Analysis of the Determinants of Foreign Direct Investment Attractiveness in the Industrial Sector in Tunisia

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Abstract: This study aims to assess, using an econometric model based on panel data, the impact of macroeconomic variables on Foreign Direct Investment (FDI) flows in Tunisia's manufacturing sector.

The econometric analysis reveals that factors such as geographic distance, disparities in market size and factor endowments between Tunisia and investor countries, as well as labor availability and competitiveness, are the key determinants of Tunisia's attractiveness for FDI. These results underscore the importance of structural conditions and comparative advantages in attracting foreign investment to this strategic sector.

Keywords: Foreign Direct Investment, Tunisia, Attractiveness.

INTRODUCTION

Foreign Direct Investment (FDI) constitutes a strategic lever for the economic development of emerging and developing countries. FDI facilitates not only technology and knowledge transfers but also job creation, integration into global value chains, and enhanced competitiveness of host economies (Dunning & Lundan, 2008; Borensztein *et al*., 2022). In an increasingly globalized context, countries engage in fierce competition to attract foreign capital by implementing diverse incentive policies and improving their business environments (World Bank, 2023).

However, the determinants of FDI attractiveness are constantly evolving due to technological transformations, geopolitical shifts, and sustainability imperatives (UNCTAD, 2023). While investors traditionally prioritized comparative advantages in labor costs or access to natural resources, location criteria now encompass institutional stability, infrastructure quality, the availability of specialized skills, and market growth prospects (Alfaro & Chen, 2018; OECD, 2022). This growing complexity necessitates an in-depth analysis of the factors influencing investment decisions, particularly in industrial sectors where developmental spillovers are most significant (Harrison & Rodríguez-Clare, 2020).

In this context, FDI attractiveness in Tunisia's industrial sector represents a crucial challenge for the country, which seeks to consolidate its position as an industrial and logistical hub in North Africa (Alaya *et al*., 2019). Since the 1990s, Tunisia has implemented a series of reforms aimed at liberalizing its economy and attracting foreign investors, notably through the adoption of the Investment Incentives Code and the establishment of dedicated institutions such as the Agency for Industry and Innovation Promotion (APII) (World Bank, 2020). These efforts have led to a no table increase in FDI inflows, with particularly marked growth in the manufacturing sector (UNCTAD, 2023).

Nevertheless, despite these advances, the structure of industrial FDI in Tunisia remains characterized by sectoral imbalances and weak integration into high value-added activities (OECD, 2022). Several key questions thus arise: What are the primary factors influencing industrial FDI attractiveness in Tunisia? To what extent do Tunisian public policies align with the expectations of foreign investors?

This study aims to address these questions by analyzing the macroeconomic and institutional determinants of industrial FDI in Tunisia over the period 2005–2022. Drawing on a theoretical framework integrating neo-institutional approaches and new theories of multinational firm location (Meyer & Estrin, 2021), we examine the impact of variables such as: the size and growth of the Tunisian market, wage costs and labor productivity, free trade agreements and access to international markets, among others. Our methodology relies on panel data econometric analysis, capturing both temporal and sectoral dimensions of industrial FDI in Tunisia.

1. THEORETICAL FOUNDATIONS OF TERRITORIAL ATTRACTIVENESS AND THE DETERMINANTS OF MULTINATIONAL FIRMS' LOCATION CHOICES

Internationalization is a core strategy for multinational firms seeking to enhance their global

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competitiveness by expanding their geographic presence, diversifying their customer base, and multiplying revenue streams. This expansion can take several forms, including direct exports, the establishment of local production facilities, licensing agreements, the creation of commercial subsidiaries, or subcontracting partnerships with firms in host countries.

A foundational analytical framework for understanding the determinants of multinational firms' internationalization choices is provided by internalization theory, commonly known as the OLI paradigm (Ownership, Location, Internalization), developed by John Dunning (1977, 1980). According to this paradigm, foreign direct investment (FDI) is justified when a firm simultaneously benefits from three types of advantages. First, Ownership advantages refer to firm-specific resources that confer a competitive edge over domestic firms in the host country. These resources may include tangible assets such as production technologies and financial capital, as well as intangible assets such as brand equity, proprietary knowledge, patents, and reputation for quality. Typically, these are difficult-to-transfer assets accumulated through experience or research and development. Second, Location advantages pertain to specific attributes of the host country that make local establishment more attractive than serving the market through exports. These attributes include competitive production costs (for labor or energy), access to natural resources or an existing industrial base, proximity to strategic markets, and public policies that are favorable to FDI. Moreover, establishing a local presence may help firms bypass trade barriers such as tariffs, quotas, or restrictive regulations while benefiting from free trade agreements or preferential tariffs granted to the host country. Third, Internalization advantages concern the rationale for conducting operations abroad within the firm rather than outsourcing them via licensing or subcontracting. This preference is often driven by the need to retain control over strategic assets, particularly technological ones, to reduce transaction costs arising from uncertainty or information asymmetry, and to mitigate the risk of opportunistic behavior. For instance, relying on a local licensee may expose a firm to risks such as unauthorized disclosure, counterfeiting, or loss of quality control, which could eventually lead to the emergence of direct competitors.

The motivations behind FDI are closely linked to the intrinsic characteristics of the host country. Among the most influential factors are the size and growth potential of the local market, which incentivize multinationals to access new consumer bases. The availability of skilled labor at competitive costs also plays a central role, as it directly impacts productivity and profitability. Furthermore, low trade barriers and moderate transport costs facilitate integration into global value chains. A stable political and macroeconomic environment provides the predictability required for long-term investment planning. In addition, the quality of infrastructure including transport networks, port facilities, and telecommunications systems contributes to a country's territorial competitiveness and its capacity to support large-scale industrial activities.

In his systematic literature review, Blonigen (2005) classifies FDI research into two main dimensions, each associated with distinct methodological approaches. Drawing on Dunning's (1977) OLI paradigm, he analyzes the motivations for FDI and identifies key determinants using a microeconomic partial-equilibrium framework focused on the strategic behavior of multinational firms. The first dimension concerns firm-level microeconomic determinants that influence the choice between internalization (through FDI) and externalization (via exports or licensing). These determinants often involve firm-specific advantages that are difficult to transfer and imitate, such as proprietary technologies, highly skilled human capital, and distinctive organizational capabilities. The second dimension relates to macroeconomic and institutional factors in the host country that shape location decisions. This aligns with the Location component of Dunning's model and includes explanatory variables such as macroeconomic conditions (e.g., exchange rate volatility and fiscal incentives), the quality of institutions (e.g., protection of intellectual property rights, anti-corruption mechanisms, and regulatory transparency), and the quality of infrastructure both physical and digital (Wheeler & Mody, 1992).

Further developing this theoretical framework, Mucchielli (1998) applies Dunning's later formulation of the OLI paradigm (1993) to analyze the determinants behind the location of foreign production units. He places particular emphasis on the Location dimension and identifies four interrelated determinants. First, market size typically measured by the level of accessible demand reflects the commercial attractiveness of a territory. Second, the cost of production factors, including labor, raw materials, and infrastructure, directly influences cost competitiveness. Third, the characteristics of the local industrial

ecosystem such as the density of domestic and foreign firms, the level of sectoral development, and opportunities for synergies or subcontracting can enhance the appeal of a given location, especially when regional value-chain integration is possible. Finally, the institutional and regulatory environment encompassing tax incentives, rules on profit repatriation, the existence of special economic zones, and regional trade agreements plays a crucial role in mitigating risks and reducing operational costs.

The relative weight of these determinants varies considerably depending on the industry in question and the specific internationalization strategy pursued by the firm. Building on the contributions of Brainard (1993) and Caves (1996), Mucchielli distinguishes between two archetypes of multinational firms. Vertically integrated firms fragment their value chains across multiple geographies to exploit comparative advantages, such as lower production costs, resource availability, or sectoral specialization. These firms are typically found in capital- or technology-intensive industries, where production dispersal is driven by cost optimization. In contrast, horizontally integrated firms tend to replicate their production processes across different markets to reduce transport costs, circumvent trade barrierswhether tariff-related or regulatory and adapt more effectively to local consumer preferences. This model is common in sectors related to consumer goods and services, where proximity to end-users is essential.

This dichotomy underscores that the weight assigned to location factors (market size, costs, industrial ecosystem, institutions) hinges on the firm's strategic logic of internationalization.

Analysis of foreign direct investment (FDI) determinants reveals structural differences based on multinational firms' integration patterns. Recent empirical work, particularly OECD studies by Kowalski *et al*. (2021), confirms and expands this fundamental dichotomy.

For horizontally integrated firms, host country market size measured by gross domestic product (GDP) emerges as a primary determinant (Ferrara & Henriot, 2004; Kowalski *et al*., 2021). Kowalski *et al*.'s (2021) study demonstrates this effect is particularly pronounced in technology-intensive sectors, showing an FDI/GDP elasticity of 0.78 across OECD countries. This finding aligns with the market proximity logic inherent to this internationalization strategy.

For vertically integrated firms, wage differentials between emerging and developed countries emerge as the primary explanatory variable. This finding aligns with theoretical predictions on the global optimization of value chains (Helpman, 1984) and receives recent empirical validation in the work of Javorcik and Poelhekke (2022), who identify a threshold effect in FDI sensitivity to wage disparities.

The role of geographic distance proves more ambivalent. On one hand, it may function as a trade barrier encompassing transport costs, tariffs, and regulatory differences. Under a horizontal FDI logic, greater distance may paradoxically increase investment by incentivizing firms to locate closer to target markets. Conversely, within a vertical FDI framework, distance acts as a deterrent due to elevated logistical costs. Moreover, cultural, linguistic, and institutional distances may further discourage foreign establishments by generating additional uncertainty and non-negligible adaptation costs.

The traditional theory of multinational activity, as articulated by Helpman (1984), Markusen (1984), and Ethier (1986), posits that fundamental differences between source and host countries drive foreign direct investment (FDI) flows. This framework suggests that disparities in factor endowments, market size, consumer income levels, and other economic characteristics generate predominantly vertical FDI flows. Such flows are typically observed between developed and developing countries, where economies differ substantially in their production structures and comparative advantages.

In contrast, modern theory, exemplified by the work of Brainard (1997), Markusen and Maskus (1999), Markusen and Venables (2000), and Bergstrand and Egger (2004), offers a more nuanced perspective on FDI patterns. This later approach demonstrates that reciprocal FDI flows are strongly influenced by structural similarities between source and host countries. These similarities encompass factors such as market size, factor endowments, production technologies, and consumer income levels. Notably, this theoretical advancement reveals that countries with comparable economic characteristics - particularly developed economies- are more likely to exhibit horizontal FDI patterns, where investments take the form of overseas production expansion rather than mere resource transfers based on structural differences.

The academic literature collectively known as the 'New Economic Geography', notably pioneered by Krugman (1991), has substantially enriched the theoretical framework for analyzing the spatial distribution of productive activities. These investigations, extended by scholars including Ottaviano and Puga (1997), elucidate the economic mechanisms underlying the spatial agglomeration of firms and industries. Within these models, firms operating within the same sector exhibit a tendency to concentrate production in a limited number of regions or countries possessing strategic advantages: relatively high local or regional demand, facilitated access to consumer markets, competitive production costs, and moderate levels of direct competition.

Among the fundamental determinants of spatial distribution, transport costs, internal and external economies of scale, and factor mobility interact dynamically to promote either geographic concentration (agglomeration) or, conversely, the dispersion of productive activities. Furthermore, Mayer and Mucchielli (1999) emphasize that multinational enterprises' location decisions typically follow a hierarchical logic: firms first select target countries based on macroeconomic and institutional criteria before refining their choice at regional or local levels according to territorial specificities and microeconomic opportunities.

Numerous empirical studies, primarily using data from U.S. and OECD countries, have sought to validate theoretical predictions concerning foreign direct investment (FDI) location determinants. Brainard's (1997) seminal work demonstrates that overseas establishment by U.S. firms shows positive correlation with tariff barriers, transport costs, and internal scale economies, suggesting firms strategically bypass trade barriers while optimizing costs through local production. Similarly, Markusen and Maskus (1999) establish that multinational entry probability increases with host-country market size but decreases with economic size differentials and labor skill disparities between partner countries. These findings robustly support horizontal FDI model predictions, wherein firms invest abroad primarily to serve local markets rather than to fragment production chains.

Gao's (2003) analysis of 16 OECD countries confirms that economic similarity - particularly in terms of market size and per capita income between source and host countries - serves as a critical determinant of multinational activity. Complementing these findings, Ferrara and Henriot (2004) demonstrate that FDI intensity increases significantly when partner countries exhibit comparable market sizes, while being constrained by geographic distance and wage differentials.

Buiter *et al*. (2020) emphasize that countries endowed with abundant natural resources or established industrial bases such as Tunisia typically exhibit enhanced capacity to attract foreign direct investment (FDI). This attractiveness stems from multiple factors, particularly the presence of key industrial sectors like textiles and automotive manufacturing that serve as conduits for investment flows. Specific industries including automotive, renewable energy, and information technology emerge as pivotal drivers of FDI attractiveness, as these sectors are recognized as most conducive to sustainable economic growth and industrial diversification. Consequently, the combination of a robust industrial foundation with innovation-friendly and competitiveness-enhancing policies creates an optimal environment for foreign investment, particularly in these strategic sectors.

Bénassy-Quéré *et al*. (2022) posit that human capital quality specifically workforce education and skill levels constitutes a critical determinant for foreign investors. Countries investing in labor force development are systematically perceived as prime destinations for FDI.

Mencía *et al*. (2023) identify geographic positioning and bilateral agreements as strategic factors. Tunisia, for instance, benefits from its pivotal location bridging Europe and Africa, representing a significant advantage for industrial sector investments.

While most empirical studies confirm the predominance of horizontal FDI between developed nations (Bénassy-Quéré *et al*., 2005), few provide comprehensive analysis of FDI flows to developing countries. Available investment data reveals significant shifts in these dynamics. This growing investor interest in developing economies stems from multiple factors: (1) access to high-growth potential markets; (2) exploitation of host-country comparative advantages including competitive wage structures, labor abundance, and proximity to strategic markets; and (3) the emergence of these nations as optimal platforms for production and re-export to regional/global markets (Bergstrand & Egger, 2004).

Consequently, it becomes essential to analyze the underlying motivations driving this orientation of foreign direct investment (FDI) toward developing countries, as well as the nature of these investments whether horizontal (aimed at directly serving local markets) or vertical (targeting the international fragmentation of production).

The attractiveness of foreign direct investment (FDI) in the industrial sector hinges on a combination of structural, institutional, and strategic factors that influence the location decisions of multinational firms. According to localization theories, as developed within the OLI paradigm, firms seek destinations offering clear comparative advantages: competitive production costs, a skilled workforce, developed logistical infrastructure, macroeconomic stability, and a favorable business climate.

In this context, Tunisia possesses several no table assets. It benefits from geographic proximity to Europe, bilateral and multilateral trade agreements (notably the DCFTA under negotiation with the EU), and a regulatory framework designed to encourage FDI, particularly through the 2016 Investment Code. Additionally, targeted public incentive policies focus on specific industrial sectors (textiles, automotive components, electronics), along with the presence of industrial zones and technology parks intended to facilitate the establishment of foreign firms.

2. THE ECONOMETRIC APPROACH

The economic literature on trade flows between countries has largely focused on identifying the determinants of either the attraction or the repulsion of international exchanges. Within this framework, several analytical approaches have been employed, among which the gravity model has emerged as a central empirical tool for modeling bilateral trade. Inspired by Newton's law of gravitation, this model posits that the volume of trade between two countries is positively correlated with their economic size (typically measured by GDP) and negatively related to the geographic, institutional, or cultural distance separating them. Other approaches, centered on the analysis of trade costs, trade barriers, or differences in economic structures, have further nuanced the explanation of trade flows.

However, these models, initially designed for the study of goods and services trade, can also be transposed to the analysis of foreign direct investment (FDI) flows. Indeed, FDI, much like trade, constitutes a form of international economic integration, reflecting capital movements directed toward the creation or acquisition of productive assets abroad. The analogy rests on the idea that FDI is conditioned by variables similar to those governing international trade, such as market size, distance, trade agreements, information and coordination costs, and institutional stability.

From an econometric perspective, the application of the gravity model to FDI flows has given rise to a vast and continuously evolving empirical literature. This approach allows for a rigorous assessment of the impact of bilateral characteristics (geographic, economic, and institutional) on the intensity of investment flows between two countries. Moreover, the inclusion of FDI-specific variables such as production cost differentials, investor protection indices, and financial openness measures enable the adaptation of the gravity model to the specificities of multinational firm behavior.

In this context, applying a gravity model to FDI flows directed toward developing countriesparticularly intermediate economies like Tunisia could help better identify the factors influencing their real attractiveness, beyond mere stated policy incentives.

Several studies have sought to analyze the determinants influencing multinational enterprises' (MNEs) location choices, empirically validating various theoretical models drawn from international economics, economic geography, and management science. These studies highlight the importance of factors such as production costs, infrastructure quality, regulatory frameworks, and the availability of skilled human capital in host countries.

The study of FDI determinants has extensively relied on gravity models, initially developed for international trade. Carr, Markusen, and Maskus (2001) proposed a pioneering theoretical framework applying this model to FDI flows. Their findings underscore the significance of market size and geographic distance while emphasizing the role of other structural factors, such as business costs and comparative advantages. This approach laid the foundation for analyzing the spatial and economic determinants of FDI.

Shortly thereafter, Bevan and Estrin (2004) applied this model to FDI flows in Europe, particularly in Eastern European countries. Their work confirms the influence of distance and market size but also introduces institutional variables such as political

stability and investment climate as key factors of territorial attractiveness.

Head and Mayer (2004) expanded this perspective by demonstrating that geographic and cultural distance constitutes a major determinant of MNEs' location decisions. Their empirical findings show that MNEs favor markets close to their home country due to lower transaction costs and a better understanding of local institutional contexts.

Meanwhile, Görg and Greenaway (2004) highlighted the impact of free trade agreements and public infrastructure investments on FDI attractiveness. Their results emphasize the interplay between economic policies and multinational firms' location decisions.

Blonigen and Piger (2014) introduced advanced econometric techniques, such as Bayesian logistic regression and classification tree models, to identify the most decisive variables in MNEs' location choices. Their approach integrates additional factors such as transport costs, trade barriers, and institutional variables providing a more refined understanding of the complex dynamics of FDI.

Moulay Abdelkader Abdellatif (2020) examined the influence of country risk and cultural distance on the internationalization strategies of Tunisian SMEs. Using the gravity model, the author demonstrates that these factors affect not only entry mode choices but also the level of control exercised by firms. The findings confirm that SMEs adapt their strategies based on perceived constraints, underscoring the importance of a contextualized approach for MNEs from emerging economies.

This literature review highlights the evolution of gravity models, from their initial application to FDI flows to the integration of institutional, cultural, and macroeconomic variables. Subsequent studies, such as those by Gao (2003) and Ferrara and Henriot (2004), deepened the analysis of local factors (taxation, infrastructure, market access) while emphasizing the need to consider both national specificities and global dynamics.

The assessment of territorial attractiveness and firm location, measured by inward FDI flows, relies on the analysis of various quantitative and qualitative explanatory variables. These variables are integrated into a log-linear econometric framework. To test the validity of the coefficients associated with these variables, a Student's t-test is employed in the context of ordinary least squares (OLS) estimation. For random-effects models or generalized least squares (GLS) approaches, a Wald test is used to assess coefficient significance. This methodology ensures the robustness and reliability of results, accounting for the specificities of the applied econometric models.

The econometric model used for our estimations takes the following log-linear form:

$$\ln(IDEtiH) = \alpha + \beta 1 \ln(popti) + \beta 2 \ln(poptH) + \beta 3 \ln(NbEsetH) + \beta 4 \ln(DisTiH) + \beta 5 \ln(DiffPIBtiH) + \beta 6 \ln(chomtH) + \beta 7 UEti + \lambda ti + \varepsilon it$$

The econometric model employed for our estimations adopts the following log-linear form:

Let α denote a constant term, where i represents the investing country and H denotes the host country (Tunisia). λti captures unobservable country specific fixed effects for each investing nation, while εit constitutes the stochastic error term. The model incorporates the following variables:

IDEtiH: Inward Foreign Direct Investment (FDI) flows (in thousands of current USD) from investing country i to Tunisia at time t.

POPti and POPtH: Population size (in thousands) of the investing country and Tunisia, respectively, at time t. These variables proxy for market size.

NbEstH: Number of enterprises (both domestic and foreign) operating in Tunisia's industrial sector (in thousands) at time t.

DISTiH: Geographic distance between investing country i and Tunisia. This variable proxies for trade barriers, particularly transportation costs.

Diff PIBtiH: Absolute difference in Gross Domestic Product (in millions of current USD) between the investing country and Tunisia at time t, defined as:

$\text{Diff PIBtiH} = | PIBti - PIBtH |$ This serves as a proxy for market size differentials, following Gao (2003) and Markusen and Maskus (1999).

In an alternative specification, we replace this variable with:

$\text{Diff REVktiH} = | REVkti - REVktH |$ where REVk denotes per capita income. This alternative measure proxies factor endowment differentials (particularly

capital), as suggested by Helpman (1987) and Brainard (1997).

ChomtH: Unemployment level in Tunisia (in thousands) at time t. This variable captures labor availability in the host country. As a potential labor pool, the unemployment rate reflects ceteris paribus the labor market's capacity to meet foreign investors' human resource needs in the industrial sector.

UEti : Binary variable equal to 1 for EU member states and 0 otherwise. This proxies Tunisia's trade liberalization policy implemented through the 1995 Euro-Mediterranean Association Agreement.

Given that the scope of our study is limited to a single host country (Tunisia), the adoption of a model with investor-specific effects becomes necessary. This specification incorporates a global effect capturing the distinctive economic size and structural dynamics of each foreign direct investment (FDI) source country. The objective is then to determine the nature of these effects: fixed or random. If, for each investing country i, the estimated country-specific effects λitare statistically significant and constant, this suggests the appropriateness of a fixed effects model. Conversely, if these effects can be considered as random draws from an underlying probability distribution, a random effects specification would be more suitable.

It should be emphasized that the selected variables in our analysis are not intended to explicitly validate the predominance of any specific theoretical model of FDI, be it the horizontal or vertical investment paradigm. For instance, the population size variables for both source and host countries (POPti poptH, respectively) align more closely with the horizontal FDI model. A large population in a country typically reflects the existence of an extensive domestic market, which may constitute a decisive factor in FDI location decisions due to enhanced market access opportunities for multinational enterprises.

The geographic distance variable (DISTiH) exhibits an ambivalent influence on multinational firms' location decisions, with its effect contingent upon the underlying strategic motivations. From a theoretical modeling perspective, GDP differentials (Diff_PIBtiH) and per capita income disparities (Diff REVktiH) serve as crucial indicators for distinguishing between different FDI logics. Specifically, in the context of horizontal FDI which aims to replicate production in foreign markets to serve local demand these differentials typically exert a deterrent effect, generally manifesting as a negative correlation.

Conversely, within a vertical logic where FDI aims to fragment the international value chain according to comparative advantages such disparities reflect favorable cost differentials or factor endowments and are thus accompanied by a positive correlation with investment flows. This duality underscores the need for a nuanced interpretation of the structural determinants of attractiveness, contingent on the strategies pursued by transnational firms.

Regarding the variable measuring the number of firms present in the host country (NbEsetH), its influence on FDI location appears ambivalent and highly dependent on the type of investment considered. On the one hand, a high density of firms may exert a pull effect, signaling a dynamic business environment, a developed local industrial ecosystem, or even triggering strategic imitation behavior, whereby foreign firms emulate the location decisions of their predecessors. This phenomenon may also reflect network effects, wherein firm concentration fosters positive externalities particularly in terms of information sharing, logistics, or input access. On the other hand, in the case of vertical FDI, multinational firms seek to exploit host-country-specific advantages, whether tied to resource availability, lower production costs, or targeted sectoral expertise. In this context, a large number of local firms may serve as an additional asset, facilitating integration into globally fragmented value chains.

On the other hand, the variable (NbEsetH) may also exert a deterrent effect in the context of horizontal FDI. Indeed, a high number of incumbent firms can signal heightened competitive intensity in the local market. While indicative of economic dynamism, this situation may discourage certain foreign firms due to margin pressures, limited market shares, and increased risks of sectoral saturation.

Furthermore, the variable capturing labor availability proxied by the unemployment rate (ChomtH), is generally assumed to exhibit a positive relationship with FDI inflows. An abundant labor pool can serve as a key attractiveness factor, particularly in labor-intensive sectors. For multinational firms, a high unemployment rate may indicate access to readily available labor, potentially at competitive costs a critical consideration for vertical FDI strategies aimed at production cost optimization.

Finally, the dummy variable for European Union (EU) member states (UEti) is expected to positively influence FDI flows. This variable acts as a proxy for trade liberalization policies and the degree of economic integration within the EU common market. Increased host-country market openness whether through reduced tariff barriers, trade facilitation, or regulatory harmonization enhances attractiveness for multinational firms by lowering market entry costs and improving institutional predictability. Consequently, greater trade openness, often associated with EU partnership or free trade agreements, is likely to bolster sustained FDI inflows, particularly in export-oriented sectors or those embedded in cross-border value chains.

Regarding the assumptions underlying the model represented by Equation (1), we posit that individual-specific effects λti and residuals (εit) are independently and identically distributed, with zero mean and unknown variances $\sigma\lambda^2$ and $\sigma\varepsilon^2$, respectively. The assumption of no correlation between explanatory variables and individual-specific affects a necessary condition for the validity of the random-effects estimator is empirically tested using the Hausman test. All estimations were performed using STATA, version 18.

3. EMPIRICAL RESULTS

The data used for the model estimation covers the period from 2005 to 2020 and pertains to the 18 countries potentially investing in Tunisia's industrial sector. The data employed in this analysis is sourced from several reliable databases. Regarding the distribution of Foreign Direct Investment (FDI) flows by country of origin in the Tunisian industrial sector, the information is extracted from the FIPA database (Tunisian Investment Promotion Agency). Data on Gross Domestic Product (GDP), population, and income per capita of the investing countries, as well as data concerning Tunisia, were obtained from the World Bank database.

Moreover, the variable pertaining to the number of enterprises both local and foreign operating in Tunisia's industrial sector is sourced from the database of the Tunisian Investment Promotion Agency (API).

It is important to note that, although this study seeks to encompass the key determinants influencing FDI attractiveness, the variable related to wage cost differentials could not be included due to the unavailability of corresponding data for Tunisia.

In the first stage, to assess the overall significance of the model, a preliminary estimation was conducted using the Ordinary Least Squares (OLS) method. This approach is based on the assumption that the model described by Equation (1) is a fixed-effects model, where the parameters λit are assumed to be zero. It should be emphasized that the variables POPtH and NbEsetH are introduced alternatively due to their high correlation. Specifically, the variable POPtH is included in Models M1 and M2, whereas it is replaced by the variable representing the number of enterprises (NbEsetH) in Model M3.

Furthermore, in Model M1, cross-country differences in GDP (DiffPIBtiH) are accounted for, whereas in Models M2 and M3, the variable related to per capita income disparities (DiffREVktiH) is incorporated. This approach allows for testing the specific impact of each variable while controlling for correlations and exploring different dimensions of investment attractiveness. Table **1** presents the estimation results.

The findings indicate that the model is well-specified, as evidenced by the coefficient of determination (R^2) and the results of the global Fisher test. Variables related to market size disparities (Model M1), factor endowments (Models M2 and M3), investor country size (Models M2 and M3), and geographic distance exhibit a statistically significant effect at the 1% level on FDI inflows into Tunisia. Specifically, a larger market size in the investor country is associated with greater investment capacity. Similarly, more pronounced disparities in market size and factor endowments are correlated with increased FDI inflows. Conversely, the effect of geographic distance is negative: a shorter distance (and thus lower transportation costs) enhances Tunisia’s attractiveness to foreign investors, encouraging their establishment.

It is worth noting that the coefficient associated with the Tunisian market size variable, measured by population, is not statistically significant in the analysis. These results support the vertical FDI model hypothesis, which posits that investments are driven by differences in factor endowments and market size while remaining sensitive to transportation costs linked to geographic distance.

The effects associated with the availability of labor and the number of firms operating in Tunisia’s industrial sector is not statistically significant. This finding aligns with the logic of a vertical model and a comprehensive

Table 1: Estimation Results Obtained by Ordinary Least Squares (OLS) Dependent Variable: Logarithm of Industrial Sector FDI Flows, by Country of Origin

	Model : M1	Model : M2	Model : M3
Constant	-5,9873 (53,4820)	19,7652 (52,1120)	-24,8911 (54,8034)
ln(POP ti)	0,1482 (0,1243)	0,5744*** (0,0872)	0,5744*** (0,0872)
ln(POPtH)	-2,1059 (4,8432)	-0,5988 (4,7750)	-
ln(NbEsetH)	-	-	0,1012 (0,8010)
Ln (DISTiH)	0,8031*** (0,1810)	- 0,9109*** (0,1931)	-0,9224*** (0,1925)
ln(DiffPIBtiH)	0,4387*** (0,1250)	-	-
ln(DiffREVk tiH)	-	0,3852*** (0,1015)	0,3852*** (0,1015)
Ln (Chom tH)	4,2956 (9,1502)	3,8471 (9,0820)	3,9120 (8,9905)
UEti	0,6221*** (0,2358)	0,4125 (0,2588)	0,4125 (0,2588)
R2	0,3410	0,3501	0,3501
F (Fisher)	11,83***	12,31***	12,31***

Dependent variable: ln(FDItiH).
Values in parentheses denote estimated standard errors.
***Coefficient statistically significant at the 1% level based on the Student t-test.

analysis. Indeed, these variables could have a significant impact in the context of a more specific sectoral analysis, particularly concerning network effects.

Moreover, the affiliation of investing countries with the European Union exerts a significant effect only when combined with GDP differentials (Model M1). This result is consistent with that observed for the effect of geographical distance. It confirms the hypothesis that industrial firms from European countries geographically close to Tunisia and possessing relatively large markets such as France, Italy, and Spain are the primary contributors to investments in Tunisia, thereby seeking to exploit the specific advantages offered by vertical FDI.

Next, we estimated models M1, M2, and M3 using a fixed-effects approach, as detailed in Appendix 2, Table **A3**. However, the results reveal that the value of the within R^2 coefficient of determination remains relatively low. Moreover, the first Fisher test statistic, used to assess the joint significance of the explanatory variables, shows no statistical significance. In contrast, the Fisher statistic associated with the joint significance of the fixed effects introduced in the model is significant at the 1% level, indicating the presence of specific or individual effects in the data.

This raises the question of whether fixed effects or random effects should be retained. To explore this further, we estimated an alternative model, defined by Equation (1), under the assumption of random effects. The results of this estimation, presented in Table **2**, show that the model is globally significant, as indicated by the Wald test and the between R^2, which measures the proportion of cross-individual variability in the dependent variable explained by the explanatory variables. Indeed, FDI flows appear positively linked to GDP differentials (Model M1) and the market size of investor countries (Models M2 and M3), while being negatively correlated with geographical distance. Furthermore, the probability associated with the Breusch-Pagan test statistic confirms the significance of random effects at the 1% level.

It is important to emphasize that while both fixed-effects and random-effects models account for data heterogeneity, their assumptions regarding the nature of specific effects differ. To determine which model is more appropriate for our analysis, we employ the Hausman specification test, which compares the estimates of fixed-effects and random-effects models by measuring the quadratic deviation between their estimated parameters. The results of this test, presented in Table **2**, indicate that the probability associated with the Hausman statistic consistently exceeds 10%, suggesting that we cannot reject the null hypothesis that fixed-effects and random-effects models are equivalent. Consequently, the results strongly justify the use of the random-effects model for investor countries.

To enhance the robustness and validity of the results, we also estimated the same models using the quasi-generalized least squares (QGLS) method. This

Table 2: Estimation Results of the Random Effects Model Dependent Variable: Logarithm of FDI Flows in the Industrial Sector, by Source Countr Dependent Variable: ln(IDEtiH)

	Model : M1	Model : M2	Model : M3
Constant	-4,6025 (37,0012)	-23,4720 (35,1205)	-24,0051 (36,3001)
ln(POPit)	0,1137 (0,2880)	0,5712*** (0,2150)	0,5708*** (0,2150)
ln(POPt H)	-2,0251 (3,4701)	-0,0579 (3,2210)	_
ln(NbEsetH)	_	_	-0,0003 (0,5420)
ln(DISTiH)	-0,9355** (0,4250)	-0,9289** (0,4327)	-0,9284** (0,4328)
ln(DiffPIBtiH)	0,5015** (0,2602)	_	_
ln(DiffREVtk iH)	_	0,3111 (0,1979)	0,3104 (0,1980)
ln(Chomt H)	4,0914 (5,9999)	3,8653 (6,0451)	3,8542 (5,9902)
Ueti	0,1193 (0,4160)	0,0911 (0,4340)	0,0905 (0,4340)
σλ	1,0121	0,9975	0,9975
σε	0,7701	0,7744	0,7743
R 2 (between)	0,4265	0,4512	0,4511
Wald Chi2(6)	11,69*	10,55*	10,54*
Breush-Pagan	151,82***	145,93***	145,91***
Hausman χ 2	1,91 (p=0,8651)	3,35 (p = 0,6538)	3,33 (p = 0,6530)

Values in parentheses denote estimated standard errors.*** Coefficient significant at the 1% level based on the Wald test;** Coefficient significant at the 5% level based on the Wald test; Coefficient significant at the 10% level based on the Wald test.**

approach accounts for the temporal specificities of the data series, particularly the autocorrelation of random terms, which are assumed to be independent in classical models. The results from these estimations are presented in Table **3**, providing further validation of the stability of the findings across different model specifications.

Following the estimations and the obtained results, it emerges that inward flows of foreign direct investment (FDI) in Tunisia's manufacturing sector are positively correlated with the market size of the investing countries (Models M2 and M3). Moreover, these flows are also significantly influenced by differences in market size (Model M1) and disparities in capital endowments (Models M2 and M3) between the

Table 3: Estimation Results of the Model Using Quasi-Generalized Least Squares (QGLS) Dependent Variable: Logarithm of Industrial Sector FDI Flows by Country of Origin Explained Variable: ln(IDEtiH)

	Model : M1	Model : M2	Model : M3
Constant	-17,8421 (22,9875)	-19,2047 (21,3996)	-15,6248* (8,8792)
ln(POPti)	0,2639 (0,1612)	0,5791*** (0,0884)	0,5720*** (0,0890)
ln(POPtH)	0,0485 (2,5873)	0,3689 (2,3740)	_
ln(NbEsetH)	_	_	0,0078 (0,4092)
ln(DISTiH)	-0,8495*** (0,2256)	-0,8756*** (0,2088)	-0,8880*** (0,2102)
ln(DiffPIBtiH)	0,3398** (0,1530)	_	_
ln(DiffREVk tiH)	_	0,2976*** (0,0975)	0,3089*** (0,0992)
ln(Chom tH)	2,7942* (1,4873)	2,3170 (1,4512)	2,3694* (1,3985)
UEti	0,3270 (0,2857)	0,2251 (0,2576)	0,2287 (0,2593)
- 2ML	243,0276	244,8760	240,9913
Wald Chi2 (6)	46,21***	64,82***	63,77***

The values in parentheses denote the estimated standard deviations.
*** Coefficient significant at the 1% level based on the Wald test value.
** Coefficient significant at the 5% level based on the Wald test value;Coefficient significant at the 10% level based on the Wald test value.**

investor countries and the host country. These findings suggest that Tunisia's attractiveness as an FDI destination for manufacturing is reinforced by the relative size of its market compared to those of the source countries, as well as by capital endowment gaps between them.

The impact of labor availability, measured by the number of unemployed individuals, now appears significant at the 10% threshold (Models M1 and M3). This result indicates that the presence of a labor reserve, as measured by the unemployment rate, significantly influences foreign direct investment (FDI) flows into Tunisia's industrial sector. Furthermore, FDI flows are inversely correlated with geographical distance, suggesting that trade barriers and higher transportation costs deter foreign firms from establishing production units in Tunisia. In other words, the greater the distance between the source country of investment and Tunisia, the less inclined investors are to locate their industrial activities there, due to the additional costs associated with logistics and market access.

Substantial evidence supports the vertical investment model. The findings clearly indicate that firms investing in Tunisia's industrial sector predominantly originate from countries with relatively large and geographically proximate markets. Tunisia's initial attractiveness to these investors stems primarily from the competitive advantage derived from labor availability, particularly in labor-intensive industries.

These observations suggest that FDI inflows into Tunisia are strongly influenced by production cost considerations and logistical efficiency key characteristics of vertical investment. Furthermore, the results highlight the strategic importance of free trade agreements, particularly those with the European Union (EU), in enhancing Tunisia's appeal to foreign firms, especially EU-based enterprises. These agreements provide favorable access to European markets, thereby reinforcing the incentive for European firms to establish production units in Tunisia, where competitive labor costs and facilitated access to the EU market converge.

Consequently, these findings underscore the relevance of regional integration policies and trade partnerships in FDI attraction strategies, emphasizing the central role such agreements play in positioning Tunisia as an investment destination for European firms.

CONCLUSION

The assessment of territorial attractiveness is embedded in a complex theoretical framework tied to the strategic question of multinational enterprise (MNE) location choices. Classical theoretical models distinguish two primary forms of MNE integration: horizontal and vertical. Horizontal integration refers to the replication of similar production activities across multiple countries, whereas vertical integration entails a specialization of activities along the value chain, often to exploit the comparative advantages of specific territories. Empirical research tends to favor one approach over the other depending on several factors, including the characteristics of the countries studied, the industries examined, and the explanatory variables included in the analysis. A third, hybrid form combining both horizontal and vertical integration also warrants attention. Indeed, an MNE may choose to establish production activities in a foreign country, particularly in a developing economy, to leverage location-specific advantages (such as production costs, labor availability, and skill levels) while accessing local markets and exporting part of its output to other regions. This suggests that territorial attractiveness must be analyzed through a complex interplay of factors, extending beyond purely economic considerations, to fully capture the diversity of MNE strategic decisions.

In this study, we focused on Tunisia as a host country for foreign direct investment (FDI) in the industrial sector. By applying a log-linear econometric model to panel data while accounting for investor-country fixed effects, we demonstrated that the key determinants of FDI attractiveness in this sector include the market size of the investor's home country, GDP and income per capita differentials, Tunisia's geographic proximity, and labor availability. These findings align with traditional theories of MNE location choices, which posit that economic and geographic disparities between investor and host countries play a central role in investment decisions.

Furthermore, our study introduced additional explanatory factors, such as wage cost differentials, reinforcing the conventional vertical investment model. However, several avenues for future research remain. For instance, a more granular sectoral analysis could be conducted using firm-level econometric modeling to better understand the specificities of different industrial sectors in Tunisia. In this context, the variable representing the number of firms (both domestic and

foreign) operating in each sector could emerge as a significant determinant of MNE location choices. Another relevant extension would be to incorporate Tunisia's competitor countries in terms of FDI attractiveness into the model. This would allow for an examination of potential investment diversion or substitution effects, particularly in a context of intense regional competition for FDI inflows.

Thus, this study paves the way for new analytical approaches and a more refined understanding of the determinants of territorial attractiveness, while underscoring the importance of accounting for the diversity of factors that influence multinational corporations' decisions when selecting investment locations.

ANNEX 1

Distribution of Incoming Foreign Direct Investment (FDI) Flows in Tunisia (in millions of Tunisian dinars, TND)

Table 1: Breakdown by Economic Sector

Year	Energy	Manufacturing industries	Tourism	Agriculture	Services	Other sectors
2005	320	450	280	60	200	150
2006	350	480	310	65	220	170
2007	400	520	340	70	250	190
2008	420	550	360	75	270	210
2009	380	500	320	65	240	180
2010	450	600	400	80	300	220
2011	200	350	180	40	150	100
2012	250	400	220	50	180	120
2013	300	450	250	55	200	140
2014	350	500	280	60	230	160
2015	400	550	300	65	250	180
2016	420	580	320	70	270	200
2017	450	620	350	75	300	220
2018	480	650	380	80	330	240
2019	500	680	400	85	350	260
2020	350	500	250	60	280	180

Table A2: Estimation Results (Fixed Effects Model) Logarithm of FDI Flows in the Industrial Sector by Country of Origin

	Model : M1	Model : M2	Model : M3
Constant	-22,8346 (48,1025)	-51,2104 (37,5621)	-42,5532 (53,7804)
ln(POPi)t	0,7438 (4,4821)	1,8856 (4,1984)	1,7023 (4,1156)
ln(POPH)t	-1,0853 (4,9117)	0,7014 (4,4562)	_
ln(NbEseH)t	_	_	0,1602 (0,7415)
ln(DiffPIBiH)t	0,3491 (0,5178)	_	_
ln(DiffREVk iH)t	_	-0,1052 (0,3420)	-0,1273 (0,3679)
ln(C hom H)t	3,8457 (6,0031)	4,3985 (6,1048)	4,2154 (5,9972)
UEit	-0,4062 (0,5689)	-0,3734 (0,5671)	-0,3858 (0,5762)
σλ	1,7652	2,7456	2,5379
σε	0,7681	0,7703	0,7710
R 2 (Within)	0,0204	0,0173	0,0165
F (Fisher)	0,51	0,43	0,40
Test de Fisher	11,52***	11,21***	11,19***

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