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Regional Concentration of FDI and Sustainable Economic Development

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Abstract

Foreign direct investment (FDI) plays a vital role in fostering sustainable economic development, particularly in emerging and post-conflict economies. Yet, the benefits of FDI inflows depend not only on the size of investment but also on how evenly it is distributed across regions. In the Kurdistan Region of Iraq (KRI), FDI inflows have grown considerably over the past two decades, remaining heavily concentrated, with 93% of total investment absorbed by the capital city, Erbil, and only 7% distributed across the remaining governorates. This study investigates the determinants of geographic imbalances in FDI inflows within the KRI. Drawing on a unique firm-level dataset from 2007 to 2021 and employing a negative binomial logit model, the results reveal that superior infrastructure, greater market accessibility, proximity to international borders, airport connectivity, and digital network penetration are significant drivers of FDI concentration. We suggest that such spatial inequality poses significant risks to inclusive and sustainable growth, threatening to entrench regional disparities and reduce resilience to economic and local political disruptions in the long term. To mitigate these issues, we recommend a regionally differentiated policy framework that includes targeted investment incentives tailored to local comparative advantages, strategic infrastructure upgrades in underdeveloped areas, strengthened investor protections, streamlined regulatory processes, and the establishment of investment promotion agencies (IPAs) to enhance investor engagement and aftercare. By diagnosing the causes of FDI concentration and offering actionable strategies, this study provides evidence-based insights for fostering balanced, inclusive, and sustainable economic development in the KRI and other post-conflict regions confronting similar challenges.

Keywords: FDI inflows; Kurdistan Region; spatial distribution; economic sustainability; logit model

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1. Introduction

Foreign direct investment (FDI) has been widely recognised as the fundamental engine of economic growth, structural transformation, and globalisation, especially in developing and transitional economies. FDI inflows not only facilitate the transfer of advanced technologies and managerial expertise but also generate new employment opportunities, enhance productivity, and foster integration into global value chains [1,2]. For less developed countries constrained by weak institutions and limited access to capital markets, FDI often provides a more stable and long-term source of external finance compared to volatile

aid or debt instruments [3,4]. International countries have pursued comprehensive reform agendas that encompass investment liberalisation, regulatory easing, and fiscal incentives to bolster their competitiveness in attracting foreign capital [5]. This tendency has been consistently documented in successive global investment reports, including evidence that over 85% of investment policy measures adopted in 2015 were geared toward liberalisation and promotion rather than restriction [6,7].

To date, a considerable body of empirical research has examined the influence of FDI on economic growth and development, although the findings still remain inconclusive. The nexus between FDI and growth appears to be contingent upon host-country conditions, with some studies reporting positive effects [8,9], others suggesting negative impacts [9] or indicating negligible or statistically insignificant results [10]. These discrepancies are often attributed to variations in institutional quality, human capital, technological readiness, and macroeconomic environments [9].

The Kurdistan Region of Iraq (KRI), an autonomous region situated in northern Iraq, operates under its governance framework, the Kurdistan Regional Government (KRG), which has distinct legislative, executive, and judicial authorities. Since the 2003 regime change in Iraq, the KRI has emerged as a primary destination for FDI, driven by its relative stability, abundant natural resources, and investor-friendly policies, particularly in the oil, real estate, and construction sectors. From 2011 to 2013, FDI inflows surged to approximately USD 7.01 billion (See https://invest.gov.krd, accessed on 10 May 2025). This upward trend positioned KRI as one of the leading destinations for foreign investment within Iraq, particularly in sectors such as real estate, manufacturing, tourism, and education. FDI inflows have displayed significant spatial disparities across governorates (see Table 1).

Table 1. Distribution of FDI inflows from 2007 to 2021.

Governorates Activities	FDI Inflows	%
Erbil	9,397,603,720	93.97
Sulaymaniyah	0.00	0.00
Duhok	605,012,459	6.05

Source: Own summary based on data collected from the KRI's Board of Investment. All values are in USD.

Erbil, the capital city, has attracted over 93% of FDI inflows, while Duhok accounts for only about 7%, and Sulaymaniyah has received virtually no FDI. The major FDI inflows originate from China (49.05%), followed by the United Arab Emirates (25.27%), Turkey (12.32%), Lebanon (10.31%), and the United States (1.16%). The remaining 1.87% is dispersed among various other countries (see Figure 1). Unlike countries such as China, where targeted regional incentives often guide FDI, the KRG's investment law prohibits the use of differentiated tax rates or tariff structures across governorates. Therefore, there is no publicly available evidence suggesting that Erbil benefits from any specific preferential treatment beyond what is provided under the general investment law.

Prior studies have extensively investigated the consequences of uneven spatial distribution of FDI in the context of other countries, which may pose a critical threat to their long-term economic sustainability and exacerbate existing regional inequalities. Some scholars argue that FDI can entrench disparities and marginalise local capacities [11], whereas others contend it can facilitate convergence, reduce poverty, and foster inclusive growth [12]. Others suggest that FDI itself is not inherently responsible for regional disparities, but rather that uneven distribution contributes to asymmetric growth outcomes [13]. Due to data limitations, this study is not able to examine the consequences of uneven FDI distribution. Instead, we focus on examining the spatial distribution and heterogeneity of inward FDI across the region by analysing the location-specific determinants that drive

investment decisions. Understanding these spatial drivers is important for informing balanced regional development strategies and ensuring that FDI contributes more equitably to economic growth and development across regions.

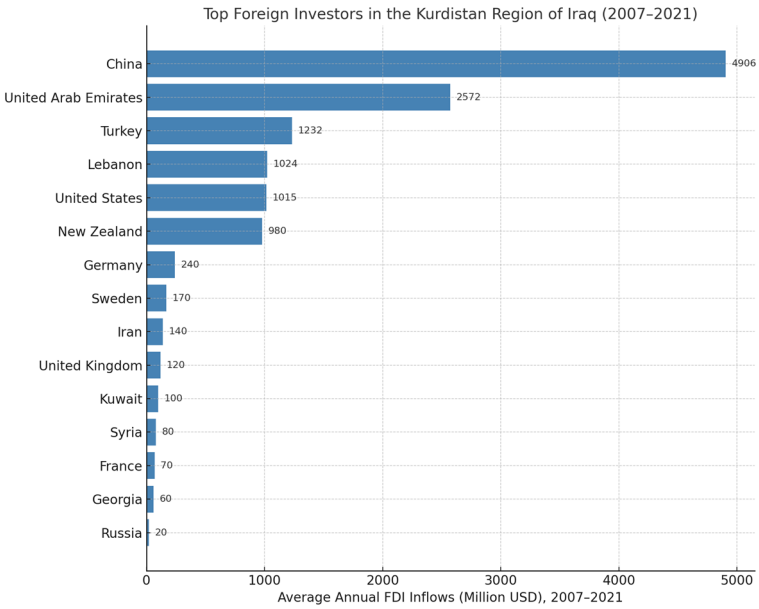

Figure 1. FDI in KRI in million USD, 2007–2021.

Using unique, hand-collected firm-level data from 2007 to 2021, our results show that several location-specific factors, such as infrastructure quality, market access, and proximity to international borders, significantly determine FDI inflows. Further analysis reveals that airport connectivity and mobile network penetration are additional critical drivers of FDI concentration. Our results are aligned with the existing body of literature that investigates the uneven spatial distribution of FDI [13]. Three main strands of the prior research are particularly relevant here. First, our findings align with prior studies arguing that inward FDI can worsen regional inequalities by concentrating in more developed, urbanised regions with superior infrastructure and stronger institutional capacities [14,15]. Our results support this perspective in Erbil, with greater connectivity, especially via airports and improved infrastructure, which received the majority of inward FDI inflows. This suggests that foreign investments tend to reinforce pre-existing regional advantages.

Second, prior studies also suggest that FDI, if properly managed, can promote regional economic convergence and reduce income disparities [16]. While our study does not examine the specific outcomes of FDI (e.g., poverty reduction or income convergence), our findings do not contradict this literature strand. Instead, they emphasise the importance of enabling factors, such as transport and telecommunications infrastructures, that can help less-developed cities attract FDI and potentially share in its developmental benefits.

Third, and most directly aligned with our study, is the perspective that FDI itself does not inherently create regional disparities; rather, it is the spatial heterogeneity in underlying economic fundamentals that determines where FDI flows [17,18]. The assembled empirical evidence reinforces this position. By identifying location-specific characteristics, especially those related to market accessibility and infrastructure, as the key drivers of FDI concentration, our findings suggest that it is the uneven distribution of these foundational assets, rather than FDI itself, that drives spatial divergence.

Our study contributes to the empirical literature on spatial determinants of FDI by offering micro-level firm evidence over a relatively long 15-year period. This long-term, high-resolution dataset allows us to observe persistent patterns in location choices that may

be less visible in cross-sectional or country-level datasets. Our identification of significant locational determinants yields novel empirical evidence and provides support for the growing importance of mobility and information access in multinational firms' investment strategies, an area that is gaining increasing attention in the recent literature but still remains under-explored in many spatial FDI studies.

Taken together, these insights underscore the importance of targeted policy interventions aimed at upgrading regional infrastructures and improving market access in lagging behind areas to ensure more balanced investment flows and support long-term regional development.

The paper proceeds as follows: Section 2 reviews the relevant literature and contextualises the KRI's Investment Law. Section 3 outlines the research methodology and the analytical framework. Section 4 presents and discusses the empirical findings. Section 5 discusses the limitations of the employed approach, proposes potentially fruitful avenues for future research and concludes with key policy recommendations.

2. Literature Review

In recent decades, inward FDI has expanded rapidly across the globe, prompting intensified research efforts to identify the key economic factors driving FDI activity. The Ownership, Localisation, Internalisation (OLI) framework clarifies the motives behind foreign investment [19]. The first factor is the ownership advantage, which explains that firms invest abroad because they possess specific advantages that can be leveraged in international markets. These may include proprietary assets, superior production technologies, well-established brand reputation, accumulated management expertise, or specialised know-how. The second factor is the location advantage, which refers to the attractiveness of a particular location for FDI. These factors include natural resources, market size, strategic position, and political stability. These location-specific factors influence firms' decisions to invest in foreign markets. Lastly, the internalisation advantage suggests that firms prefer FDI over other modes of entry, such as licensing or joint ventures, when it is more cost-effective to maintain control of operations in a foreign market. By internalising operations, firms can avoid transaction costs and mitigate risks associated with legal and regulatory uncertainties. Taken together, these factors provide a comprehensive explanation of how firms decide to invest abroad.

In line with the OLI framework, the formal Knowledge Capital Model (KCM) is developed, which argues that MNEs invest abroad primarily for both market-seeking and efficiency-seeking reasons [20,21]. Market-seeking investment, typically associated with horizontal FDI, involves firms establishing production facilities in foreign markets to eliminate the costs of exporting. In contrast, efficiency-seeking investment, linked to vertical FDI, involves firms optimising production costs by dispersing production processes across countries according to their comparative advantages, particularly related to cross-country differences in relative human capital endowments.

While Dunning's original OLI framework still remains influential, the modern theory of globalisation has further refined it in the context of evolving global production structures. In particular, it introduces the concept of the "second unbundling," [22], whereby advances in digital communication and logistics technologies have enabled firms to offshore specific tasks rather than entire production processes to countries with cost or skill advantages [23]. This task-based fragmentation of global value chains has contributed to what is termed the "Great Convergence," as developing countries integrate into international business networks not by replicating full industries but by specialising in modular production or service tasks outsourced by multinational enterprises [22]. This change reframes location advantages: rather than competing solely on macroeconomic conditions or infrastructure,

countries must demonstrate micro-level readiness, such as skilled labour pools, digital infrastructure, and regulatory efficiency, to plug into these unbundled global value chains. As such, Baldwin's new theory of globalisation moves beyond earlier spatial models, including Krugman's New Economic Geography [24], by highlighting how production tasks migrate, not just capital or factories.

The international economics literature has extensively investigated the determinants of inward FDI [25,26]. In developed countries, several key factors have consistently emerged as significant indicators of FDI inflows, including market size, trade openness [27], and good governance [28]. In emerging markets, market size remains a critical determinant, alongside other factors such as bilateral investment treaties (BITs), geographic proximity (contiguity), a shared language, and historical ties such as a common coloniser factor, which is particularly relevant in the context of FDI in the Gulf Cooperation Council (GCC) region [29]. More focused regional analyses have also highlighted additional economic indicators, such as economic freedom, ease of doing business [30], and political and government stability, as important determinants of FDI attraction [31,32].

Although most empirical studies on FDI concentrate on national-level trends, this focus is largely due to the limited availability of disaggregated subnational data. Regional-level analyses offer more granular insights into spatial distribution patterns, as inward FDI is rarely dispersed evenly across countries [29]. A growing body of research has highlighted this intra-national variation, showing that regional disparities in FDI inflows can be more pronounced than cross-country differences. Recent research on Central and Eastern Europe has provided additional insights on FDI determinants, including Poland, identifying both horizontal and vertical investment motives as key factors [2,33–35]. Recent analyses of the determinants of outward FDI from the UK, employing Bayesian Model Averaging (BMA) to investigate FDI in the EU, highlight the significance of relative market size and factor endowments [36].

In emerging markets, studies investigate the determinants of FDI using panel data from the MENA region [28]. Beyond traditional determinants of inward FDI, studies also identified several additional factors affecting foreign investment, including small market size, limited economic integration, and inadequate trade reforms [37]. However, the challenge of stimulating inward FDI in the KRG has so far received very little academic and policy attention. In 2006, the Kurdistan Region enacted a comprehensive Investment Law, designed to diversify the economy, attract foreign capital, and enhance regional sustainability. The law offered generous incentives, including tax incentives of up to ten years, exemptions from customs duties, land allocation for strategic projects, and full foreign ownership rights, to create a more investor-friendly climate. Despite these measures, questions remain about the law's effectiveness in overcoming structural constraints, such as political instability, limited infrastructure in certain governorates, and regulatory inconsistencies, which continue to shape the spatial distribution and volume of FDI. Further, FDI inflows remain disproportionately concentrated among the governorates. Prior studies emphasise the importance of understanding local factors to foster investment in the region [38]. Other studies [39] assess the sectoral distribution of FDI in the KRI, particularly in non-oil sectors, and propose fiscal and cashless policies to enhance investment [40].

Despite this growing scholarly interest in the determinants of FDI, much of the existing literature remains heavily focused on destination-specific factors such as market size, infrastructure, and labour costs while paying insufficient attention to origin-specific variables and intervening opportunities, especially within subnational contexts. This narrow focus tends to overlook important spatial interdependencies between FDI source and recipient regions, potentially leading to biased or incomplete estimates when origin–region characteristics are excluded [41,42]. Addressing this gap, the present study utilises a unique panel

dataset spanning 2007 to 2021 to examine the determinants of FDI inflows, with a focus on firm-level heterogeneity and sectoral characteristics [43,44]. This approach allows us to analyse how the interaction between investor origin, firm type, and regional characteristics shapes FDI patterns at regional level. Table A1 in the Appendix A provides firm-level data used in the current study.

We employ Poisson and negative binomial (NegBinII) models, advancing methodological approaches in the field. These techniques offer more robust estimates for skewed and zero-inflated data, thereby complementing previous work that relies heavily on traditional static models such as ordinary least squares (OLS). Finally, the study extends the debate on the uneven distribution of FDI by examining the role of foreign policy frameworks in this context. This could provide policy-relevant insights into how spatial equity in terms of foreign investment can enhance the environmental and economic dimensions of sustainability. Our findings are particularly relevant for other post-conflict or resource-rich regions with similar governance and development challenges. Ultimately, this study contributes to a more comprehensive understanding of FDI dynamics and offers policy-relevant guidance for fostering spatially inclusive and sustainable development through FDI.

2.1. Inward FDI's Investment Incentives

FDI in Iraq has fluctuated considerably over the past two decades due to political instability, security concerns, shifts in global oil markets and the political escalation with the central Iraq government. However, following the 2003 regime change and subsequent economic liberalisation efforts, Iraq began to attract increasing levels of FDI. Between 2004 and 2012, FDI inflows peaked at USD 3.4 billion in 2012 (about 1.6% of GDP), following the post-2003 economic opening. However, starting in 2013, net FDI inflows turned negative and declined further, reaching around −USD 5.27 billion in 2023 (nearly −2.1% of GDP). While the oil and gas sector remains the main driver of foreign investment, greenfield investments also surged to close to USD 24 billion in the first nine months of 2024, more than doubling the previous annual peak recorded in 2008.

The Kurdistan Region is constitutionally a semi-autonomous region in the northern part of Iraq [45,46]. In September 2017, the Kurdistan Regional Government held an independence referendum, with over 93% of the voters casting ballots in favour of secession from Iraq. However, due to strong international opposition, including from the US, Turkey, and Iran, independence was not declared [47]. This region comprises three formal governorates: Erbil, Sulaymaniyah, and Duhok [48]. In April 2025, Halabja was officially recognised as the 19th province of Iraq, and the KRG acknowledged it as the fourth governorate within the region. As our dataset does not include any FDI activity recorded in Halabja, we were unable to analyse this area. This limitation is acknowledged and highlighted in the study. As a federal region of Iraq, KRG spans an area of approximately 40,643 square kilometres. The region had an estimated population of 6.37 million in 2024, representing roughly 14% of Iraq's total population. The population is ethnically and culturally diverse, with Kurds forming the majority, alongside Arabs, Assyrians, Chaldeans, Turkmen, and Armenians. The region is also home to multiple religious communities, including Muslims, Christians, and Yazidis, reflecting its multicultural and multi-faith identity. Kurdish is the primary languages, although Arab, Turkmani and other minority languages are also spoken. The economy operates with the Iraqi Dinar (IQD), maintaining an average exchange rate of 1300 IQD per USD during the study period.

In July 2006, the KRG introduced the new investment law (see a detailed explanation of investment law: https://presidency.gov.krd/krp/uploadedforms/_InvestmentLaw_en.pdf, accessed on 3 January 2024). The main aim has been to increase non-oil revenues by attracting FDI. The new investment law encompasses general provisions, exemptions

and obligations, investment hierarchy and licensing, as well as arbitration for foreign investment in the region. The KRG offers various incentives based on this investment law. The law provides tax and import duty exemptions for FDI projects lasting over ten years, as well as tax and duty exemptions for investment equipment, including machinery and vehicles. Moreover, the law provides legal guarantees for foreign investors, ensuring equal treatment with domestic businesses. Additionally, it promises to allocate plots of free land for FDI investments while prohibiting land allocation for the extraction of oil, gas, and expensive heavy mineral resources. Finally, the law permits unrestricted profit and capital transfers to investors' home countries (Board of Investment, Law of Investment in Kurdistan Region, 2021). These factors are intended to motivate foreign firms to invest in the KRI.

Inward FDI in the KRI is located in three governorates: Erbil, Sulaymaniyah, and Duhok. Notably, as a capital city, Erbil attracts the majority of FDI, particularly in sectors such as tourism, housing, and banking. At the same time, Duhok and Sulaymaniyah receive comparatively less foreign investment. The FDI inflows come from both neighbouring and more remote countries. The main foreign investor in the KRI is China, which alone accounts for nearly half of the total FDI (49.05%), followed by the UAE (25.27%), Turkey (12.32%), Lebanon (10.31%), and the United States (1.16%). Figure 1 shows the FDI inflows in the KRI from 2007 to 2021 (Board Investment of Kurdistan). Table A1 in Appendix A provides firm-level data applied in the current study.

Figure 1 illustrates the major foreign investor countries in the Kurdistan Region of Iraq (KRI) from 2007 to 2021. China emerges as the leading investor in terms of equity, followed by the United Arab Emirates. Other significant investor countries include Turkey, Lebanon, the United States, New Zealand, Germany, Sweden, and Iran. Russia has invested lower FDI than other countries in the region. Source: Own calculation based on hand collected data from the KRI's Board of Investment.

2.2. Inward FDI in the Kurdistan Region Versus Other Countries

Many countries have made significant liberalisation reforms in recent years, recognising the positive role of FDI in economic growth and development, job creation, managerial skills, and technology transfers. For instance, in 2016, Jordan revoked a minimum capital requirement imposed on foreign investors and expanded the sectors open to full foreign ownership. In 2019, restrictions in some service sectors were further eased. In North Africa, Tunisia removed the requirement for foreign investors to receive approval for equity stakes exceeding 50% of a firm's capital in 2016. In 2020, Algeria ended its most substantial restriction, a cap on foreign equity of 49% in all sectors. Many countries in other parts of the world, such as Chile, Guatemala, Georgia, and Montenegro, have allowed foreign ownership in all major sectors of their economies [49]. At the same time, however, several countries restricted FDI in specific sectors of their economies due to monopolistic market structures or national sensitivities. For example, Mauritius limited FDI (as well as all private investment) in nationalised sectors such as electricity transmission and distribution, waste management and recycling, and port and airport operations. China limits FDI in media and defence for political and national security reasons.

According to the OECD, the EU member states are generally more open to FDI than other countries. Among non-OECD countries, Chile and Argentina are among the most open, while India, China, and Russia are among the most restrictive. The most restricted sectors include electricity, transport, telecommunications, and finance. Sectors such as manufacturing, tourism, construction, and distribution are the least restricted sectors.

Compared to the aforementioned countries, the KRI's FDI policies are quite liberal and welcoming in all sectors. According to the new investment law of the KRI, foreign investors

are free to invest in all sectors except some formal restrictions on energy sectors, subject to approval from the Board of Investment. These sectors include manufacturing, agriculture, scientific and technological research, information technology, modern transportation and telecommunications, banks, insurance companies, infrastructural investments, and education. However, the new KRI investment law still does not permit foreign investors to own land that contains oil and gas (KRI Investment Law, Article 19). There are foreign companies, such as Turkish, British, and Russian companies, that have previously invested in the oil and gas sectors, but they were not granted land ownership. Instead, the lands were assigned for exploration with long-term leasing contracts.

The KRI's new investment law, which went into effect in 2006, was designed to increase non-oil revenue and attract FDI investments to boost the development of its economy. The investment law provides various incentives for foreign investment, as discussed in the previous section. Additionally, the KRG has implemented new business policies to reduce entry barriers and enhance the investment climate.

2.3. Spatial Patterns of Firm Location in the Kurdistan Region

Data availability has been a major challenge in conducting empirical studies in the KRI. To obtain FDI data, we conducted an in-person visit to the Kurdistan Board of Investment in 2021. During this visit, we collected data on all foreign firms that invested in the region between 2007 and 2021. The typology of FDI in KRI includes small, medium, and large international firms. Accordingly, we classify foreign firms into four categories: (i) micro-firms, (ii) small firms, (iii) medium-sized firms, and (iv) large firms. Firm size is measured based on the amount of allocated land, expressed in square kilometres. Under the new KRI Investment Law of 2005, foreign investors are entitled to receive plots of land free of charge, with the allocation determined by the size of their equity investment. In particular, micro-firms with equity between USD 1000 and 1 million are entitled to receive a land allocation of 0.5 to 5 square kilometres; small-sized firms with equity between USD 1 million and 250 million are entitled to receive 5 to 10 square kilometres; medium-sized firms with equity between USD 250 million and 500 million are entitled to receive between 10 and 20 square kilometres; and large-sized firms with equity over USD 500 million are entitled to receive 50 square kilometres.

The KRI regional distribution of FDI firms belonging to each of these four groups is distributed among three governorates. To study the changes in the location pattern of foreign firms across KRI governorates, we adopt the Herfindahl–Hirschman Index (HHI). This approach is applied in the prior literature [36] and used to study the regional distribution of firms with foreign capital in Poland, using a standard measure of market concentration, i.e., the regional version of the HHI. This index can be calculated according to the following formula:

$$H = \sum_{i=1}^{N} s_i^2 \quad (1)$$

where s_i represents the proportion of firms from region i in the total number of firms belonging to a particular size category, and N stands for the total number of regions in the country. The index varies between 1/N and 1. As outlined by the US Department of Justice (2010), the HHI's interpretation is as follows: A value below 0.15 suggests no concentration, between 0.15 and 0.25 indicates moderate concentration, and above 0.25 indicates high concentration.

Table 2 shows the changes in the HHI index for each firm category during the 2007–2021 period. It is displayed that in 2007, the calculated values of the HHI were below 0.15 for micro- and medium-sized firms, while small-sized firms and large firms had values of 0.20, indicating moderate concentrations. The highest concentration for micro-firms

is reported between 2012 and 2014. Large firms dominate the group, with the highest concentration between 2011 and 2014.

Table 2. Changes of the HHI index from 2007 to 2021 by firm group.

Firm Size Year	Micro Firms	Small Firms	Medium Firms	Large Firms	All Firms
2007	0.12	0.20	0.09	0.20	0.61
2008	0.08	0.15	0.09	0.10	0.42
2009	0.04	0.07	0.09	0.20	0.40
2010	0.04	0.07	0.18	0.30	0.59
2011	0.04	0.20	0.27	0.40	0.23
2012	0.24	0.33	0.36	0.40	1.33
2013	0.18	0.17	0.36	0.20	0.93
2014	0.20	0.17	0.09	0.16	0.62
2015	0.20	0.07	0.12	0.16	0.55
2016	0.08	0.09	0.01	0.16	0.34
2017	0.04	0.9	0.15	0.16	1.25
2018	0.16	0.12	0.13	0.16	0.57
2019	016	0.13	0.14	0.10	0.53
2020	0.16	0.15	0.14	0.10	0.55
2021	0.16	0.15	0.14	0.10	0.55

Source: Own calculations based on the data received from KRI's Board of Investment.

3. Research Design

3.1. Model Selection

Our study employs the Poisson and negative binomial (NegBinII) estimators for sample analysis. Given the substantial number of regions with zero FDI entries, the Poisson model offers a reliable estimation method. A recent study applies the NegBinII model to allow for greater flexibility in variance structure and uses it to assess robustness [50]. This model is particularly effective in handling overdispersion common in firm location data, where the number of firms varies dramatically across cities, and does not require partitioning the choice set or strict IIA adherence. Instead, it allows for direct modelling of the frequency of firm entries in each region as a function of site-specific explanatory variables [50]. Thus, the NegBinII model provides a flexible and empirically grounded approach for examining spatial variation in FDI firm locations, particularly when dealing with a large number of small, heterogeneous geographic units.

3.2. Analytical Framework and Statistical Methodology

Following the previous studies [51,52], we study the uneven spatial distribution of foreign firms in the KRI. These studies suggest that MNEs select their locations considering a range of factors that affect both their revenues and costs. Higher product prices and regional productivity parameters positively impact firm profits, influencing location decisions through both direct channels, such as increased sales revenues, and indirect channels. Contrarily, higher factor prices have a negative influence on the location of foreign firms because they increase production costs and reduce the number of specialised input suppliers in the region.

Prior studies have empirically investigated location choice, which has traditionally followed a conditional logit model, a statistical approach that has been identified as more promising for studying firm location. Hence, we turn to Poisson and the negative binomial models. Such models were commonly employed to study the determinants of foreign firm locations across various economies, including the US, Poland, Portugal, and the

Philippines [53–55]. Such studies employ consistent methodologies, ensuring a degree of comparability across different regions.

In our study, the dependent variable is the number of operational foreign firms in each region. This variable comprises non-negative integer numbers. Hence, we employ the Poisson regression model. In this model, the number of firms y_i operating in the i-th region is assumed to follow a Poisson distribution with the parameter λ_i, which is associated with the vector of regressors x_i. The probability of observing a count of operational foreign firms in the i-th region, y_i, is expressed as follows:

$$\Pr\left(y_i|x_i\right) = \frac{e^{-\lambda_i \lambda^{-y_i}}}{Y_i}, y_i \;=\; 0, 1, 2, \ldots, N. \tag{2}$$

where λ_i is assumed to be log-linearly dependent on the vector of explanatory variables x_i that stand for regional characteristics:

$$\text{Ln}\ \lambda_i \;=\; \beta' x_i \tag{3}$$

where β stands for a vector of coefficients on explanatory variables that need to be estimated. The key assumption of the Poisson model is that the first two moments are equal to λ_i.

$$\text{E}\left[y_i|x_i\right] = \text{var}\left[y_i|x_i\right] = \lambda_i \tag{4}$$

This assumption is recognised as a notable drawback of the Poisson model, as count data frequently exhibit overdispersion, where the conditional variance often exceeds the mean. In response to this challenge, several alternatives have been proposed in the statistical literature. Among these is the negative binomial model (NegBinII) [56]. This model serves as a generalised version of the Poisson model, integrating an individual unobserved effect, labelled as ε_i, into the conditional mean.

$$\text{Ln}\ \lambda_i \;= \beta' x_i + \varepsilon_i, \tag{5}$$

where ε_i can be interpreted as a specification error and some cross-section heterogeneity with exp (ε_i) having a gamma distribution with unit mean and variance α. In the NegBinII model, the anticipated value of y_i is identical to that in the Poisson model. However, there is a distinction in the variance, which exceeds the mean:

$$\text{var}\left[y_i|x_i\right] = \text{E}\left[y_i|x_i\right]\{1 + \alpha\,\text{E}\left[y_i|x_i\right]\}. \tag{6}$$

The NegBinII model reduces to the standard Poisson model when the estimated parameter a_i is not different from zero. In our study, we estimated both the Poisson and NegBinII models. However, in the majority of specifications, the estimated parameter a_i was different from zero. Hence, we only present the regression results for the NegBinII model. The model was estimated using cluster-robust standard errors with clustering on regions. Except for the dummy variables, we use logarithmically transformed variables.

3.3. Data

The dependent variable in our study is the number of foreign firms in each province for a given year. The data was hand-collected and received from the Kurdistan Board of Investment, covering the period from 2007 to 2021. It includes information on the governorates of Erbil, Sulaymaniyah, and Duhok. We classify foreign firms into four groups (micro-firms, small firms, medium-sized, and large firms) [51].

As we mentioned earlier, the majority of the region's environmental factors are not available in any databases, including the regional GDP. Therefore, we measure the market

potential, a critical factor for FDI, according to theoretical models of firm location, using regional population data. The market potential variable is calculated using the following general formula:

$$Marketpotential_{it} = \left[\sum_{j \neq i} \frac{Population_j}{Distance_{ij}}\right] \quad (7)$$

where $Population_j$ is a proxy for the size of the market and $Distance_{ij}$ is the geographic distance between the cities and the capital city. Distance inversely affects market potential, as regions farther away contribute less to the overall market potential.

The market potential index indicates the accessibility of economic activity around a governorate. Regions with higher scores are likely to have better access to consumers and specialised suppliers and hence are more attractive to foreign investors.

To illustrate how we calculate regional market potential for a specific region—Erbil—we use the following equation:

$$MP_{\ Erbil} = \frac{Population_{Sul}}{Distance_{Erbil\ to\ Sul}} + \frac{Population_{Duhok}}{Distance_{Erbil\ to\ Duhok}} \quad (8)$$

To account for the differences in trade costs that may affect FDI location, we measure the influence of national borders on economic interactions, which has garnered significant attention in the recent economic literature. The term "border effect" commonly refers to the adverse impact of national borders on investment volumes between adjacent regions of different countries. Typically, the existence of these effects is attributed to factors such as tariffs, transport costs, regulatory disparities, differences in information costs, high elasticity of substitution between imports and domestic goods, and, more recently, the spatial clustering of firms. We account for national border effects by including a set of dummy variables that indicate borders with neighbouring countries (1 if neighbouring, zero otherwise).

Moreover, physical infrastructure stocks, such as roads, railways, airports, and telecommunications infrastructure, can also affect the costs of doing business and may be important for firm location choices. Therefore, to proxy for telecommunications infrastructure and GDP, we use the number of mobile subscriptions from World Bank data, as Kurdistan is a region not included in the World Bank Database. Additionally, we also control transportation infrastructure using road and railway network densities. Moreover, we control for regional international airports that may be important for attracting foreign firms by constructing a dummy variable for an international airport in a region (1 if present, and zero otherwise). Finally, we also control for the availability of key factors of production, such as capital and labour, that may be crucial for firms' location choices in Iraq. Data on these variables are sourced from the World Development Indicators. In addition, considering the importance of GDP per capita in influencing firm location decisions, we also include this variable, with data obtained from the World Development Indicators [57]. These variables have been widely investigated in prior studies [58,59].

Although this may raise concerns about measurement error, it is important to note that KRI operates within Iraq's broader economic framework, receiving its budget allocation from the central government. A significant proportion of the KRI population, approximately 20%, relies on public sector salaries funded by Baghdad, suggesting some level of economic integration. Equally, mobile network access is regulated at the national level, and citizens in both KRI and the rest of Iraq have comparable access to telecom services.

4. Empirical Results

4.1. Descriptive Statistics

Table 3 summarises the descriptive statistics for the variables used in the study. The total number of observations is 223 country-year observations covering sizes, geographic factors, and infrastructure. The mean number of micros, small, medium-sized, and large firms vary, with large firms averaging the highest (11.939) and micro-firms the lowest (4.369). Geographic factors include proximity to borders (e.g., 35.9% near any border, 33.6% near the Syrian border, 24.2% near the Turkish border, and 11.2% near the Iranian border). Economic indicators include GDP (8.502) and labour force metrics (3.768). Market potential scores average 7.236, while mobile subscriptions (76.537) and infrastructure indicators (e.g., airports and transportation) reflect diverse accessibility and economic activity.

Table 3. Descriptive statistics.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Micro-firms	223	4.369	0.404	1.071	9.236
Small firms	223	8.647	0.192	5.433	49.172
Medium-sized firms	223	6.847	0.315	9.071	50.172
Large firms	223	11.939	0.374	1.041	350.2
Border	223	0.359	0.481	0.000	1.000
Syria border	223	0.336	0.474	0.000	1.000
Turkey border	223	0.242	0.429	0.000	1.000
Iran border	223	0.112	0.316	0.000	1.000
Capital	223	13.35	0.415	12.766	13.687
GDP	223	8.502	0.256	7.72	8.797
Labour	223	3.768	0.016	3.726	3.802
Market potential	223	7.2361	2.138	2.654	8.796
Mobile subscriptions	223	76.537	11.976	48.921	93.604
Airport	223	0.664	0.474	0.000	1.000
Transportation	223	13.706	0.53	13.074	15.387

Note: Table 3 summarises descriptive statistics for the sample variables applied in the study. The total number of observations is 223 country-year observations covering sizes, geographic factors, and infrastructure. The mean number of micros, small, medium-sized, and large firms varies, and the firm-level data have been obtained from the Board of Investment of Kurdistan.

Table 4 presents a correlation matrix that highlights the relationships between firm sizes, border-related variables, and economic and infrastructure factors. We have observed negative correlations between micro, small, and medium-sized firms. Borders show varying correlations with economic variables. A weak positive relationship exists between the Turkey and Syria borders (0.283), but negative associations are observed with GDP and mobile usage. Capital and market capitalisation demonstrate a strong positive correlation (0.879), indicating synergy between financial and investment infrastructure. Mobile technology is positively linked to GDP (0.656), reflecting its significant economic impact, while transportation exhibits mixed effects, with a negative relationship to GDP (−0.530) but a moderate correlation with labour (0.305). These results highlight the multifaceted interplay of regional, firm-level, and economic factors.

Table 4. Pairwise correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Micro-firms	1.000													
Small firms	−0.492	1.000												
Middle firms	−0.390	−0.402	1.000											

Table 4. *Cont.*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Large firms	−0.245	−0.253	−0.101	1.000										
Border	−0.117	0.061	0.101	0.001	1.000									
Syria border	−0.038	0.199	−0.088	−0.137	−0.104	1.000								
Turkey border	0.139	−0.093	0.040	−0.097	0.070	0.283	1.000							
Iran border	0.141	−0.130	−0.067	0.097	−0.113	0.108	0.336	1.000						
Capital	−0.003	−0.003	−0.002	0.010	−0.010	0.276	0.182	−0.108	1.000					
GDP	0.112	−0.067	−0.071	−0.017	0.072	−0.373	−0.116	−0.279	−0.013	1.000				
Labour	0.165	−0.164	0.006	−0.016	0.093	0.025	0.294	0.319	0.010	−0.159	1.000			
Market potentials	0.006	0.065	0.054	−0.018	−0.02	0.057	0.053	0.156	0.079	−0.018	0.002	1.00	0	
Mobile	0.119	−0.156	−0.033	0.066	0.143	−0.551	−0.312	−0.106	0.005	0.656	0.182	1.000		
Airport	0.004	0.005	0.004	−0.018	−0.002	0.357	0.253	−0.156	0.879	−0.018	0.002	−0.007	1.000	
Transportation	0.019	−0.107	−0.019	0.150	−0.249	−0.026	−0.325	0.124	0.018	−0.530	0.305	0.203	−0.026	1.000

Note: Table 4 presents a correlation matrix highlighting the relationships between firm sizes, border-related variables, and economic and infrastructure factors.

4.2. Main Results

This section presents and interprets the estimation results. Table 5 presents the baseline estimates of the negative binomial model, which includes controls for the overall border effect. The dependent variables in Table 5 are the number of firms differentiated by firm size. They are categorised into micro-firms in columns (1,2), small firms in columns (3,4), medium firms in columns (5,6), and large firms in columns (7,8), with controls for individual time effects. However, the majority of estimated parameters appear statistically not significant. The overall border effect is found to be statistically significant for micro-firms (−0.870; p-value < 0.10). Such results are in line with pioneering work that found that distance reduces investment between countries [60].

Table 5. Benchmark estimation results, 2007–2021.

Variable	Micro-Firms		Small Firms		Middle Firm Sizes		Large Firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Border	−0.870 *	-	−0.590	-	0.110	-	−0.470	-
	(2.550)	-	(−1.770)	-	(0.500)	-	(−0.311)	-
Syria border	−2.790	0.034	1.630	−0.750	1.184	−1.182	1.210	−0.170
	(0.240)	(0.131)	(0.141)	(0.210)	(−0.801)	(−0.840)	(0.430)	(−0.301)
Turkey border	0.330	0.029	−2.020 **	−1.200 **	0.866	0.863	−1.120	−0.900
	(0.401)	(0.031)	(2.730)	(3.210)	(1.575)	(1.570)	(−0.240)	(−0.230)
Iran border	0.059	0.019	−0.960 *	0.610	(0.340)	(0.341)	1.660	−0.340
	(0.110)	(0.020)	(2.220)	(1.580)	(−1.061)	(−1.060)	(1.011)	(−0.890)
Capital	3.000	2.003	0.371	0.300	0.123	0.120	0.412	0.201
	(0.480)	(0.322)	(0.742)	(0.320)	(2.131)	(2.131)	(0.513)	(0.342)
GDP	4.801	10.601 ***	10.823	7.590	2.510	2.513	0.984	−0.013
	(1.881)	(1.510)	(0.480)	(1.730)	(−1.710)	(1.710)	−0.105	(0.451)
Labour	6.062	5.820 ***	4.470	5.310 **	−14.110	−14.111	−0.405	−0.010
	(1.830)	(−0.871)	(0.390)	(3.120)	(−1.340)	(−1.303)	−0.220	−0.240
Market potential	0.141	0.190	1.053 ***	0.041 **	0.340 ***	0.530 **	0.061 ***	0.340 ***
	(0.060)	(0.980)	(0.700)	(0.600)	(0.010)	(0.412)	(0.130)	(0.020)
Mobile subscription	−1.703	0.991 ***	1.050	2.440 ***	2.440 *	2.440 *	2.120	0.180
	(−0.550)	(0.720)	(0.740)	(0.661)	(2.120)	(2.122)	(0.531)	(0.150)
Airport	0.773	0.020	0.410	0.300	1.591	1.593	−3.434	0.372
	(0.271)	(−0.010)	(−0.150)	(0.330)	(0.810)	(0.810)	(−0.440)	(0.170)
Transportation	1.790	0.111 ***	0.790	3.250	0.770	0.771	−0.890	0.690
	(1.630)	(0.443)	(−1.500)	(2.430)	(−1.670)	(−1.672)	(−0.711)	(0.632)
_cons	642.601	6778.501	262.700	1095.40	−582.201 *	−582.201 *	−555.4000	452.60
	(−0.720)	(−0.791)	(0.710)	(0.800)	(−1.970)	(−1.972)	(−0.43)	(−0.720)
Lnalpha	(0.730)		0.880 ***		0.281 *		(35.300)	
	(−1.750)		(6.630)		(2.551)		(2.505)	
No. observations	223.000	223.000	223.000	223.000	223.000	223.000	223.000	223.000
Time effect	No	Yes	No	Yes	No	Yes	No	Yes
Number of clusters	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
Pseudo R2	0.315		0.044		0.094		0.607	
Log likelihood	(125.691)		(412.989)		(624.243)		(23.504)	

Source: Robust standard errors are in parentheses with significance at the *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$ levels.

Moreover, the border estimation coefficients for neighbouring countries Syria and Iran do not exhibit any statistically significant association with foreign investment, implying that the border has no impact on foreign investment concerning these neighbouring countries. However, the results show a negative association between the Turkish border and foreign investment (2.020; p-value < 0.050). The estimation coefficients for labour and GDP are statistically significant at the 1% level, suggesting that access to labour and country GDP per capita encourage foreign FDI, but only for micro-firms. The estimation coefficient of market potential is statistically significant for all firm types except micro-small firms. Additionally, mobile subscriptions are statistically significant, suggesting that they, along with transportation infrastructure, play a significant role for micro-firms. However, the airport variable does not impact the location decisions of other firm types, and the proximity of transportation matters only for micro-firms. The estimated parameters for the remaining variables are either not statistically significant or exhibit signs that are outside the initial expectations.

In Table 6, we investigate whether the determinants of FDI differ between KRI locations (i.e., Erbil, Sulaymaniyah, and Duhok). Columns 1–4 examine FDI determinants in Erbil governorate, columns 5–8 examine FDI determinants in Sulaymaniyah, and columns 9–12 examine FDI determinants in Duhok.

Table 6. Estimation results of border effects, 2007–2021.

		Erbil				Sulaymaniyah				Duhok		
Variable	**Micro (1)**	**Small (2)**	**Medium (3)**	**Large (4)**	**Micro (5)**	**Small (6)**	**Medium (7)**	**Large (8)**	**Micro (9)**	**Small (10)**	**Medium (11)**	**Large (12)**
Syria border	0.191	0.519	−0.580	−0.560	2.131	1.160	1.580	3.421 ***	1.050	−1.481	−2.080 *	−1.031
	(0.460)	(0.260)	(0.890)	(0.790)	(0.311)	(0.760)	(0.430)	(2.250)	(0.211)	(0.210)	(0.010)	(1.110)
Turkey border	0.690	−1.680	0.180	2.710 **	1.830	−0.241	−0.111	1.970	1.862	0.112	1.693	4.190 **
	(0.501)	(1.730)	(0.160)	(2.750)	(1.550)	(0.181)	(0.072)	(2.643)	(1.384)	(0.082)	(0.911)	(3.160)
Iran border	−0.180	−1.410 *	−0.610	1.480	0.531	−1.080	−0.401	3.180 **	1.040	−0.740	−0.250	0.300
	(0.170)	(2.050)	(−0.880)	(2.161)	(0.540)	(1.011)	(0.432)	(2.290)	(1.600)	(1.211)	(0.410)	(0.502)
Capital	0.731	−0.420	−9.570	−0.511	0.290 *	0.450	−0.980	−0.610 *	0.491 *	0.910	0.610	−0.62 ***
	(1.232)	(1.170)	(−0.041)	(2.201)	(2.301)	(0.320)	(−0.230)	(2.31)	(2.350)	(0.700)	(1.010)	(4.371)
GDP	5.740	0.802	0.610	4.191	2.382	−3.971	2.050	5.222	−2.621	−5.070	−3.532	−7.833
	(1.412)	(0.360)	(0.200)	(1.911)	(0.662)	(1.121)	(0.401)	(1.920)	(0.715)	(1.500)	(0.510)	(3.300)
Labour	0.531	0.240	1.381	0.802 **	0.250	−2.121	1.270	0.420	0.762	−2.581	−9.420	2.311 **
	(1.44)	(1.370)	−0.071	(2.100)	(1.462)	(0.790)	(0.471)	(2.140)	(1.502)	(1.171)	(0.611)	(2.680)
Market potential	−4.540	2.781	0.050	4.100 *	−1.440 *	−0.630	0.560	4.490	−1.651 *	−1.652	−3.152	7.331 ***
	(1.270)	(1.183)	(0.012)	(2.112)	(2.321)	(−0.261)	(0.200)	(2.150)	(2.350)	(0.680)	(1.060)	(4.310)
Mobile subscription	−4.540	2.780	0.052	4.102 *	−1.403 *	−0.674	0.560	4.490	−1.610 *	−1.650	−3.150	7.311 ***
	(1.270)	(1.183)	−0.020	(2.110)	(2.302)	(−0.231)	(0.202)	(2.151)	(2.300)	(0.600)	(1.600)	(4.310)
Airport	−0.601	−0.990	0.011	4.330 ***	−0.320	−0.420	0.310 ***	2.291	−0.612	−1.333	−1.101	4.334
	(0.682)	(0.300)	−0.940	(2.110)	(0.101)	(−0.270)	(4.480)	(2.150)	(2.300)	(0.500)	(1.001)	(2.101)
Transportation	0.6700	−0.690	0.860	1.821 ***	−1.525	−1.484	1.071	1.745 **	−1.638	−1.604	0.173	0.241
	(0.553)	(0.870)	(0.807)	(2.050)	(0.915)	(1.511)	(1.094)	(2.511)	(0.912)	(1.710)	(0.180)	(0.320)
_cons	−170.300	680.800	190.500	120.900 *	−361.800	−951.100	102.000	109.6000	−323.500	−289.7000	−808.000	181.80 ***
	(1.530)	(1.101)	(0.270)	(2.208)	(1.830)	(0.154)	(0.140)	(1.910)	(1.901)	(0.711)	(1.072)	(3.721)
Lnalpha	0.7400 **	0.661 **	0.822 ***	0.751 ***	0.644 ***	0.842 ***	0.890 ***	0.710 ***	0.410 ***	0.900 ***	0.910 ***	0.741 ***
	(4.420)	(3.210)	(5.105)	(5.190)	(3.400)	(3.540)	(5.111)	(4.360)	(1.310)	(3.850)	(5.180)	(4.620)
No. observations	98.000	98.000	98.000	98.000	72.000	72.000	72.000	72.000	53.000	53.000	53.000	53.000
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
Prob > chi2	0.3755	0.0237	0.8084	0.0002	0.5083	0.4083	0.9422	0.0003	0.456	0.456	0.8188	0.0001
Pseudo R2	0.0881	0.0591	0.0138	0.053	0.089	0.037	0.009	0.0574	0.0348	0.0348	0.0129	0.059
Log likelihood	−66.8	−187.26	−274.64	−330.7	−135.12	−135.12	−227.03	−271.19	−136.36	−136.36	−227.82	−282.06

Source: Robust standard errors are in parentheses with significance at the *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$ levels.

Columns 1–4 reveal estimation results controlling for the Erbil governorate. The decomposition of the overall border effect is statistically significant for large firms in the Erbil and Sulaymaniyah governorates. The estimation coefficients of the Iraqi and Syrian borders are statistically significant for larger firms, indicating their importance. However, the borders between Turkey and Iran are not statistically significant at any level. The labour

parameter is statistically significant only for large firms, suggesting that labour in Erbil enhances FDI inflow. The proximity of the international airport is statistically significant, indicating a positive effect on FDI inflow, which is consistent with the presence of a larger international airport in Erbil. Additionally, the estimated parameters of transportation are statistically significant only for the location choice of the largest firms.

Columns 5–8 show estimation results controlling for the Sulaymaniyah governorate, where the effect of individual proxies for specific neighbouring countries is statistically significant for Iraq, Syria, and Iran for larger firms.

Columns 9–12 control the Duhok governorate, where the individual border effect of Turkey is statistically significant only for larger firms. Labour, market capitalisation, and mobile subscription parameters are statistically significant for large firms, suggesting their positive impact on FDI. The remaining estimated parameters are either not statistically significant or exhibit signs not in line with the initial expectations.

Due to data constraints, we used lagged variables as a robustness check. Lag estimation helps address endogeneity by using past values of explanatory variables as instruments or predictors, which are less likely to be correlated with current error terms. By incorporating lags, the model captures the temporal structure and reduces simultaneity bias, since past values are predetermined and not influenced by current shocks. This approach can thus mitigate endogeneity issues and improve the reliability of causal inference.

In Table 7, to avoid potential simultaneity problems, all explanatory variables, except for time effects, are lagged by one period. Overall, the results are noteworthy, as the decomposition of the overall border and individual border has a statistically significant impact on FDI. These findings align with previous studies [61]. Market capitalisation is also statistically significant, indicating that firms consider the size of the market. Moreover, physical infrastructure, such as airports, appears to be an important factor for a larger group of multinational firms. The results also indicate that factors like transportation play a crucial role in attracting FDI. However, GDP and labour have yet to play a significant role.

In summary, the findings suggest that shared borders have a positive and significant impact on FDI inflows, with the effect varying across governorates. Neighbouring countries, such as Turkey, Iraq, and Iran, play particularly important roles as sources of investment due to the distance cost. Moreover, physical infrastructure, including market potential, mobile subscriptions, airports, and transportation networks, emerges as a key determinant in attracting FDI. While this positive association could raise concerns about reverse causality (i.e., whether FDI itself drives infrastructure development), evidence suggests that the bulk of infrastructure improvements in the Kurdistan Region were predominantly driven by governmental urban development programmes and public investments, rather than by foreign capital. For instance, major projects such as the Erbil International Airport expansion (completed in 2010, financed primarily by the Kurdistan Regional Government), the construction of the 100-metre and 120-metre ring highways (2008–2014, as part of urban planning initiatives), and extensive power grid and water infrastructure upgrades (2009–2015, publicly funded) were conceived and implemented largely independent of FDI inflows. These large-scale initiatives either predated or coincided with the subsequent surge in FDI, reinforcing the view that the observed link between infrastructure quality and FDI is not primarily driven by reverse causality.

Table 7. Sensitivity test using lag estimations, 2007–2021.

Variable	All Firms (1)	All Firms (2)	Micro-Firms (3)	Small Firms (4)	Middle Firms (5)	Large Firms (6)
Border	0.150 **					
	(0.021)					
Iraq border	0.340	0.110	(0.100)	0.030	0.170 **	0.560 **
	(1.342)	(1.472)	(−0.180)	(0.152)	(0.041)	(0.121)
Syria border	0.086	0.200	0.041	0.121	0.172	0.143
	(0.520)	(1.530)	(0.011)	(1.101)	(1.011)	(0.730)
Turkey border	1.410	0.56 ***	0.222	0.321	0.243 ***	0.120 ***
	(0.800)	(0.010)	(0.120)	(0.170)	(0.010)	−0.300
Iran border	−0.220 *	0.180 ***	(0.010)	0.012	0.051	0.171 **
	(−2.410)	−6.691	(0.030)	(0.171)	(0.500)	(0.300)
Capital $(t-1)$	1.121 ***	1.381	1.700	−2.090 *	0.670	2.781
	(0.021)	(0.122)	(1.040)	(−2.041)	(0.550)	−1.551
GDP $(t-1)$	−2.972 ***	0.050	0.320	0.340	0.790	−1.180
	(3.901)	(0.021)	(0.080)	(0.520)	(1.000)	(0.960)
Labour $(t-1)$	1.550	1.086	1.700	1.331	1.442	1.973
	(1.340)	(0.560)	(0.660)	(1.760)	(0.480)	(1.300)
Market potential $(t-1)$	0.091	0.122 ***	0.020	0.040 ***	0.130 ***	0.391 ***
	(0.710)	(5.042)	(0.110)	(0.031)	(0.112)	(0.303)
Mobile subscription $(t-1)$	0.012 ***	−0.051	0.052	0.040	0.080	−0.087
	(0.141)	(1.042)	(0.361)	(0.550)	(0.060)	(0.660)
Airport	1.770 **	0.036	0.047	0.451	0.172 **	0.421 ***
	(1.610)	(0.430)	(0.070)	(0.501)	(0.040)	(0.300)
Transportation $(t-1)$	0.305 ***	0.067 **	0.153	0.093	0.122	0.770
	(4.066)	(2.087)	(0.158)	(1.701)	(0.722)	(1.930)
_cons	55.55	48.33	290.9	82.13	12.05	48.33
	(0.985)	(0.847)	(0.567)	(1.865)	(0.306)	(0.845)
Lnalpha	0.92 ***	−35.33 **	35.33 **	20.40 **	0.36 **	−35.33 **
	−11.450	0.391	(0.390)	(0.322)	(0.173)	(0.524)
No. observations	210.000	210.000	210.000	210.000	210.000	210.000
Time effect	No	Yes	Yes	Yes	Yes	Yes

Source: Columns (1,2) include present full sample estimation controlling for individual time effects. To avoid multicollinearity, we take a one-period lag for all explanatory variables. Robust standard errors are in parentheses with significance at the *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$ levels.

5. Conclusions

This study empirically examines the determinants of the uneven spatial distribution of foreign direct investment (FDI) across the governorates of the Kurdistan Region between 2007 and 2021. The findings show that infrastructure quality, market accessibility, proximity to international borders, airport connectivity, and mobile network penetration are significant drivers of FDI concentration. Among major multinational enterprises (MNEs), FDI originates from neighbouring countries, such as Turkey and Iran. These findings underscore the importance of cross-border cost advantages and geographic proximity in shaping investment decisions. This pattern is more pronounced for larger firms, whose location choices are more systematically influenced by the identified locational factors. These results are consistent with earlier studies [51,62], which emphasise the role of geographic and market-access variables in FDI location decisions.

Our findings have several important implications for addressing the negative consequences of the uneven distribution of FDI inflows in the region. First, policymakers in the region may develop regionally tailored investment incentives [59]. These incentives need to be aligned with local comparative advantages to attract sector-specific investment (e.g., agribusiness in Duhok and tourism in Sulaymaniyah). Second, strengthening infrastructure outside the capital city, e.g., investment in transportation networks, digital infrastructure such as banking networks, and border logistics in less-developed areas, is

crucial [60,61]. Erbil, with its relatively advanced infrastructure and established service and trade sectors, could focus on attracting higher value-added services and logistics-oriented FDI. Meanwhile, governorates such as Duhok and Sulaymaniyah, with their natural resource endowments and agricultural potential, could target FDI in agribusiness, light manufacturing, and tourism projects. Third, the KRI has historically been perceived as a comparatively stable part of Iraq, which has enabled it to attract significant FDI, even during periods of regional turbulence (e.g., 2014–2017, during the ISIS conflict). Building on this reputation, targeted measures such as strengthening investor protections through clearer legal guarantees, accelerating business registration and permitting processes, and offering tailored subsidies or low-interest loans for strategic sectors can offset some of the risks investors perceive. For example, during previous downturns, the KRG successfully used targeted tax breaks and land grants to sustain investment in construction and energy, even when security conditions were volatile. Expanding such programmes, especially in relatively secure urban centres, can create safe havens for investors and signal the region's commitment to supporting FDI despite broader geopolitical uncertainties. Moreover, establishing regional investment promotion agencies (IPAs) to decentralise investment promotion to governorate-level agencies would allow more localised, targeted investor engagement and aftercare services [62]. These IPAs could work with local chambers of commerce and international partners to identify and package investment opportunities. Finally, monitoring and evaluating the spatial distribution of FDI through a robust FDI monitoring system, disaggregated by region, sector, and firm size, is necessary to assess the effectiveness of regional investment policies and ensure data-informed adjustments.

Our study has three main limitations. First, our study uses data on three governorates within a single region. This may raise statistical concerns. Clustering robust standard errors at such a low number of units may lead to biased inference and understated standard errors. Hence, the limited number of clusters is a constraint, and the statistical findings should be interpreted with caution. Second, due to data constraints, our study was unable to incorporate sectoral dynamics, such as variations in FDI patterns across industries. Future research could address this gap once more detailed and consistent sector-level FDI data become accessible, enabling a more nuanced exploration of how sectoral composition shapes the spatial distribution and developmental impact of FDI across regions. This study focuses exclusively on FDI without accounting for other forms of investment, such as joint ventures. Future research could extend the analysis to include joint venture investments to determine whether similar patterns of spatial distribution emerge. This would broaden our understanding of investment dynamics in the region and help assess whether factors beyond geographic determinants, such as local governance, play a role in shaping investment flows. Finally, given the increasing global emphasis on sustainable development, further research could examine the environmental and social dimensions of FDI in KRI, such as the extent to which foreign firms contribute to local value chains, adhere to ESG standards, or affect inclusive growth in marginalised regions.

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Appendix A

Table A1. Distribution of FDI inflows across cities in the Kurdistan Region from 2007 to 2021.

Year	License No	Location	Sector	Name of Project	Country Origin	Capital USD	Area km
2007	10	Erbil	Bank	Byblos Bank/Hawler/Branch	Lebanon	700,000,000	0.23
2007	24	Erbil	Tourism	Rotana Hotel/Hawler	Lebanon	35,000,000	96
2008	145	Erbil	Agriculture	IK cow building and dairy products	UK	12,500,000	3
2008	72	Erbil	Trading	American Jonder equipment	USA	2,930,769	3.52
2009	161	Erbil	Industry	Medical paper product factory	Lebanon	13,621,654	8.31
2009	167	Erbil	Tourism	Erbil Arjaan by Rotana	Lebanon	24,323,257	1.6
2009	155	Erbil	Housing	Nobel village	Sweden	17,372,000	71.32
2009	147	Erbil	Education	Belkent school	Turkey	40,000,000	300
2009	194	Erbil	Housing	Ozal village	Turkey	45,000,000	150
2010	248	Erbil	Health	German hospital	Germany	8,450,000	1.6
2010	241	Erbil	Education	Lebanese–France university	Lebanon/France	7,082,207	20
2010	270	Duhok	Housing	Avro City	Turkey	55,7000,000	438.7
2010	281	Erbil	Industry	Polteks Doga factory—production of iron	Turkey	150,000,000	145.62
2011	407	Erbil	Industry	Plastic pipes, PVC, and cement factory	Germany	15,905,712	32
2011	341	Erbil	Health	Antalya specialists complex	turkey	2,300,000	
2011	344	Erbil	Education	Tishk University	Turkey	79,411,530	52
2011	4	Duhok	Housing	Dubra City	Turkey	74,652,60	52
2011	5	Duhok	Housing	Stera zevi City	Turkey	10,000,000	6.37
2011	11	Duhok	Housing	Rona City	Turkey	12,600,000	6.31
2011	368	Erbil	Housing	The Atlantic	United States	96,106	156
2012	36	Erbil	Housing	Orbela	emirates	14,286,5250	116.58
2012	64	Duhok	Industry	Plastic recycling factory	Georgi	60,000	3.06
2012	48	Erbil	Trading	Dilan Resort Hotel	Iran	14,950,802	4.5
2012	8	Erbil	Housing	Lebanese village	Lebanon	312,851,252	96
2012	46	Erbil	Trading	Bakery and more	Lebanon	250,0000	1.2
2012	46	Erbil	Trading	Mali new centre	Lebanon	2,500,000	1.2
2012	27	Erbil	Housing	Deutsches dorf	Turkey	150,000,000	147.47
2012	40	Erbil	Industry	Fomex factory for carpet, spring beds, and furniture	Turkey	115,346,610	44
2012	25	Duhok	Industry	Yaseen factory for concrete molds	USA	2,000,000	2
2012	37	Erbil	Tourism	Doubletree Suites by Hilton Hotels	USA	14,786,000	2.49
2013	32	Erbil	Tourism	Downtown	Emirates	2,384,350,750	220
2013	97	Duhok	Industry	Stone crusher plant	Lebanon	4,160,000	6.21
2013	68	Erbil	Tourism	Dedaman 5-star hotel	Turkey	31,122,200	1.02
2013	98	Erbil	Industry	Almar plant for umbrellas and tents	Turkey	2,876,000	2
2014	117	Erbil	Industry	Kherat al-sharq for the production of sunflower oil	Turkey	25,430,174	20
2014	132	Duhok	Industry	Production factory of siramik and ponza block	Turkey	617,199	2.4
2015	745	Erbil	Industry	Gona factory for aluminium company	Turkey	3,547,700	8
2016	761	Duhok	Industry	Steel factory for iron production	Kuwait	10,570,000	4.32
2016	765	Erbil	Trading	Complex stores	Lebanon	21,145,100	2.4
2016	781	Erbil	Industry	Sivan dough	Syria	8,300,000	4.6
2021	1055	Erbil	Tourism	Happy City Complex project	China	490,611,0000	2000
2007	12	Erbil	Housing	Hawler commercial project	Iraq/United Kingdom	100,000,000	41.6
2007	20	Erbil	Agriculture	Rasson bird company for poultry	Iraq/Germany	7,770,000	210

Table A1. *Cont.*

Year	License No	Location	Sector	Name of Project	Country Origin	Capital USD	Area km
2007	23	Sulaymaniyah	communication	Fiber optic network project	Iraq/Sweden	20,893,549	
2007	26	Sulaymaniyah	Education	American University in Iraq	Iraq/United States	235,000,000	677.84
2007	38	Erbil	Housing	American Khanzad village	Iraq/United States	80,000,000	127
2007	41	Erbil	Tourism	Aur tourists' company	Iraq/Canada	2,000,000	17.2
2007	43	Erbil	Industry	Koya cigarette company	Iraq/South Africa	12,000,000	50
2008	71	Sulaymaniyah	Agriculture	Tara for agriculture exibitions	Iraq/United Kingdom	9,000,000	43
2008	97	Sulaymaniyah	Trading	City centre mall	Iraq/Kuwait	51,250,000	24
2008	130	Erbil	Tourism	Dewan Hotel	Iraq/Kuwait	84,634,507	24
2008	146	Erbil	Industry	Hareer canning plant for The production of tomato paste and fruit	Iraq/United States	1,700,000	37
2009	195	Duhok	Housing	War City	Iraq/Turkey	54,016,013	500
2009	201	Sulaymaniyah	Service	Kargaw village	Iraq/UAE	28,109,000	100
2010	297	Duhok	Housing	Roo City	Iraq/Turkey	9,050,000	5.7
2011	360	Duhok	Industry	M.S. factory for producing cleaning	Iraq/Turkey	2,000,000	2.32
2011	396	Erbil	Industry	Factory for producing PVC	Iraq/Spain	3,284,530	9.5
2011	1	Erbil	Housing	Korean village	Korea/Canada/Iraq	343,132,266	1592
2011	14	Duhok	Industry	Cakes, ice cream, juice jelly cubes, boxes, and silicon factory	Iraq/Jordan	15,794,000	40.33
2012	224	Duhok	industry	Excavator production factory	Iraq/New Zealand	2,500,000	-
2012	53	Duhok	Industry	Iron production factory	Iraq/Pakistan	13,000,000	24
2012	71	Duhok	Agriculture	Dry port of Duhok/PDP	Iraq/UAE	400,000,000	360
2013	64	Sulaymaniyah	Industry	Aluminium profile factory and glass enhancement	Iraq/Germany	75,000,000	137
2013	64	Sulaymaniyah	Industry	Arbat industrial city	Iraq/Iran	2,000,000,000	1000
2014	132	Erbil	industry	Edemli factory	Iraq/Turkey	1,750,000	0.8
2015	729	Sulaymaniyah	Industry	Ecocem station for waste recycling	Iraq/France	52,872,278	204
2016	757	Duhok	industry	Bahdare power station	Iraq/Turkey	100,000,000	81.25
2016	759	Erbil	Trading	Alhain Aldwalia Co. for insurance	Iraq/UAE	5,599,200	1.19
2017	804	Sulaymaniyah	Agriculture	Agricultural and gardening tools showroom	Iraq/Lebanon/France	4,282,400	1.32
2020	971	Erbil	Industry	Factory for investing hospital material	Iraq/Egypt/Canada	4,240,000	10.8
2020	982	Erbil	Trading	Ssvela Mall	Iraq/China	13,326,000	4.41
2021	1061	Erbil	Industry	Erbil factory for producing profael	Iraq/Turkey	19,818,000	9

Note: Byblos Bank and Tishk University have branches in the Sulaymaniyah governorate, but they are registered in Erbil. Source: KRI's Board of Investment.

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