net\_mig_{i,t}$	$bribe\_rent_{i,t}$	$reg\_rent_{i,t}$
$GFDI_{i,t}$	1.0								
$pop\_den_{i,t}$	0.81	1.0							
$firm\_den_{i,t}$	0.88	0.86	1.0						
$educ_{i,t}$	0.04	0.12	0.05	1.0					
$qual\_lab_{i,t}$	0.09	0.06	-0.01	0.16	1.0				
$avg\_inc_{i,t}$	0.36	0.39	0.39	-0.12	-0.31	1.0			
$net\_mig_{i,t}$	0.32	0.32	0.29	-0.08	0.14	0.25	1.0		
$bribe\_rent_{i,t}$	0.10	-0.01	0.01	0.08	0.40	-0.22	0.10	1.0	
$reg\_rent_{i,t}$	0.15	0.08	0.12	0.01	-0.05	0.15	0.11	0.54	1.0

## 4.5 Empirical Strategy

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

$$\begin{aligned}
 GFDI_{i,t} = & \alpha_i + \beta_1 \cdot pop\_den_{i,t-1} + \beta_2 \cdot firm\_den_{i,t-1} + \beta_3 \cdot educ_{i,t-1} + \beta_4 \cdot qual\_lab_{i,t-1} \\
 & + \beta_5 \cdot avg\_inc_{i,t-1} + \beta_6 \cdot net\_mig_{i,t-1} + \beta_7 \cdot bribe\_rent_{i,t-1} + \beta_8 \cdot reg\_rent_{i,t-1} \\
 & + \beta_9 \cdot \sigma_t + \epsilon_{i,t}
 \end{aligned}$$

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

## 4.6 Estimation Results

We estimate different specifications of our model. Specifically, since the population density is strongly correlated with the density of firms, we include each of these variables in separate

regressions. The same applies to the moderately correlated variables, i.e., the percentage of firms that believe that firms in their industry are asked for bribes by provincial authorities and the percentage of firms that believe that local authorities use regulations to extract rents. This approach avoids multicollinearity and serves further as a robustness check for the estimated coefficients of the other variables. Hence, we estimate a total of four specifications. We apply a Poisson regression and exclude provinces that did not receive GFDI during the study period (i.e., Cao Bang, Bac Kanh, Tuyen Quang, Dien Bien, Lai Chau and Kon Tum).

Table 11 shows the estimation results in the first, third, fifth and seventh number columns. Since an estimated coefficient  $\beta$  in our model is the expected logarithmic change in a province's GFDI inflows per unit change of its associated independent variable, we perform a marginal analysis to provide a clear and understandable interpretation. Therefore, for each variable in every specification, we calculate the marginal effect by including its respective coefficient into the expression  $(e^\beta - 1)$ . The result obtained give the expected percentage change in a province's GFDI inflows for a one-unit change of the variable in question, ceteris paribus (Coxe et al., 2009; Woolridge, 2015). The transformed coefficients are presented in the second, fourth, sixth and eight 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 GFDI 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 labor 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 labor 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 of 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 the 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 with insignificant coefficients.

Table 11: Estimation results

Dependent variable: $GFDI_{i,t}$   Poisson regression								
	Model 1		Model 2		Model 3		Model 4	
	Poisson	Marginal effects	Poisson	Marginal effects	Poisson	Marginal effects	Poisson	Marginal effects
$pop\_den_{i,t-1}$	0.0007** (0.0003)	0.0007	-	-	0.0007** (0.0003)	0.0007	-	-
$firm\_den_{i,t-1}$	-	-	0.0081* (0.0044)	0.0081	-	-	0.0084** (0.0041)	0.0084
$educ_{i,t-1}$	0.0808** (0.0408)	0.0841	0.0859** (0.0413)	0.0896	0.0837** (0.0397)	0.0873	0.0887** (0.0403)	0.0927
$qual\_lab_{i,t-1}$	0.0207*** (0.0075)	0.0209	0.0211*** (0.0074)	0.0213	0.0208** (0.0074)	0.0210	0.0213** (0.0073)	0.0215
$avg\_inc_{i,t-1}$	-0.0212** (0.0094)	-0.0209	-0.0193** (0.0092)	-0.0191	-0.0211** (0.0092)	-0.0208	-0.0193** (0.0091)	-0.019
$net\_mig_{i,t-1}$	0.0249*** (0.0078)	0.0252	0.0265** (0.0066)	0.0268	0.0249*** (0.0060)	0.0252	0.0265*** (0.0066)	0.0268
$bribe\_rent_{i,t-1}$	-0.0024 (0.0060)	-0.0024	-0.0024 (0.0061)	-0.0024	-	-	-	-
$reg\_rent_{i,t-1}$	-	-	-	-	-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 Chi <sup>2</sup>	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.

#### 4.7 Lessons from the study

This paper examines how provincial characteristics affect GFDI inflows in Vietnam. To do so, we study the period from 2012 to 2021 and use a Poisson regression for the empirical analysis. The results indicate that the market size and the industrial agglomeration of a province, measured as inhabitants and firms per hectare, respectively, are important factors in attracting GFDI. Regarding the labor market characteristics, the results show that the education level, labor 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 analyze whether the impact of a province's determinants varies by the sector of an investment.

## 5 The Location Choice of Foreign Direct Investments in Emerging Markets: Empirical Evidence from Indonesia <sup>7</sup>

### 5.1 Introduction

This chapter follows the previous one since it investigates the location choice of foreign investors among provinces in Indonesia based on their respective economic determinants. Therefore, it contributes also to the second research stream. We focus on Indonesia since it features a remarkable history regarding the stance towards investments from abroad. Starting in 1959 the Indonesian government adopted an increasingly socialist orientation by implementing a political system referred to as 'Guided Democracy'. Among other measures, this orientation led to a confiscation of most foreign enterprises in the country in 1964 (Lindblad, 2015) and a ban on foreign direct investment (FDI) inflows in 1965. As the state of the economy deteriorated significantly during this period, the government was ousted by a military coup in 1966. The subsequent adoption of a new policy under authoritarian rule, called the 'New Order', was intended to bring political stability and economic advancement to Indonesia (Lipsky and Pura, 1978). Central to this was the creation of an appealing investment environment to attract western investors and restore their confidence (Wie, 1987). Therefore, the first legal framework on FDI was enacted in 1967, which defined, first, the sectors and second, the conditions under which FDI were allowed (Magiera, 2011). The democratic transition in 1999 ended the existing policy and brought about a significant change to institutions, which became more liberal towards FDI (Poczter and Pepinsky, 2016). As a result, the 1967 law on FDI was replaced in 2007 by a new legal framework, which was designed to facilitate the operations of foreign investors by, among other things, opening more sectors for investment, removing indigenous ownership conditions and providing fiscal incentives.

Based on this particular history, FDI in Indonesia has attracted attention from several researchers, who have addressed multiple related research topics. In this context, a distinct branch of research has developed that examines the location choice of foreign investors based on a region's economic determinants. Since the selection of these determinants and their measurement varies widely across studies, there is much room for further investigation and contribution to the existing body of knowledge. Therefore, we contribute to the relevant literature by expanding the determinants that may play a role in attracting FDI. This helps to expand the view on what influences FDI inflows in emerging markets. In this regard, we include the percentage of

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<sup>7</sup> This chapter is based on an unpublished working paper which is co-authored with Michael Frenkel, WHU - Otto Beisheim School of Management. The reference is as follows: Frenkel, M. and Stefan, H. (2023c). "*The Location Choice of Foreign Direct Investments in Emerging Markets: Empirical Evidence from Indonesia*". Unpublished working paper.

villages that have base transceiver stations, the percentage of households that have a minimum of hygienic standards being measured by whether a handwashing facility with soap and water is present, the percentage of the population employed in the informal sector and the percentage of at least ten-year-olds who have never attended school.

In this chapter, we study the impact of a province's economic determinants on its inflows of FDI for the years from 2015 to 2021 using a negative binomial regression and assigning the selected determinants to the following categories: market size, labor market, infrastructure and human capital. The underlying dataset contains information on all 34 provinces and comes from the Central Bureau of Statistics Indonesia (CBSI) a non-ministerial government agency responsible for collecting statistical data on the economy.

The remainder of the chapter is structured as follows: Section 5.2 reviews the relevant literature. Section 5.3 elucidates the estimation approach. Sections 5.4 and 5.5 provide information on the provinces' economic determinants and the underlying model specification, respectively. Section 5.6 presents the findings of the analysis. Finally, Section 5.7 provides the conclusion.

## **5.2 A Brief Overview of the Literature**

Within the field of research that studies the location choice of foreign investors between regions of a country based on several economic determinants, a particular branch has developed that focuses on Indonesia. The size of the country, the availability of data, and the political changes that have taken place in recent decades make Indonesia an interesting case for emerging markets. Relevant studies are listed in Table 12, with most focusing on the provincial-level for the respective empirical analysis. Although several determinants have been selected, they can be broadly grouped into the following four categories: market size, labor market, infrastructure, and education. In the following, we provide a brief overview for each category.

The first category comprises determinants that capture the market size of a region. In this regard, most studies use a region's GDP to explain FDI inflows. Although most results point to a positive effect (Syamwil et al., 2000; Firdaus, 2010; Fitriandi et al., 2014), the results of Sodnik et al. (2019) and Agustina and Flath (2019) remain the exceptions since they point to a negative and insignificant effect, respectively. Fu et al. (2018) measure the GDP of a region against this backdrop, confirming the positive effect found in most studies. Sodik et al. (2019) use a different approach in addition to the two aforementioned determinants by including the number of inhabitants and find a positive effect.

The second category comprises determinants related to the labor market of a region. The most commonly used determinant in this context is the average monthly wage, which shows

a positive (Syamwil, 2000), negative (Fitriandi et al., 2014) or insignificant effect (Fu et al., 2018) on the FDI inflows of a province. When the minimum wage is used instead, the results of Agustina and Flath (2019) and Sodik et al. (2019) show a positive effect. In addition to considering only this particular determinant of a region's labor market, several studies also include the labor market size (Fu et al., 2018; Sodnik et al., 2019) and unemployment rate (Fitriandi et al., 2014) showing a positive effect.

The third category comprises proxies that aim at measuring the state of the infrastructure of a region. In this regard, the results of Sodik et al. (2019) and Fitriandi et al. (2014) show that road length is positively correlated with FDI inflows, while the results of Syamwil et al. (2000) suggest a deterrent effect. By including road density in the specification, Agustina and Flath (2019) use a modified but related measure compared to the aforementioned studies and present a positive effect. Apart from proxies that refer in some way to the roads of a region, several studies use other ones such as the percentage of households that have access to electricity (Firdaus, 2010), the number of telephone lines (Syamwil et al., 2000), or water supply and capacity (Fitriandi et al., 2014) indicating a positive effect. Furthermore, the studies of Fitriandi et al. (2014) and Syamwil et al. (2000) include the amount of electricity sold in a province and confirm the positive effect. However, the study of Fu et al. (2018) uses the same approach and finds an insignificant effect, as does the study of Sodik et al. (2019) when using the amount of electricity that the power plants of a province can produce.

The fourth category comprises determinants that account for a region's human capital. In that respect, Sodik et al. (2019) use the number of high school graduates and point to a positive effect on the location decision of foreign investors. In contrast, Agustina and Flath (2019) use the percentage of the labor force with secondary or undergraduate education suggesting a negative effect, while Firdaus (2010) uses only the percentage of people in a province with secondary education finding no effect.

It becomes clear that a number of researchers focused on Indonesia and its provinces by investigating several economic determinants. However, there exists room for further research since, first, the variables used and, second, the underlying methodology varies widely. As a consequence, it is worthwhile to investigate the same, similar or different economic determinants to shed more light on them and deepening the discussion. In this regard, certain results in the respective literature can be confirmed or not, thus, indicating particular fields which might need more attention from future research.

Table 12: Studies focusing on Indonesia

Study	Period	Focus
Agustina and Flath (2019)	2013-2017	23 counties of Java Island
Evrensel and Kutan (2007)	1992-2001	26 provinces
Firdaus (2010)	1983-2009	34 provinces
Fitriandi et al. (2014)	2000-2009	30 provinces
Fu et al. (2018)	2006-2016	34 provinces
Meivitawanli (2021)	2010-2019	33 provinces
Sodik et al. (2019)	1990-2014	26 provinces
Syamwil et al. (2000)	1984-1994	5 regions

### 5.3 Estimation Approach

#### 5.3.1 The Data Set for Indonesia

The underlying database compiled for the analysis includes information on each of Indonesia's 34 provinces for the years from 2015 to 2021 and is highly balanced. The dependent variable,  $fdi_{i,t}$ , represents the number of received FDIs of province  $i$  during year  $t$ . The database includes only investments in the following sectors: agriculture, hunting, forestry, fishery, mining, quarrying, manufacturing, electricity, gas and water supply, construction, wholesale and retail trade, restaurants and hotels, transportation, warehousing and communications, business services, community, social and personal services. We use count data instead of the respective projects' capital expenditure, since it avoids the bias towards large single investments that would affect the subsequent analysis. As independent variables, we include a set of economic determinants that could influence an investor's decision to locate in a particular province. The variables are sourced from the Central Bureau of Statistics Indonesia (CBSI), a non-ministerial government agency responsible for collecting statistical data on the economy.

#### 5.3.2 Economic Determinants

We classify each independent variable into one of the following four categories: market size, labor market, infrastructure, and human capital. In this regard, Table 13 shows for each variable its respective category and provides further information on the definition, source, and the expected effect.

The first category contains variables to capture the market size of a province. In this regard, the first variable presented,  $gdp_{i,t}$ , measures the GDP in trillions of Indonesian rupiah. We expect that a higher economic output attracts foreign investors since it offers a more profitable



market potential based on, among other things, the higher purchasing power of residents and the benefits associated with industrial agglomeration. The second variable,  $gdp\_cap_{i,t}$ , describes the GDP per capita in millions of Indonesian rupiah. This variable can also be considered as a measure of market size. Therefore, we include it in the specification to examine the robustness of the results of the first variable.

The second category contains variables that cover aspects related to the labor market of a province. In this regard, the first variable,  $inf\_emp_{i,t}$ , describes the percentage of people employed in the informal sector. We assume that a larger share of informal workers leads to unfavorable competition from informal firms, since they face lower production costs. As a consequence, the decision of foreign investors could be affected to the detriment of a province. The second variable,  $wage_{i,t}$ , measures the hourly average wage in thousands of Indonesian rupiah, since related studies argue that higher labor costs deter foreign investors by lowering a firm's profitability (Agustina and Flath, 2019; Fu et al., 2018). However, the measurement is not an indicator of labor productivity, thus, the respective interpretation should be taken with caution. The third variable,  $unemp_{i,t}$ , describes the unemployment rate and is defined as the share of unemployed persons in the labor force. In this respect, it is argued by Fitriandi et al. (2014) that a larger pool of applicants deters foreign investors, since it is a sign of a shortage of suitable employees.

The variables in the third category intends to measure the state of a province's infrastructure. In this regard, the first variable,  $digital\_infra_{i,t}$ , measures the percentage of villages that have a base transceiver station. A base transceiver station is a facility that sends and receives radio signals to mobile devices in the respective surrounding area. As a consequence, it allows, among other things, for the telecommunication via mobile phones and internet access. We consider this variable to be an indicator of the infrastructure and expect a positive effect on the location choice of foreign investors. The reason for this is that a greater penetration of these technical devices increases a firm's productivity, since it enhances a firm's operations by facilitating wireless communication. The second variable,  $house\_infra_{i,t}$ , describes the percentage of households that have handwashing facilities with soap and water. Since we assume that both variables are indicative of the state of the infrastructure, we include the second variable in the specification to examine the robustness of the results of the first variable.

The fourth category contains the variable  $school_{i,t}$  that is intended to capture human capital in a province. For this purpose, it captures the percentage of the population older than ten years of age who has never attended school. As Firdaus et al. (2010) argue, higher levels of education leads to a more productive labor force and foreign investors have more flexibility in

their choice of technologies to use. In this respect, we expect that a higher value deters foreign investors since it indicates a less favorable economic environment.

Table 13: Information on the determinants used

Category	Variable	Definition	Expected effect
Market Size	$gdp_{i,t}$	Gross domestic product in trillions of Indonesian rupiah.	+
	$gdp\_cap_{i,t}$	Gross domestic product per capita in millions of Indonesian rupiah.	+
Labor market	$inf\_emp_{i,t}$	Percentage of people being employed in the informal sector.	-
	$wage_{i,t}$	The hourly average wage of a worker in thousand Indonesian rupiah.	-
	$unemp_{i,t}$	Percentage of persons in the economically active population being unemployed.	-
Infrastructure	$digital\_infra_{i,t}$	Percentage of villages that have base transceiver stations.	+
	$house\_infra_{i,t}$	Percentage of households that own a hand washing facility with soap and water.	+
Human Capital	$school_{i,t}$	Percentage of population being ten years of age and over who have never attended school.	-

Note: The presented variables are taken from the Central Bureau of Statistics Indonesia

## 5.4 Descriptive Information

Table 14 presents the descriptive statistics of the variables used. The results show that the average annual number of FDIs received by a province was 864.02 during the period from 2015 to 2021. Since the mean clearly exceeds the median, the respective distribution is positively skewed. This means that the number of investments received is considerably low for the majority of provinces, whereas it is relatively high for a smaller number. As a consequence, the distribution of FDIs among provinces follows a rather heterogenous pattern. A closer look at the provincial level shows that the provinces of Jakarta, Jawa Barat and Banten attracted the largest number of foreign investments during the study period with an average of 8 430.71, 5 955.57 and 2

436.85, respectively. In contrast, the provinces of Sulawesi Barat and Maluku received the lowest number of foreign direct investments with an average of 25.71 and 41.28, respectively. Regarding the GDP of the provinces (measured in in trillions of Indonesian rupiah), the database shows that Jakarta (2 514.93), Jawa Timur (2 121.24) and Jawa Barat (1 906.36) exhibit the highest level, while the reverse is true for Maluku Utara (36.98) and Gorontalo (37.03). Looking instead at GDP per capita (measured in millions of Indonesian rupiah), the provinces with the highest values in this regard are Jakarta (240.95) and Kalimantan Timur (165.28), while the provinces with the lowest values are Nusa Tenggara Timur (18.11) and Maluku (23.76). The results relating to the extent of informal employment in a province show that Nusa Tenggara Timur (78.41) and Kalimantan Timur (42.35) feature the highest and lowest percentage of people employed in the informal sector, respectively. Further analysis shows that the highest hourly average wage (expressed in thousands of Indonesian rupiah) was paid to workers in Papua (25.91) and Jakarta (24.79), whereas those in Jawa Tengah (11.15) are paid the lowest. The provinces facing the highest unemployment rates are Banten (9.13), Jawa Barat (8.91) and Kep Riau (8.12). In contrast, the results for Bali (2.76) and Sulawesi Barat (3.19) are at the lowest end of the scale. Regarding the state of the infrastructure, the data show that Jakarta (86.73) and Kep Bangka Belitung (81.34) have the highest shares of villages with base transceiver stations. However, Sulawesi Tenggara (77.79) and Bali (77.32) have the highest share of households that have handwashing facilities with water and soap. The highest percentage of persons being ten years of age or older and have never attended school are in Papua (21.82) and Nusa Tenggara Barat (5.78). The lowest percentage in this regard is in Sulawesi Utara (0.52) and Jakarta (0.62).<sup>8</sup>

Table 14: Descriptive statistics

Variable	Average	Median	St. dev.	Min	Max.	Obs.
$fdi_{i,t}$	864.02	203.50	1895.64	16	16 787	238
$gdp_{i,t}$	427.58	176.95	614.30	26.63	2 914.58	238
$gdp\_cap_{i,t}$	58.33	44.23	45.25	14.86	274.70	238
$inf\_emp_{i,t}$	60.05	61.08	11.87	26.81	86.80	238
$wage_{i,t}$	16 473	15 747.50	4 429.89	8 525	32 138	238
$unemp\_rate_{i,t}$	5.30	4.93	1.88	1.40	10.95	238
$digital\_infra_{i,t}$	43.62	39.90	20.43	3.61	91.38	238
$house\_infra_{i,t}$	66.57	74.25	21.27	13.51	92.78	238
$school_{i,t}$	0.99	1.58	0.34	0.64	1.65	238

<sup>8</sup> Appendix 5.A. provides further information on the averages of the variables used for each province for the investigation period. Furthermore, Appendix 5.B. provides an illustration of the provinces' respective location in Indonesia.

Table 15 shows the pairwise correlation coefficients of the variables used in our study. We measure the strength of the correlation between the independent variables by calculating the respective variance inflation factor for each. The results obtained range from 1.80 to 3.35 and indicate that although a moderate correlation is present multicollinearity does not pose a problem for the empirical analysis.

Table 15: Correlation matrix

	$fdi_{i,t}$	$gdp_{i,t}$	$gdp\_cap_{i,t}$	$inf\_emp_{i,t}$	$wage_{i,t}$	$unemp\_rate_{i,t}$	$digital\_infra_{i,t}$	$house\_infra_{i,t}$	$school_{i,t}$
$fdi_{i,t}$	1.0								
$gdp_{i,t}$	0.77	1.0							
$gdp\_cap_{i,t}$	0.50	0.48	1.0						
$inf\_emp_{i,t}$	-0.44	-0.38	-0.69	1.0					
$wage_{i,t}$	0.28	0.12	0.57	-0.40	1.0				
$unemp\_rate_{i,t}$	0.44	0.35	0.33	-0.45	0.33	1.0			
$digital\_infra_{i,t}$	0.52	0.45	0.38	-0.53	0.07	0.23	1		
$house\_infra_{i,t}$	0.09	0.07	0.12	-0.26	0.26	-0.08	0.32	1.0	
$school_{i,t}$	-0.10	-0.08	-0.11	0.35	0.22	-0.26	-0.29	-0.34	1.0

## 5.5 Empirical Approach

We employ a negative binomial regression to explain the annual number of FDI's received by a province based on the selected economic determinants. The reason for using this particular specification is that the dependent variable ( $fdi_{i,t}$ ) exhibits overdispersion. We argue that a foreign investor's decision to acquire a controlling stake of at least ten percent in a foreign company, buy it outright or to establish a subsidiary from scratch follows a profound planning phase that extends over a longer period of time. Therefore, our specification allows for a one-year time lag between the independent variables and the investment project. In this way, problems of endogeneity can also be avoided. The model to be estimated can thus be formulated as follows:

$$\begin{aligned}
fdi_{i,t} = & \alpha_i + \beta_1 \cdot gdp_{i,t-1} + \beta_2 \cdot gdp\_cap_{i,t-1} + \beta_3 \cdot inf\_emp_{i,t-1} + \beta_4 \cdot wage_{i,t-1} \\
& + \beta_5 \cdot unemp\_rate_{i,t-1} + \beta_6 \cdot digital\_infra_{i,t-1} + \beta_7 \cdot house\_infra_{i,t-1} \\
& + \beta_8 \cdot school_{i,t-1} + \beta_9 \cdot \sigma_t + \epsilon_{i,t}
\end{aligned}$$

The subscripts  $i$  and  $t$  refer to the province and the year, respectively. The vector  $\alpha_i$  captures the provinces' time invariant characteristics and, thus, contains the province-specific constants. The remaining vectors  $\sigma_t$  and  $\epsilon_{i,t}$  account for the time-specific constants and the error term, respectively.

## 5.6 Findings of the Estimation

We estimate four different specifications, since we control for the robustness of the results by including an additional variable that captures, respectively, the market size of a province ( $gdp\_cap_{it}$ ) and the state of its infrastructure ( $infra\_house_{it}$ ). In this respect, Table 16 shows the estimation results in the second, fourth, sixth and eighth number columns. A closer inspection of the obtained coefficients shows a pronounced robustness in terms of their magnitude and sign under the specifications outlined. Since an estimated coefficient in our model shows the expected logarithmic change in the number of foreign investments received by a province per unit change of its associated independent variable, it can only determine whether the effect is positive or negative. Therefore, we calculate the magnitude of the effect of each variable by inserting the respective coefficient into the expression  $(e^\beta - 1) \cdot 100$ . The obtained result presents the expected percentage change in a province's FDI inflows given a one-unit change in the underlying variable, *ceteris paribus* (Coxe et al., 2009). The transformed coefficients are presented in the third, fifth, seventh and ninth number columns.

The results show that the GDP of a province positively influences the location choice of foreign investors. In this regard, Model 1 indicates that an increase in a province's GDP by one unit (i.e., one trillion Indonesian rupiah) is expected to increase its annual inflows of FDIs by 0.02 percentage points. However, a province's GDP per capita, which is also supposed to capture market size but at a different level, appears with an insignificant coefficient. With regard to a province's labor market, the results show that a one percentage point increase in the percentage of informal sector workers is expected to decrease the annual inflow of FDIs by 1.39 percentage points, while the hourly average wage is not found to be significant. The unemployment rate has a positive and significant coefficient indicating that a one percentage point increase is expected to increase a province's inflows of FDIs by 4.81 percentage points. Regarding the state of a province's infrastructure, the results show that a one percentage point increase in the share of villages that have base transceiver stations and households that own a handwashing facilities with soap and water is expected to increase FDI inflows by 1.65 and 0.77 percentage points, respectively. Human capital, measured as the percentage of persons being ten years of age or older who have never attended school, is found to have no significant effect.

Table 16: Estimation results

Dependent variable: $fdi_{i,t}$   Negative binomial regression								
	Model 1		Model 2		Model 3		Model 4	
	Coefficient	Effect in %	Coefficient	Effect in %	Coefficient	Effect in %	Coefficient	Effect in %
$gdp_{i,t-1}$	0.0002 (0.0001)**	0.02	0.0004** (0.0001)	0.04	-	-	-	-
$gdp\_cap_{i,t-1}$	-	-	-	-	-0.0021 (0.0021)	-0.21	-0.0002 (0.0022)	-0.02
$inf\_emp_{i,t-1}$	-0.0140*** (0.0041)	-1.39	-0.0163*** (0.0039)	-1.61	-0.0093** (0.0038)	-0.93	-0.0128*** (0.0038)	-1.27
$wage_{i,t-1}$	0.0062 (0.0121)	0.62	-0.0044 (0.0113)	-0.43	0.0150 (0.0120)	1.51	0.0034 (0.0119)	0.34
$unemp\_rate_{i,t-1}$	0.0470*** (0.0172)	4.81	0.0406** (0.0184)	4.14	0.0672*** (0.0189)	6.95	0.0688*** (0.0203)	7.12
$digital\_infra_{i,t-1}$	0.0164*** (0.0058)	1.65	-	-	0.0202*** (0.0054)	2.04	-	-
$house\_infra_{i,t-1}$	-	-	0.0077*** (0.0024)	0.77	-	-	0.0060** (0.0023)	0.60
$school_{i,t-1}$	0.0202 (0.0205)	2.04	0.0100 (0.0183)	1.00	0.0112 (0.0206)	1.13	0.0017 (0.0194)	0.17
<i>Constant</i>	4.8919*** (0.0373)	-	4.0388*** (0.2835)	-	4.8475*** (0.3537)	-	3.7640*** (0.2976)	-
Time fixed effects	Yes		Yes		Yes		Yes	
Entity fixed effects	Yes		Yes		Yes		Yes	
Observations	204		204		204		204	
Wald Chi <sup>2</sup>	1 014.55		954.26		898.83		759.99	

Note: Robust standard errors in parentheses. \*\*\*/\*\* denote statistical significance at the 1% and 5% levels, respectively.

## 5.7 Conclusion of the study

This chapter studies how the determinants of provinces in Indonesia affect their respective inflows of FDI. In this regard, we study the period from 2015 to 2021 and employ a negative binomial regression for the empirical analysis. The results show that the market size of a province, measured as its GDP, constitutes an important factor for foreign investors. In contrast, the GDP per capita does not significantly attract investments from abroad. One reason for this finding could be that GDP per capita is not indicative of a province's market size, as it can be high even when a small population generates a large gross value added in certain sectors. Regarding the labor market, the results show that the percentage of informal workers has a negative effect on the inflows of FDI in a province, while the unemployment rate has the opposite effect. One reason for the latter result could be that investors target provinces where labor markets are less tight, making it easier for them to employ people. The monthly average wage does not appear to be significant which could be due to investors placing more emphasis on labor productivity and unit labor costs than on wages. Regarding the variables in the category that focus on the state of a province's infrastructure, we find that both the share of villages with base transceiver stations

and the share of households that have handwashing facilities with soap and water positively affect FDI inflows.

## 6 Summary

This thesis investigates the impact of selected economic determinants on the location choice of foreign direct investment. In this regard, the focus is put on the country- and the regional-level, thus, contributing to both streams of research in the respective field.

Chapter two examined on the country-level whether the held referendum over a withdrawal from the European Union affected the number of announced greenfield foreign direct investments from 2016 to 2019 which were planned to materialize in the United Kingdom. In this context, the results indicate that the surge in political uncertainty regarding the future relationship with the European Union had a negative effect. Furthermore, the number of announcements made by investors outside the European Single Market were more negatively affected than those made by investors within. We argue that a potential reason for this might be that the former used to target the United Kingdom more often as an export platform. However, the underlying methodological approach does not allow for a verification of this assumption.

Chapter three builds upon that by examining at the county-level for England, Wales and Scotland whether the held referendum over a withdrawal from the European Union affected the inflows of greenfield foreign direct investment. The obtained results confirm the negative impact of the faced uncertainty on the location choice of foreign investors. To put it concisely, chapters two and three show that the political uncertainty regarding the United Kingdom's future economic relationship with the European Union represented an important determinant in the location decision of foreign investors.

Chapter four examines the location choice of greenfield foreign direct investments among provinces in Vietnam by means of several selected economic determinants. In this regard, the data indicates that investments are heterogeneously distributed among provinces which stresses the necessity to study the influence of their respective economic determinants. The results show that a province's population and firm density, present human capital, quality of the labor force and net migration rate affects its respective inflows of greenfield foreign direct investment positively. However, the level of labor costs has a negative effect in this context.

Chapter five examines the location choice of foreign direct investments among provinces in Indonesia. As in the study that focuses on Vietnam, the distribution of investments among provinces follows a heterogenous pattern emphasizing the role of their respective determinants. The results show that a province's GDP, unemployment rate and infrastructure affect the inflows of foreign direct investment positively. However, the extent of informally employed workers has a negative effect. To put it concisely, chapters four and five investigate the impact of economic determinants at the regional-level on the location decision of foreign investors.



Since there exist many more unexplored economic determinants at the county- and regional-level, there is scope for further contributions within this particular field of research. In this regard, future research should also start to categorize foreign investors according to their investment motives, industry sectors, countries of origin and so forth. In this way, a better general understanding can be gained since it becomes possible to study whether the impact of an economic determinant varies over the different categories. More precisely, it can be studied whether an investor's underlying investment motive has an effect on the magnitude of an economic determinant's impact on the location decision. It can be assumed, for instance, that investors with a cost-seeking-motive are more negatively affected by the labor costs, whereas those with a market-seeking-motive are more positively affected by the population density. A similar approach is also possible when categorizing foreign investors according to their respective industry sectors. In this regard, it can be assumed, for instance, that investors from the information and communication sector are more positively attracted by human capital, whereas it is the other way around for those in the textile industry. This thesis abstained from categorizing foreign investors since the necessary data on their respective characteristics is either not available or in a very rudimentary condition being unsuitable for research. However, when the relevant data becomes available in the right quality and quantity the opportunity of new contributions to both research streams arises.

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## Appendix

### Appendix 3.A: Averages of the variables used for the counties

County	$GFDI_{i,t}$	$unemp_{i,t}$	$high\_qual_{i,t}$	$infra_{i,t}$	$industry_{i,t}$	$population_{i,t}$
Blaenau Gwent	0.69	9.63	19.77	36.07	0.10	6.41
Bridgend	2.70	6.23	31.12	72.23	0.13	5.29
Caerphilly	1.50	7.53	26.10	59.92	0.13	6.48
Cardiff	8.39	7.23	43.07	68.83	0.70	25.32
Carmarthenshire	1.20	5.42	32.67	247.15	0.03	0.78
Ceredigion	0.10	4.65	33.82	180.39	0.02	0.41
Conwy	0.40	5.36	34.31	144.81	0.03	1.03
Denbighshire	0.89	5.76	31.69	128.45	0.04	1.13
Flintshire	3.00	5.05	29.24	121.39	0.10	3.52
Gwynedd	0.10	5.32	33.77	318.88	0.02	0.48
Isle of Anglesey	0.50	5.88	34.65	108.34	0.03	0.48
Merthyr Tydfil County Borough	0.50	8.14	24.01	36.43	0.10	5.33
Monmouthshire	0.30	4.20	41.90	108.65	0.04	1.09
Neath Port Talbot	0.69	6.71	26.22	103.51	0.06	3.19
Newport	2.00	7.38	33.19	50.48	0.19	7.80
Pembrokeshire	0.60	5.55	30.29	168.28	0.03	0.76
Powys	0.60	3.78	34.44	410.66	0.01	0.25
Rhondda Cynon Taff	1.10	7.74	28.26	116.84	0.11	5.59
Swansea	2.20	6.90	33.59	70.80	0.15	6.37
Torfaen	0.50	7.36	27.17	21.93	0.15	7.31
Vale of Glamorgan	0.60	5.73	41.09	46.38	0.11	3.89
Wrexham	2.40	5.69	30.36	79.79	0.07	2.68
Northumberland	2.40	6.23	31.36	376.47	0.02	0.63
Cumbria	1.90	4.44	30.44	692.54	0.03	0.73
County Durham	9.50	7.25	27.34	275.19	0.05	2.33
Tyne and Wear	17.10	8.38	30.06	264.00	0.44	20.73
North Yorkshire	8.39	4.05	36.27	697.14	0.03	0.75
West Yorkshire	18.10	7.05	29.75	695.66	0.33	11.19
South Yorkshire	11.60	8.05	29.55	425.01	0.21	8.84
East Riding of Yorkshire	3.70	5.00	34.09	251.69	0.05	1.40
Merseyside	12.60	7.28	29.27	320.41	0.51	21.72
Greater Manchester	39.50	7.15	32.77	649.41	0.67	21.53
Lancashire	5.90	5.07	32.35	539.98	0.13	4.09
Cheshire	12.70	4.62	39.35	510.20	0.14	3.40
Derbyshire	9.60	4.69	31.78	466.16	0.10	3.07
Nottinghamshire	6.50	5.69	30.99	406.91	0.11	3.85
Lincolnshire	7.50	5.36	27.45	690.07	0.04	1.24
Shropshire	4.40	4.28	33.04	355.92	0.04	0.97
Staffordshire	9.60	4.96	28.44	600.27	0.13	4.10
Leicestershire	8.80	5.99	31.67	364.72	0.17	4.70

Appendix 3.A: Averages of the variables used for the counties (continued)

County	$GFDI_{i,t}$	$unemp_{i,t}$	$high\_qual_{i,t}$	$infra_{i,t}$	$industry_{i,t}$	$population_{i,t}$
Rutland	0.20	3.31	40.00	59.32	0.04	1.00
Herefordshire	1.20	4.09	32.43	282.95	0.04	0.86
Worcestershire	5.50	4.23	34.96	352.35	0.13	3.32
Warwickshire	9.50	4.13	37.52	388.44	0.12	2.81
Northamptonshire	8.89	4.88	30.35	453.76	0.12	3.04
Hertfordshire	7.69	4.50	41.38	376.22	0.33	7.02
Cambridgeshire	12.60	4.19	42.47	379.31	0.08	2.08
Norfolk	3.59	5.15	28.60	581.15	0.05	1.64
Suffolk	4.50	4.67	29.73	441.50	0.07	1.95
Essex	5.69	5.03	28.64	441.57	0.16	4.15
Kent	8.60	5.77	33.37	706.73	0.15	4.28
Bedfordshire	4.19	3.06	36.42	195.32	0.15	3.64
Buckinghamshire	11.50	4.05	45.07	262.66	0.18	3.34
West Midlands	35.20	9.13	27.54	444.45	0.83	31.33
Oxfordshire	9.00	3.44	48.09	364.50	0.11	2.57
Gloucestershire	4.40	4.30	38.60	400.76	0.10	2.31
Wiltshire	5.90	3.98	38.63	439.78	0.06	1.49
Berkshire	26.10	4.24	43.70	302.26	0.31	7.03
Surrey	8.50	3.48	45.94	448.17	0.35	7.00
East Sussex	3.40	4.77	34.23	275.70	0.12	3.16
West Sussex	4.09	3.92	33.58	357.60	0.10	4.19
Hampshire	14.50	3.95	37.61	582.77	0.15	3.67
Dorset	2.50	4.08	33.87	330.44	0.11	2.80
Somerset	3.30	4.23	32.33	475.28	0.06	1.57
Devon	4.59	4.01	36.69	727.81	0.05	1.17
Bristol	11.30	5.98	46.02	66.09	1.43	40.68
Cornwall	2.59	4.71	32.04	433.60	0.06	1.54
Isle of Wight	0.60	6.48	28.29	75.50	0.11	3.67
Greater London	432.50	6.98	48.79	1108.11	2.70	54.48
Aberdeen City	16.40	4.71	46.94	56.36	0.45	12.21
Aberdeenshire	2.09	3.16	42.08	551.00	0.02	0.40
Angus	0.89	5.09	39.66	150.53	0.01	0.53
Argyll and Bute	1.40	4.71	39.57	494.62	0.01	0.12
Clackmannanshire	0.30	6.86	37.28	31.93	0.06	3.23
Dumfries and Galloway	1.30	5.27	31.71	525.20	0.01	0.23
Dundee City	3.30	8.29	38.89	28.97	0.50	24.74
East Ayrshire	1.00	8.10	33.11	123.25	0.02	0.96
East Dunbartonshire	0	4.46	53.23	32.95	0.15	6.11
East Lothian	0	5.17	42.50	102.83	0.04	1.51
East Renfrewshire	0	4.53	52.31	30.79	0.13	5.34
City of Edinburgh	25.40	5.23	55.39	100.89	0.62	18.88
Eileanan Siar	0.30	4.84	40.97	205.71	0.00	0.08
Falkirk	2.20	6.05	33.94	91.88	0.11	5.32

Appendix 3.A: Averages of the variables used for the counties (continued)

County	$GFDI_{i,t}$	$unemp_{i,t}$	$high\_qual_{i,t}$	$infra_{i,t}$	$industry_{i,t}$	$population_{i,t}$
Fife	4.00	6.61	40.69	264.98	0.06	2.78
Glasgow City	18.20	8.68	42.15	113.74	0.92	34.76
Highlands	4.80	4.09	39.45	1457.95	0.01	0.09
Inverclyde	0.50	7.55	35.76	30.57	0.09	4.96
Midlothian	0.50	5.21	36.60	71.50	0.06	2.46
Moray	1.30	4.28	34.07	159.42	0.01	0.42
North Ayrshire	0.80	9.13	32.54	97.36	0.03	1.54
North Lanarkshire	2.70	7.50	31.77	121.33	0.14	7.20
Orkney Islands	0.30	2.83	33.18	101.81	0.01	0.21
Perth and Kinross	0.60	4.23	44.86	411.45	0.01	0.28
Renfrewshire	2.20	6.61	40.52	64.70	0.16	6.70
Scottish Borders	1.40	4.57	38.64	385.80	0.01	0.24
Shetland Islands	0.10	2.83	35.77	139.79	0.01	0.15
South Ayrshire	1.80	6.55	39.03	125.27	0.02	0.92
South Lanarkshire	1.60	5.90	38.31	237.55	0.04	1.78
Stirling	1.40	5.63	44.28	210.49	0.01	0.42
West Dunbartonshire	0.50	7.94	32.21	39.93	0.10	5.65
West Lothian	4.00	5.52	36.98	35.50	0.09	4.17



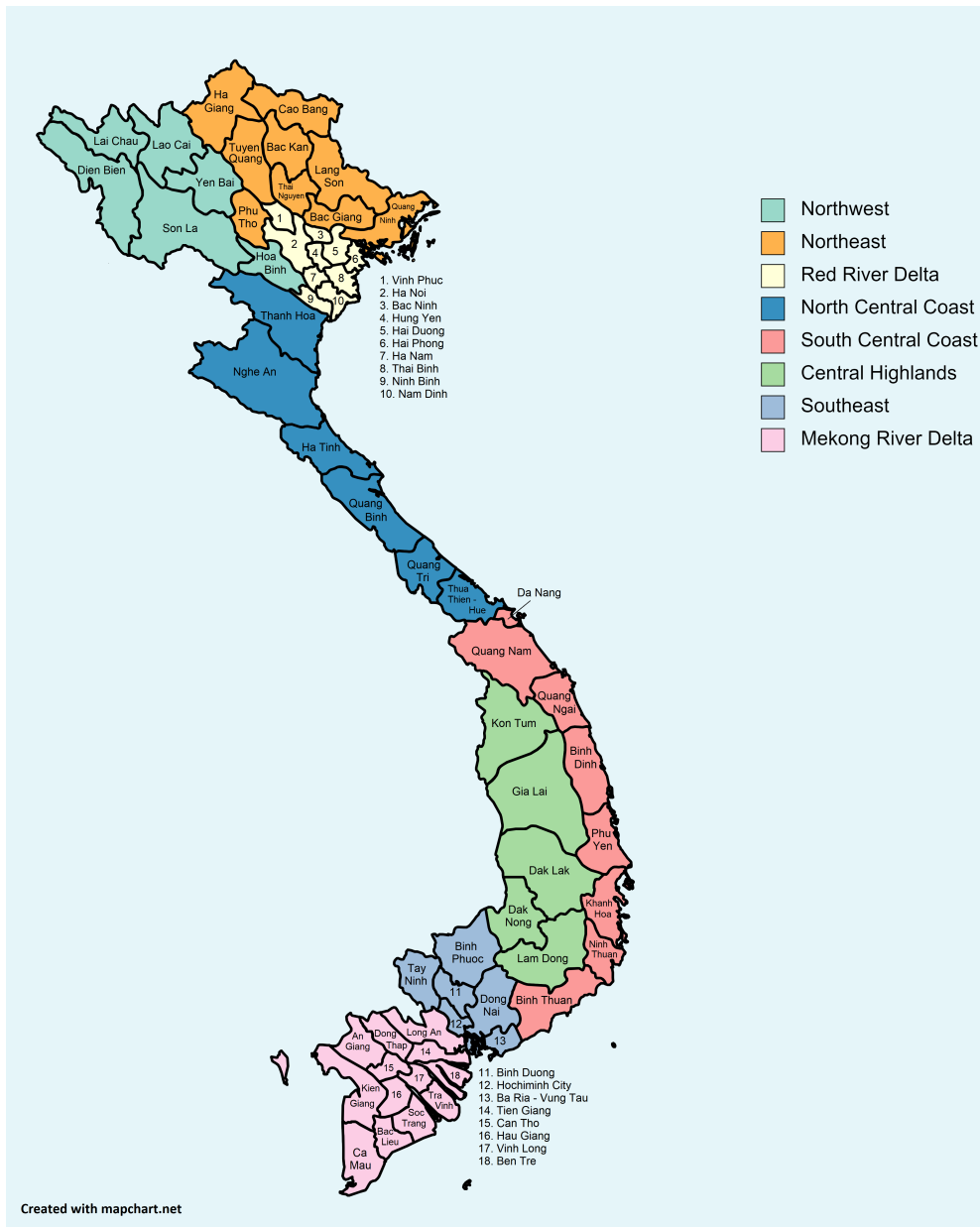
Appendix 4.A: Average of the variables used for Vietnamese provinces

Province	$GFDI_{i,t}$	$pop\_dens_{i,t}$	$firm\_dens_{i,t}$	$educ_{i,t}$	$qual\_lab_{i,t}$	$avg\_inc_{i,t}$	$net\_migt_{i,t}$	$bribe\_rent_{i,t}$	$reg\_rent_{i,t}$
Ha Noi	27.90	2 242.6	35.32	16.41	85.42	84.84	2.30	60.18	66.36
Vinh Phuc	3.00	881.70	3.60	15.50	88.59	72.79	-0.42	52.89	55.35
Bac Ninh	4.70	1 505.00	8.26	18.08	88.24	82.90	16.01	52.94	56.04
Quang Ninh	2.40	203.60	0.98	17.32	87.02	84.07	-2.57	46.78	45.98
Hai Duong	2.40	1 091.70	3.74	17.14	88.38	66.88	-0.92	56.50	55.13
Hai Phong	10.30	1 288.00	8.25	17.55	84.73	68.94	1.44	61.17	62.53
Hung Yen	1.80	1288.50	4.75	16.96	86.88	68.13	1.05	55.51	58.05
Thai Binh	0.20	1 147.90	2.17	18.97	85.51	48.89	-4.34	57.77	58.07
Ha Nam	3.80	951.00	3.25	17.62	82.80	60.76	-2.36	57.97	55.98
Nam Dinh	0.30	1 102.60	2.68	17.64	82.57	48.95	-4.47	56.90	56.78
Ninh Binh	0.20	692.70	2.01	16.76	88.11	54.37	0.05	53.25	56.44
Ha Giang	0.30	103.90	0.10	10.28	76.45	51.70	-2.59	58.23	56.44
Cao Bang	0	79.01	0.11	14.70	73.72	56.57	-4.20	65.10	65.16
Bac Kanh	0	64.80	0.09	15.42	75.93	54.24	-4.65	56.45	57.72
Tuyen Quang	0	131.30	0.16	16.81	83.14	56.97	-4.15	57.95	57.59
Lao Cai	0.10	109.40	0.26	12.74	84.77	69.47	-1.95	55.76	56.11
Yen Bai	0.20	116.50	0.16	13.11	82.01	55.49	-2.97	56.10	54.43
Thai Nguyen	0.80	349.80	0.84	17.10	86.19	77.42	-1.58	54.50	54.35
Lang Son	0.20	92.70	0.14	17.97	81.01	52.08	-4.97	61.54	58.67
Bac Giang	1.40	438.40	0.90	17.18	85.05	66.22	-2.13	62.90	59.96
Phu Tho	0.10	397.60	1.03	15.73	83.04	58.82	-1.78	58.16	56.35
Dien Bien	0	59.20	0.09	13.22	76.61	44.50	-1.36	62.06	62.37
Lai Chau	0	48.50	0.08	9.38	69.12	52.34	-3.71	62.82	57.04
Son La	0.20	85.70	0.09	12.19	80.56	45.00	-2.70	58.97	60.50
Hoa Binh	0.50	181.80	0.38	16.99	83.64	55.51	-4.93	64.55	59.28
Thang Hoa	1.80	319.80	0.73	17.70	86.79	46.79	-3.93	63.92	64.07
Nghé An	1.40	191.30	0.50	17.59	83.06	51.15	-1.87	58.78	60.76
Ha Tinh	1.30	211.70	0.59	20.20	85.02	57.04	-4.67	61.48	62.80
Quang Binh	0.20	109.90	0.38	19.03	84.12	51.90	-3.89	57.94	57.92
Quang Tri	0.20	133.80	0.47	20.04	81.21	51.17	-4.27	62.53	61.41
Thua Thien Hue	0.10	229.70	0.71	19.21	84.82	51.54	-3.27	49.11	52.70
Da Nang	6.50	832.60	11.05	17.73	88.34	67.27	7.58	48.28	49.43
Quang Nam	1.80	141.40	0.47	20.34	87.84	54.15	-3.09	50.46	55.08
Quang Ngai	1.40	241.50	0.69	18.32	86.44	70.74	-4.17	54.82	59.65
Binh Dinh	1.80	249.40	0.80	20.35	85.50	52.01	-4.20	50.29	51.14
Phu Yen	0.30	176.20	0.38	19.20	84.18	47.35	-4.42	51.87	51.27
Khang Hoa	1.0	235.10	1.25	16.95	82.98	61.69	-1.85	58.44	49.16
Ninh Thuan	1.10	177.30	0.46	15.25	86.86	57.30	-2.15	52.52	49.52
Binh Thuan	1.10	155.10	0.43	15.94	82.14	50.72	-3.56	56.09	53.04
Kon Tum	0	53.10	0.13	12.38	81.54	50.62	-0.45	59.93	60.74

Appendix 4.A: Average of the variables used for Vietnamese provinces (continued)

Province	$GFDI_{i,t}$	$pop\_den_{i,t}$	$firm\_den_{i,t}$	$educ_{i,t}$	$qual\_lab_{i,t}$	$avg\_inc_{i,t}$	$net\_mig_{i,t}$	$bribe\_rent_{i,t}$	$reg\_rent_{i,t}$
Gia Lai	0.30	92.90	0.18	13.51	81.43	56.07	-2.17	57.91	60.14
Dak Lak	0.30	142.90	0.33	17.02	87.51	44.78	-2.78	57.85	57.81
Dak Nong	0.10	93.01	0.19	14.97	82.29	48.51	6.23	60.25	62.65
Lam Dong	0.50	131.40	0.43	17.46	87.52	62.87	-1.11	51.39	57.29
Binh Phuoc	1.40	140.30	0.47	14.98	82.23	64.19	-1.51	59.09	58.29
Tay Ninh	1.30	280.20	0.73	14.19	82.94	66.39	-0.66	51.53	50.98
Binh Duong	10.40	788.30	6.90	9.96	86.90	77.85	40.22	53.91	57.19
Dong Nai	10.30	506.30	2.43	14.97	84.70	81.47	7.95	51.86	58.56
Ba Ria Vung Tau	3.50	555.70	3.88	16.09	87.63	98.02	2.14	57.33	59.88
Ho Chi Minh	56.50	4 062.30	85.58	16.90	86.80	89.80	9.69	59.32	63.32
Long An	1.50	345.20	1.30	15.21	83.64	66.32	-1.29	48.28	47.41
Tien Giang	1.40	692.60	1.48	14.98	85.38	58.86	-1.06	50.30	49.98
Ben Tre	0.60	534.90	1.01	15.89	87.25	58.46	-5.48	40.03	39.60
Tra Vinh	0.20	436.60	0.64	13.76	83.98	48.31	-6.66	43.57	44.73
Vinh Long	0.5	682.10	1.31	17.07	86.64	51.06	-3.49	49.19	53.10
Dong Thap	0.80	490.60	0.77	14.39	92.23	57.37	-8.47	43.09	39.30
An Giang	0.30	589.00	0.94	13.18	87.31	56.09	-11.15	50.53	45.37
Kein Giang	0.80	276.50	0.83	12.72	86.02	58.84	-8.43	49.52	48.50
Can Tho	1.50	873.20	4.35	14.88	84.47	56.14	-1.12	45.62	52.74
Hau Giang	0.30	470.80	0.95	13.55	87.89	54.05	-9.43	49.08	52.78
Soc Trang	0.70	385.80	0.56	12.46	80.99	55.72	-11.10	44.68	48.90
Bac Lieu	0.80	345.10	0.52	11.85	81.99	46.13	-10.15	49.97	52.16
Ca Mau	0.30	231.20	0.55	13.45	82.64	61.22	-10.63	51.32	51.08

Appendix 4.B: Illustration of the provinces in Vietnam





Appendix 5.A: Average of the variables used for Indonesian provinces

Province	$fdi_{i,t}$	$gdp_{i,t}$	$gdp_{cap_{i,t}}$	$inf\_emp_{i,t}$	$wage_{i,t}$	$unemp\_rate_{i,t}$	$digital\_infra_{i,t}$	$house\_infra_{i,t}$	$school_{i,t}$
Aceh	102.85	154.73	29.63	61.76	14.81	7.06	21.01	57.73	0.99
Sumatera Utara	734.42	727.77	50.28	58.58	13.48	6.04	37.03	61.04	0.93
Sumatera Barat	195.42	223.00	41.27	65.76	14.66	6.01	61.58	68.59	0.92
Riau	392	731.93	111.34	57.20	16.20	6.28	59.06	61.45	1.02
Jambi	153.71	197.26	55.94	57.71	14.37	4.31	40.50	60.74	1.58
Sumatera Selatan	325.14	412.78	49.41	62.72	13.51	4.86	38.51	64.61	0.99
Bengkulu	67.28	65.39	33.33	71.76	14.93	3.75	25.49	67.76	1.32
Lampung	162.85	321.93	37.77	72.82	12.31	4.50	44.43	64.67	1.30
Kep Bangka Belitung	129.28	72.32	50.33	53.85	15.48	4.30	81.34	74.59	1.92
Kep. Riau	1 072.52	241.37	115.21	34.61	22.37	8.12	63.95	71.11	1.36
Jakarta	8 430.71	2 514.93	240.95	31.66	24.79	7.59	86.73	67.55	0.62
Jawa Barat	5 955.57	1 906.36	39.56	48.86	16.46	8.91	68.78	66.66	1.41
Jawa Tengah	1 250.71	1 238.43	35.42	63.02	11.15	5.07	44.73	72.31	2.62
Di Yogyakarta	256.57	127.01	33.90	57.23	13.06	3.64	73.05	74.20	2.20
Jawa Timur	1 917.42	2 121.24	53.33	63.16	12.45	4.57	48.76	68.18	3.89
Banten	2 436.85	589.68	48.01	46.86	20.63	9.13	65.17	66.96	1.68
Bali	2 047.14	216.11	50.48	51.47	15.60	2.76	69.61	77.32	2.84
Nusa Tenggara Barat	869.57	125.15	24.60	72.92	11.43	3.86	69.30	61.17	5.78
Nusa Tenggara Timur	250.57	96.23	18.11	78.41	13.65	3.48	24.56	44.35	3.70
Kalimantan Barat	448.14	191.01	37.50	59.84	14.73	4.84	35.81	62.68	4.08
Kalimantan Tengah	260.28	135.52	51.58	54.32	17.82	4.37	29.92	66.90	1.06
Kalimantan Selatan	170.28	166.59	40.52	62.72	16.15	4.76	36.01	73.15	1.38
Kalimantan Timur	451.57	599.51	165.28	42.35	21.10	6.91	51.16	66.48	1.33
Kalimantan Utara	65.57	85.41	123.35	42.94	20.44	5.08	37.62	74.92	2.10
Sulawesi Utara	196.28	118.03	46.94	57.61	17.65	7.06	31.88	73.33	0.52
Sulawesi Tengah	218.14	165.55	55.46	69.80	15.18	3.61	28.59	72.41	1.62
Sulawesi Selatan	268.14	449.78	50.96	65.60	16.35	5.42	46.05	76.74	4.24
Sulawesi Tenggara	128.85	115.52	44.20	63.65	17.89	3.82	22.31	77.79	2.44
Gorontalo	44.42	37.03	31.70	64.38	13.01	3.77	33.82	70.76	1.37
Sulawesi Barat	25.71	42.14	30.99	76.26	14.30	3.19	28.86	69.57	3.62
Maluku	41.28	42.18	23.76	66.52	18.07	7.77	32.49	67.78	1.11
Maluku Utara	36.98	36.98	29.89	70.72	17.47	4.95	24.97	65.76	1.04
Papua Barat	93.28	76.28	77.87	56.92	22.53	6.79	13.10	61.89	2.76
Papua	129.71	192.44	54.29	77.88	25.91	3.58	6.99	32.41	21.82

Appendix 5.B: Illustration of the provinces in Indonesia

