FEDERAL UNIVERSITY OF SAOCARLOS - UFSCar
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POSTGRADUATE PROGRAM IN PRODUCTION ENGINEERING - PPGEP

ESSAYS ON FOREIGN DIRECT INVESTMENT AND CORRUPTION: REVIEW AND EMPIRICAL STUDY

VANESSA DA SILVA MARIOTTO ONODY

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VANESSA DA SILVA MARIOTTO ONODY

Doctoral dissertation presented to Industrial Engineering Postgraduation Program of Federal University of SaoCarlos (UFSCar), Campus SaoCarlos, as one of the requirements to obey the Doctorate Degree in Industrial Engineering.

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I **dedicate** this study to my family, especially to my father (in memorian), for the constant encouragement. They are my foundation and my joy, with much love.

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"There are no butterflies if life does not undergo long and silent transformations."

(Fr. Eduardo Malaspina)

ABSTRACT

Foreign Direct Investment (FDI) is a crucial development tool for many emerging regions. A specific issue explored in the international business literature is the relationship between corruption and FDI, examining whether corruption repels foreign investments (acting as "sand") or attracts more foreign investments (acting as "grease"). Several authors in the international literature have analyzed factors influencing the outcomes of this relationship, but few have investigated the role of corruption in FDI at the regional level, especially in emerging countries in Latin America, including Brazil. This thesis examines the relationship between corruption and regional concentration of FDI. To do so, two chapters (2 and 3) have been developed in the form of articles. The first is theoretical and serves to contextualize the research themes through a systematic literature review method, highlighting the trend of corruption as "sand" or "grease" in the analyzed studies. The next article, on the other hand, is applied, utilizing statistical analyses. To characterize this study, a new dataset with regional-level information on FDI is used to investigate whether foreign companies can tolerate some level of corruption in exchange for specific location-based advantages, thus challenging the binary view of the "sand" or "grease" hypothesis. As the main results, Chapter 2 revealed that research on macroeconomic factors is the most robust determinant in articles on the subject. These factors are understood to include institutional quality, governance, political and financial institutional risk, and business environments. Corruption is demonstrated in many studies as an indicator to be considered among other researched factors, observing the scarcity of research exclusively on the topic. After an extensive literature analysis, the main trend of the "sand or grease" hypothesis in emerging countries is concluded to lean towards "sand." With the third chapter, it was possible to empirically examine the sensitivity of multinational companies (MNCs) to corruption in the Latin American economy at the level of individual sectors. It was observed that corruption functions as a "lubricant" for both FDI and at the level of individual sectors. Finally, by using a non-linear approach, it was detailed that corruption functions as a lubricant for FDI only in regions with intermediate (medium-low) levels of corruption. This thesis provides a general contribution to national and international literature on the issue of the relationship between regional attractiveness of FDI and corruption in emerging countries in Latin America.

Keywords: Corruption; Foreign Direct Investment (FDI); Brazil and Sao Paulo.

RESUMO

O Investimento Direto Estrangeiro (IDE) é uma ferramenta de desenvolvimento crucial para muitas regiões emergentes. Uma questão específica explorada na literatura empresarial internacional é a relação entre corrupção e IDE examinando se a corrupção repele investimentos estrangeiros (atuando como “areia”) ou atrai mais investimentos estrangeiros (atuando como “graxa”). Vários autores na literatura internacional analisaram fatores que influenciam os resultados dessa relação, mas poucos investigaram o papel da corrupção no IDE em nível regional, especialmente em países emergentes da América Latina, incluindo o Brasil. Esta tese examina a relação entre corrupção e concentração regional de IDE. Para tanto, foram desenvolvidos dois capítulos (2 e 3) em forma de artigos. O primeiro é teórico e serve para contextualizar os temas de pesquisa através de um método de reviSaosistemática da literatura, destacando a tendência da corrupção como “areia” ou “graxa” nos estudos analisados. O próximo artigo, por outro lado, é aplicado, utilizando análises estatísticas. Para caracterizar este estudo, é utilizado um novo conjunto de dados com informações a nível regional sobre o IDE para investigar se as empresas estrangeiras podem tolerar algum nível de corrupção em troca de vantagens específicas baseadas na localização, desafiando assim a viSaobinária da hipótese "areia" ou da "graxa". Como principais resultados, o Capítulo 2 revelou que a pesquisa sobre fatores macroeconômicos é o determinante mais robusto nos artigos sobre o tema. Entende-se que estes factores incluem a qualidade institucional, a governação, o risco institucional político e financeiro e os ambientes de negócios. A corrupção é demonstrada em muitos estudos como um indicador a ser considerado dentre outros fatores pesquisados, observando-se a escassez de pesquisas exclusivamente sobre o tema. Após uma extensa análise da literatura, conclui-se que a principal tendência da hipótese da “areia ou graxa” nos países emergentes é inclinar-se para a “areia”. Já no Capítulo 3, foi possível examinar empiricamente a sensibilidade das empresas multinacionais (MNCs) à corrupção na economia latino-americana ao nível dos setores individuais. Observou-se que a corrupção funciona como um “lubrificante” tanto para o IDE como a nível de sectores individuais. Finalmente, utilizando uma abordagem não linear, foi detalhado que a corrupção funciona como um lubrificante para o IDE apenas em regiões com níveis intermédios (médio-baixos) de corrupção. Essa tese fornece uma contribuição geral para a literatura nacional e internacional sobre a questão da corrupção, apresentando a relação entre a atratividade regional do IDE e a corrupção nos países emergentes da América Latina.

Palavras-chave: Corrupção; Investimento Estrangeiro Direto (FDI); Brasil e Sao Paulo.

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LIST OF ABBREVIATIONS

ABNT - Brazilian Association of Technical Standards

BCB - Brazilian Central Bank

BoP - Balance of Payments

BRICS - Brazil, Russia, India, China and South Africa

CPI - Corruption Perception Index

DK - Driskoll–Kraay

FDI - Foreign Direct Investment

FE - Traditional Fixed

FEGLS - Fixed Effects Generalized Least Squares

FGLS - Generalized Least Squares

IFGF - Firjan Fiscal Management Index

GDP - Gross Domestic Product

JCR - Journal Citation Reports

LIML - Limited Information Maximum Likelihood

MENA - Middle East and North African

MNC - Multinational Company

MNE - Multinational Enterprises

MPF - Brazilian Federal Public Ministry

PCSE - Panel-Corrected Standard Errors

QR - Research Question

RE - Random Effects

SLR - Systematic Literature Review

UNCTAD - United Nations Conference on Trade and Development

USA - United States of America

VIF - Variance Inflation Factor

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CHAPTER 1: INTRODUCTION

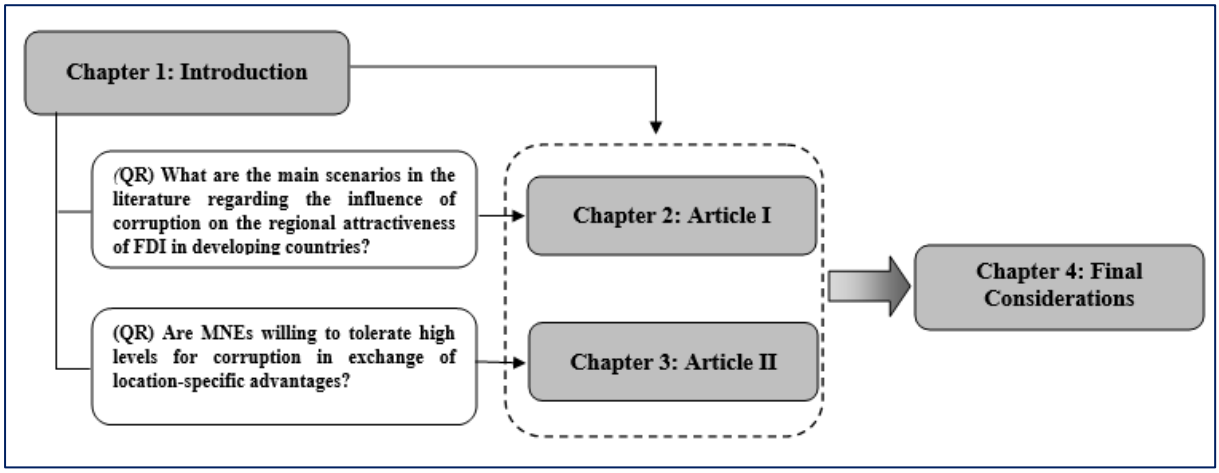
1.1. Structure

This thesis follows the format of journal articles. Each chapter is structured as a complete research study, with the exception of the first and last chapters, which serve as an overall introduction and a conclusion, respectively.

For this reason, the title of the thesis is *"Essays on Foreign Direct Investment and Corruption: Review and Empirical Study"*, indicating that it consists of several articles connected by a central theme.

The thesis is organized in the following sequence:

Figure 1 - Structure of the thesis



Source: Author (2024)

The figure 1 shows the structure of doctoral dissertation composed of several chapters, each addressing a specific aspect of the research on the influence of corruption on the attractiveness of Foreign Direct Investment (FDI) in developing countries.

Chapter 1: Introduction, this chapter introduces the research topic and presents the main research questions (RQs).

Research Questions (RQs):

- **RQ 1:** "What are the main scenarios in the literature regarding the influence of corruption on the regional attractiveness of FDI in developing countries?" This question is addressed in Chapter 2: Article I.
- **RQ 2:** "Are multinational enterprises (MNEs) willing to tolerate high levels of corruption in exchange for location-specific advantages?" This question is addressed in Chapter 3: Article II.

Chapters Addressing the Research Questions:

Chapter 2: Article I. Here, the first research question about the scenarios in the literature related to corruption and FDI is analyzed.

Chapter 3: Article II. This chapter explores the second research question about the tolerance of multinationals to corruption in exchange for location-specific advantages.

Chapter 4: Final Considerations. This chapter concludes the work, integrating the findings from the previous chapters and providing an overall view of the study's conclusions.

The figure 9 uses arrows to show the connection between the chapters and how they relate to the research questions. The arrows indicate that Chapter 1 introduces the research questions which are addressed in Chapters 2 and 3, and then, all the findings are synthesized in Chapter 4.

1.2. Foreign Direct Investment in Origin and Host Countries

Foreign Direct Investment (FDI) is a key element in the global landscape, having significant impacts on both the countries of origin where investing companies are based and the host countries that receive such investments.

Hymer (1970) stood out among the beginnings when stating in his thesis that Firms undertake operations in a foreign country to appropriate fully the returns to certain abilities which they possess. They chose this method rather than an alternative such as licensing because the imperfections in the market prevent the fullest realization of profits unless the firms exercise some control. Complementing Hymer's idea, Moosa (2002) defines Foreign Direct Investment (FDI) as a process where investors of a source country acquire ownership of assets aiming to control the production, distribution, and other activities in another host country. Lorfing (2021) described FDI as an investment reflecting a lasting interest and control by a foreign direct investor, resident in one economy, in an enterprise resident in another economy (foreign affiliate).

Thus, Moosa (2002) explains that differences in FDI, in comparison with other forms of international investment, are the element of control overmanagement policy and decisions. The author argues that the elements of control give direct investors an informational advantage over foreign portfolio investors and domestic savers.

Most FDI is carried out by Multinational Corporations (MNCs), firms become multinational (or transnational) when they undertake FDI. Thus, FDI represents an internal organizational expansion by multinationals. The link between FDI and MNCs is so close that the motivation for FDI may be used to distinguish between MNCs and other firms (MOOSA, 2002).

Jude (2016) explains that foreign firms are thought to possess some form of a specific asset (often knowledge) which is productivity-enhancing and enables them to enjoy higher efficiency compared with domestic firms. To the extent that domestic firms manage to get access to this knowledge, their productivity is also improved and a form of a virtuous circle of efficiency spillovers is created. This multiplier effect thus becomes the main argument when supporting the contribution of FDI to the economic development of host countries (DEMELLO, 1997).

Through this multiplier effect, the Foreign Direct Investment (FDI) represents an important channel for competitiveness and overall economic growth, as it may generate various effects on the host's economy, including regional development, economic diversification, and productivity gains (MORALLES; MORENO, 2020). Casson (2007) declared that many governments seek high-technology MNCs believing they will generate positive knowledge spillovers in the country. (LEHNERT; BENMAMOUN; ZHAO, 2013); BENMAMOUN; ZHAO, 2013), found significant evidence of FDI generating positive outcomes for the host country's welfare, explaining that FDI will transfer into stronger social welfare functions such as increased education and life expectancy, in addition to the increased purchasing power and spillover effect.

These FDI-driven benefits can be represented by employment opportunities, knowledge and technology spillovers, and new enterprises (ARIF; KHAN; WAQAR, 2020). Ju and Wei (2007) complement that Foreign Direct Investment (FDI) is a global phenomenon and is widely understood to be a major antecedent to economic development. Buchanan; Le and Rishi (2012) show that over the 1996–2006 time period, worldwide trade of goods and services increased by 8% while net inflows of FDI surged by 19%.

1.3. Foreign Direct Investment in emerging economies

Many empirical studies focus on the effects of FDI on output growth in the host country (CHUANG; HSU, 2004; LARDY, 1995). In these studies, FDI is typically considered a significant promoter of economic growth in emerging economies. This is because FDI may help facilitate physical capital stock accumulation, stimulate knowledge spillover, encourage the incorporation of new technologies (BORENSZTEIN et al. 1998,), and advance labor skill acquisition by the host economy through the introduction of management practices and organizational arrangements from the developed world (DEMELLO, 1997; PHAN; NGUYEN, 2020).

Dunning; Kim and Lee (2007) conclude that there have been numerous changes in the international economic environment for foreign direct investment (FDI) over the past decades. The authors mention that more than ever, the trend towards globalization, has stimulated both firms and countries to establish closer cross-border economic linkages and interdependence throughout the world. This, in turn, has fostered a reconfiguration of both the geographical and industrial composition of the activities of Multinational Enterprises (MNEs).

Kayalvizhi and Thenmozhi (2018) emphasize that this globalization process, coupled with technological advances, has led to an increasing convergence of economic structures among developed countries over time. It has also contributed to generating new markets between developed and developing countries and stimulated the promotion of competitiveness-enhancing policies by the governments engaged in FDI. Dunning; Kim and Lee (2007) point out that addition, the elimination or reduction of trade barriers has put more pressure on MNEs to sustain and/or augment their global competitive advantages by accessing created assets and inputs from the cheapest and most reliable sources, and by exploiting both vertical and horizontal economies of scale and the benefits of geographical clustering.

In particular, FDI inflows make positive and crucial contributions to the economic performance of less developed countries (BARTELS ET AL., 2009; GOHOU & SOUMARÉ, 2012; YUSOFF, 2011; NOURZAD; GREENWOLD; YANG, 2014). According to Dunning; Kim and Lee (2007), motivations explaining the internationalization of firms distill into efficiency-seeking, market-seeking, and strategic asset-seeking motives. Still, the number of foreign investments being hosted varies depending on the host's attractiveness (ILOIE, 2015).

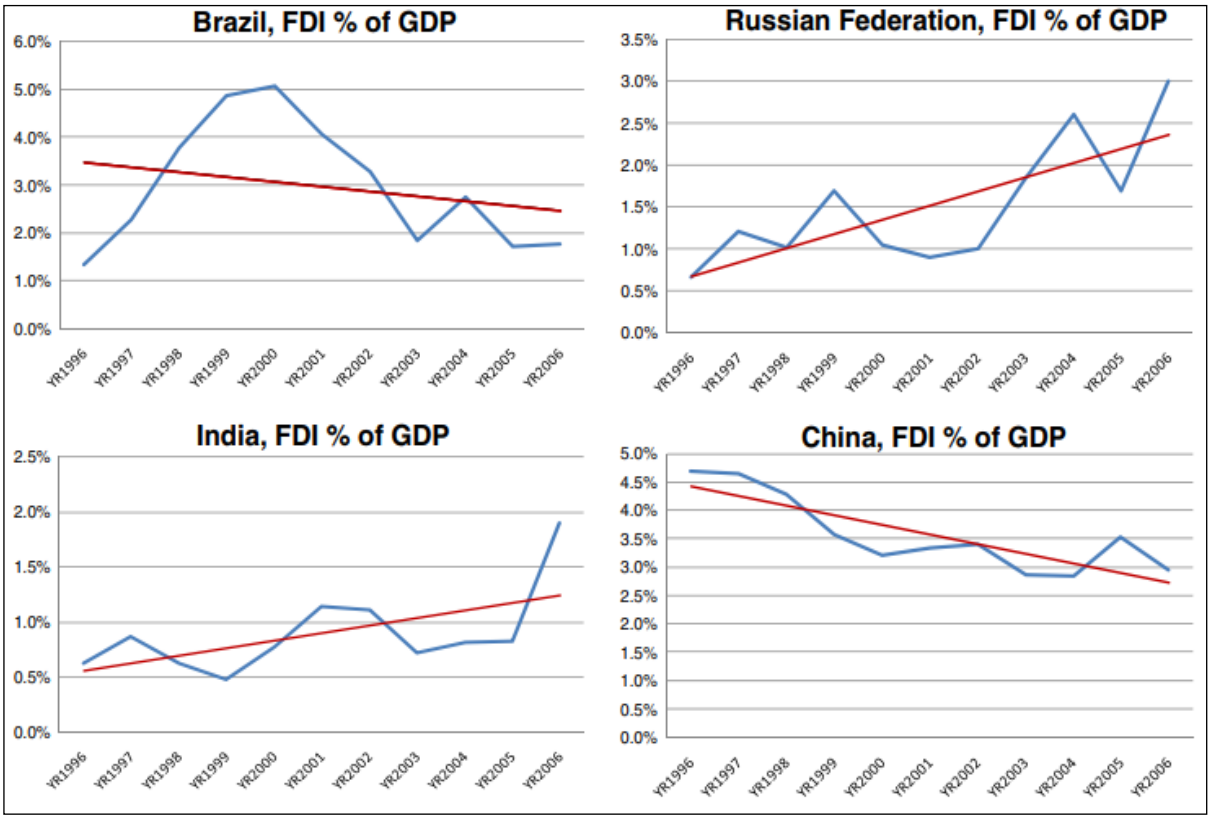
Kayalvizhi; Thenmozhi (2018) highlight while a better economic environment and country governance may induce more FDI, the distinctive factors that attract FDI in emerging

economies is largely dependent on the institutional environment. The authors point out that in the context of emerging economies, it is the institutional environment that determines the level of technological growth and innovation more than country governance.

Kayalvizhi and Thenmozhi (2018) point out that the firm-level corporate governance and country culture may also play a significant role in the success of FDI investment. Yusoff (2011) includes that, a plausible conjecture is formed by factors such as the ability to adopt technology, innovation capacity, quality of corporate governance, and dynamic cultural factors that may be associated with the competitiveness of a country and the increase in the flow of FDI in emerging economies.

Buchanan; Le and Rishi (2012) portray in their study the scenario of FDI in developing economies, mentioning that one of the successful phenomena of FDI in the last decade has been the BRIC economies (Brazil, Russia, India, and China) (Figure 2). The authors include that in 2005, these four economies attracted US$144.57 billion, or 16% of total FDI inflows in the world. The mining, manufacturing, and service sectors – especially automobiles, electronics and electrical, oil and gas and mining, metal and steel, energy, finance, telecommunications, and real estate – benefited most from the increase in FDI in these four economies.

Figure 2 - FDI inflows as percent of GDP



Source: Buchan, Le e Rishi (2012 p. 84)

As mentioned earlier, the literature reveals the importance of FDI for developing countries, in this context Teixeira; Guimarães (2015) explain that FDI plays a key role in the economic development of the recipient countries. In particular, FDI inflows make positive and crucial contributions to the economic performance of less developed countries (YUSOFF, 2011; NOURZAD; GREENWOLD; YANG, 2014).

Zhan; Bolwijn and Santos-Paulino (2021) update the data by completing that developed economies' share in global outward FDI dropped to a record low of 48 percent in 2020. Europe accounted for 11 percent, North America accounted for 19 percent, and developed Asia accounted for 16 percent. On the recipient side, as a result of robust flows in Asia, developing economies accounted for 67 percent of global FDI inflows, up from 48 percent in 2019. Developing Asia is the only region recording growth, accounting for 54 percent of global inward flows. Developing America accounts for 9 percent and Africa for 4 percent, as shown in Table 1.

Table 1- Foreign direct investment outflows, top 20 home economies, 2020

Economy	Inflows		Inward stock
	Value	Ratio to GDP	Ratio to GDP
(Ranked by inflow value)	(Billions of US$)	(Percentage)	(Percentage)
United Statted of America	156	0.7	51.3
China	149	1.0	13.0
China, Hong Kong SAR	119	34.1	539.1
Singapore	91	26.8	549.1
India	64	2.4	17.9
Luxembourg	62	84.8	856.3
Germany	36	0.9	27.9
Ireland	33	8.0	321.9
Mexico	29	2.7	56.0
Sweden	26	4.9	76.1
Brazil	25	1.7	42.8
Israel	25	6.1	46.9
Canada	24	1.4	66.9
Australia	20	1.5	58.8
United Arab Emirates	20	5.6	42.3
United Kingdom	20	0.7	81.5
Indonesia	19	1.8	22.7
France	18	0.7	37.2
Viet Nam	16	5.9	65.8
Japan	10	0.2	4.9

Source: UNCTAD, World Investment Report (2021 p. 55)

1.4. Determinant of FDI: Corruption

The existing literature (YUSOFF, 2011; BUCHANAN; LE; RISHI, 2012; DARLEY, 2012) mentions important determinants of FDI flows: the size and dynamics of the market, human capital, innovation capacity, economic stability, and the quality of institutions, including a prominent factor: corruption.

Teixeira and Guimarães (2015) claim that studies on the impact of corruption and/or countries' institutional quality on FDI are relatively scarce, albeit recently on the rise. In general, authors agree that high levels of corruption (reflecting low institutional quality) tend to increase a country's risks and economic uncertainty and, therefore, decrease FDI inflows (HABIB; ZURAWICKI, 2002; UHLENBRUCK; RODRIGUEZ; DOH; EDEN, 2006; BITZENIS; TSITOURAS; VLACHOS, 2009).

This growing body of literature has already examined the relationship between economic growth and FDI. De facto, the FDI-growth nexus can be studied through many lenses, and one of the more novel perspectives relates to the link between economic growth, FDI, and corruption. In other words, evidence suggests that corruption is an important aspect of the formulation of new public policies to attract FDI and boost the host's growth (FRECKLETON; WRIGHT; CRAIGWELL, 2012).

1.5. Sand and grease theory

The international business literature suggests that corruption moderates the FDI-driven impacts on the host's development (WEI, 2000; MEYER & NGUYEN, 2005). Furthermore, corruption may influence how much investment a region will receive. From this perspective, scholars argue that Multinational Corporations (MNCs) pay careful attention to choosing the location of their new investments, as widespread corruption could increase their risks and operating costs (KWOK AND TADESSE, 2006). Therefore, previous studies recognize that corruption is harmful to foreign investors, and a barrier to inward FDI (BÉNASSY-QUÉRÉ, COUPET & MAYER, 2007). Another perspective, however, argues that corruption can attract foreign investors (URBINA, 2020). Thus, corruption may either attract new investments (in other words, serve as "grease") or decrease the FDI inflows (in other words, serve as "sand") (CUERVO-CAZURRA, 2008).

The "sand" view, as elucidated by Barassi and Zhou (2012), posits that corruption does not attract Foreign Direct Investment (FDI). It underscores how the "grabbing-hand" behavior exhibited by corrupt officials raises the costs of conducting business. Put simply, corruption can dissuade new foreign investments by introducing uncertainty and potentially unnecessary expenses, such as bribes, thereby impacting the profitability of Multinational Corporations (MNCs).

This perspective suggests that corruption amplifies transaction costs, consequently deterring the influx of new foreign investments. Transaction costs refer to all the expenses associated with completing a business transaction beyond the actual cost of the product or service itself. In a corrupt setting, businesses may be forced to pay bribes to officials or navigate complex bureaucratic processes to secure necessary permits or contracts. These additional costs not only increase the financial burden on businesses but also create uncertainty about the overall investment environment.

Scholars such as Saltz (1992), Meyer and Nguyen (2005), Broutthers, Gao, and McNicol (2008), and Cuervo-Cazurra (2008) have extensively explored this notion, emphasizing how corruption diminishes the attractiveness of a market for potential investors.

For instance, Hakimi and Hamdi's (2017) research focused on 15 countries in the Middle East and North Africa (MENA) region, highlighting how corruption serves as a significant obstacle to investment activities and FDI inflows. This empirical evidence underscores the detrimental impact of corruption on economic development and foreign investment within affected countries.

On the other side, corruption may serve as a ‘helping hand’ to foreign investors, as bribes could circumvent restrictions and regulations (LUI, 1985). This other strand of the international business literature suggests a different view on the FDI-corruption link, and these scholars argue that corruption can help increase market efficiency, reduce the companies’ business expenses and arguably facilitate the entry of new MNCs into the market (corruption as “grease”) (EGGER & WINNER, 2005; ZURAWICKI & HABIB, 2010; BARASSI & ZHOU, 2012). Indeed, Urbina (2020) argues that the current debate on corruption and FDI is based on the “sand” and “grease” hypotheses. Nonetheless, the results are still contradictory. To exemplify, Luu Hiep et al. (2019), when analyzing 131 countries, found that corruption reduces cross-border mergers and acquisitions, although it appears to have a positive effect on greenfield investments.

The "sand" and "grease" theory are one of the main approaches used to understand how corruption affects foreign direct investment (FDI). Among the most important

contributions to this theory are Rose-Ackerman (1999), who examined how corruption impacts the functioning of government and the economy, and Kaufmann and Wei (1999), who discussed the ambivalent effects of corruption on the economy, depending on the context and magnitude. Lambsdorff (2007) further developed the "sand" and "grease" theory by exploring the role of corruption in the economy and politics, introducing these concepts to understand the varied effects of corruption.

In addition to the "sand" and "grease" theory, there are several other theories that explore the relationship between corruption and foreign direct investment (FDI). The "Tax Burden" theory, developed by Becker (2009), Buchanan and Tullock (2009), suggests that corruption can arise as a response to the high tax burden imposed by the government on companies, with corrupt officials soliciting bribes to reduce the tax burden. The "Monopoly Cost" theory, proposed by Krueger (1999) and Stiglitz (2017), posits that corruption can result from monopolies or oligopolies in certain sectors of the economy, where corrupt officials use their position to extract bribes from companies in exchange for market access. The "Entry Costs" theory, argued by Paul Romer (1986), De Soto and Junior (2001), suggests that corruption can act as a barrier to entry for foreign companies, with corrupt officials demanding bribes or favors to grant necessary licenses and permits to operate. The "Regulatory Capture" theory, developed by Stigler (1961) and Peltzman (1975), suggests that corruption can arise when government regulators are "captured" by private interests, acting on behalf of specific companies and harming competition. Finally, the "Compliance Costs" theory, developed by Rose-Ackerman (1975) and Klitgaard (1998), argues that corruption can arise as a response to excessive regulatory compliance costs, with companies resorting to corruption to circumvent onerous regulations.

These theories offer varied perspectives on how corruption can affect economic dynamics and the business environment. However, the "sand" and "grease" theory are often considered more relevant in analyzing the relationship between corruption and FDI for several reasons. First, it recognizes that corruption can have both negative ("sand") and positive ("grease") effects on economic transactions, offering a more balanced view. Second, it is widely used and tested in empirical studies, providing a framework for analyzing FDI data in different contexts and countries, becoming a useful tool for economists and policymakers. Third, it helps explain why, in some cases, corruption can facilitate investment by reducing excessive bureaucracy (as "grease"), while in others, it hinders investment by increasing uncertainty and transaction costs (as "sand"). Fourth, it informs public policies practically, suggesting that responses to corruption should be contextualized, with policies adapted to

mitigate negative effects and recognize situations where corruption may temporarily smooth bureaucratic failures. Fifth, it is based on solid theoretical foundations of institutional economics and transaction cost theory, providing a robust analytical framework for understanding the dynamics between corruption and FDI. Finally, it can be applied to different sectors and types of corruption, offering analytical flexibility that other more specific theories do not possess, allowing the analysis of both small, sporadic bribes and systemic, institutionalized corruption.

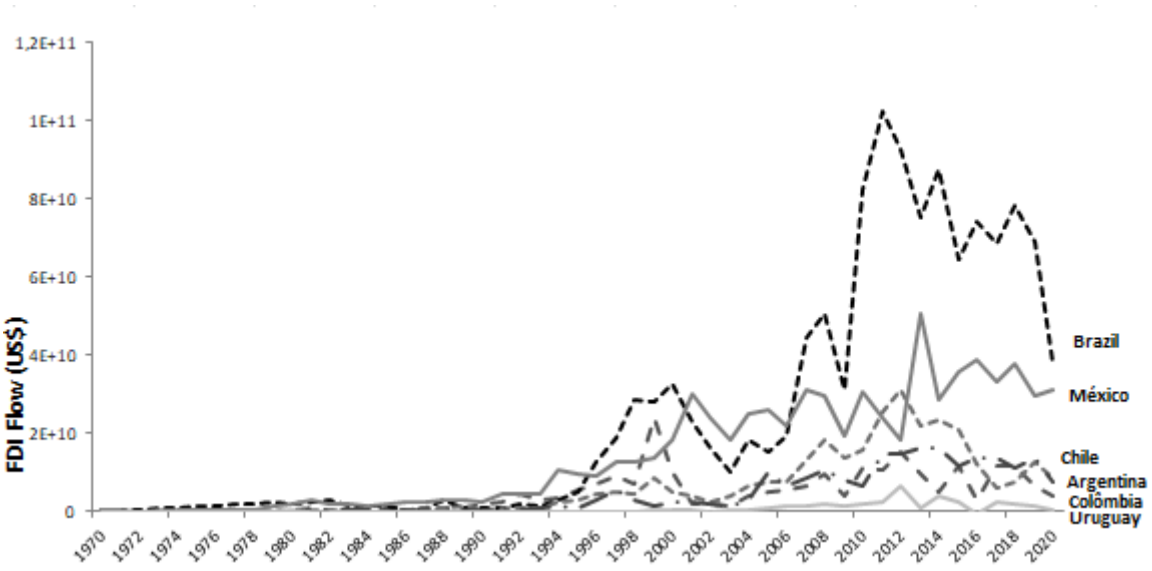
For these reasons, the "sand" and "grease" theory are widely used and considered relevant for the study of corruption and foreign direct investment, providing a comprehensive and balanced view of the varied impacts of corruption on the global economy.

1.6. Motivation

The dynamics between corruption and Foreign Direct Investment (FDI) are complex and multifaceted. The theory of "Sand and Grease" suggests that regions with high levels of corruption can function both as facilitators and as barriers to FDI. In this study, we intend to investigate whether regional levels of corruption in Brazil play a role as "grease", attracting more FDI, or as "sand", repelling it. Therefore, we will use regional Brazilian data to investigate if the hypotheses of corruption serve as “grease” (attracting more FDI) or as “sand” (repelling FDI) in the process of attracting FDI. Thus, this study will investigate this issue using the municipalities from the Sao Paulo state region and a novel dataset on FDI.

According to Moralles and Moreno (2020) even though Brazil is the largest economy in Latin America (in GDP absolute terms) and a major recipient of FDI in the last decades, knowledge about the effects of FDI is little still. The World Bank database (2022) (Figure 3) shows FDI with net inflows (BoP, current US$) in the main Latin American countries: Mexico, Argentina, Brazil, Chile, Colombia and Uruguay. In this context, it is possible to visualize the importance of Brazil as a recipient of FDI in developing countries in Latin America.

Figure 3 - Inward FDI flow



Source: World Bank database (2022).

Thus, this study will investigate this issue using the municipalities from the Sao Paulo state region and a novel dataset on FDI. Up to now, Brazil has received little attention from the international business literature, especially considering FDI-related issues. Regional-level research on FDI in Brazil and other emerging economies is still limited. To our knowledge, regional investigations on the effects of FDI on the host are almost nonexistent in Brazil, with only a few exceptions (MORALLES AND MORENO 2020, POLLONI-SILVA ET AL., 2021). These exceptions, however, failed to study the relationship between FDI and corruption.

Additionally, it is necessary to highlight the importance of Sao Paulo for Brazil and foreign investors. The Sao Paulo state region is particularly relevant for an FDI-focused investigation considering the number of investments in the region. According to the Central Bank of Brazil, the Sao Paulo state region hosts almost 40% of all foreign investments, at least considering industrial activities. Also, Sao Paulo state presents itself as the most developed and rich region in the country and also displays the most economically complex area in the country.

1.7. Importance, Contributions, Problem and Study Objectives

This study aims to better understand the behavior of Foreign Direct Investment (FDI) in the region, essential for shaping future policies, and fills a gap in the international business literature, providing new data and insights. Critical questions to be answered include: "What are the main scenarios identified in the literature on the influence of corruption on the regional attractiveness of FDI in developing countries?" and "Are multinational companies willing to tolerate high levels of corruption in exchange for specific location-related advantages?"

The main contributions of the study are:

- Elucidating the relationship between FDI and corruption at a regional level in the most important economy in Latin America, which is relevant to the literature on emerging economies.
- Using regional data to examine how corruption affects FDI, exploring the "sand" (obstacle) or "lubricant" (facilitator) hypothesis.

The relevance and justification of the study can be summarized in three points:

- Regional Approach: Brazilian municipalities show significant disparities in FDI flows, reflecting institutional, cultural, and income differences that may impact corruption practices. This argument is partially supported by Fredriksson et al. (2003), who found that corruption (along with environmental policy) is relevant in defining the spatial allocation of FDI in the USA.
- History of Corruption in Brazil: Brazil, despite historically being the largest recipient of FDI in Latin America, has a business culture marked by opaque agreements and a significant drop in the corruption perception ranking, from 69th in 2012 to 106th in 2019, due to a series of recent scandals.
- Research Gap: There are no studies evaluating the relationship between FDI and corruption in Latin American countries, justifying the need for this study.

These points guide the study to achieve a deeper understanding of the relationship between FDI and corruption in Brazil, providing a solid foundation for future research and for the development of public policies that can promote a more attractive environment for FDI while addressing the issue of corruption.

CHAPTER 2: FDI AND CORRUPTION IN BUSINESS RESEARCH: A SYSTEMATIC LITERATURE REVIEW AND FUTURE DIRECTIONS

It is worth noting that this text has been submitted for peer review to the scientific journal *"Journal of Business Ethics"*, with Journal Citation Reports (JCR) 6,1 e Qualis A1.

2.1. Introduction

Academic research has been concentrating on the impact of institutions and their regulations on economic outcomes focusing on economic growth and its channels such as Foreign Direct Investment (FDI) (DESLI, 2018). Endogenous growth theories emphasize FDI as a key determinant of economic progress due to its role in transferring technology from developed countries (SABIR, S; RAFIQUE, A; ABBAS, K, 2019). Therefore, the incorporation of new inputs and foreign technology increases the local stock of knowledge and positively affects domestic firms via spillovers (PHAN; NGUYEN, 2020).

FDI is widely acknowledged as growth enhancer, as it can direct impact on production, exports, and employment by means of foreign technology, modern management skills and corporate governance it is also associated with the reduction of inequalities and improve human development and infrastructure. In addition to affecting economic growth and the general welfare of the host country, it has a (LESTARI; LESMANA; YUDARUDDIN; YUDARUDDIN, 2022; ZANDER, 2021b).Therefore, FDI can positively contribute to the convergence of developed and developing countries, and these investments can particularly increase imitation activities in developing countries (BUSSE; HEFEKER, 2007). In this context, hoping to benefit from FDI, many emerging nations replace existing controls and restrictions over the entry of foreign multinational companies (MNCs) with policies that are designed to attract and encourage FDI.

In this context, theoretical and empirical research on the determinants of FDI inflows identifies a variety of restraining and catalyst factors such as market-seeking motives, political risks, and the quality of institutions and sufficient natural resources to enhance the efficiency of core competences (LUU; NGUYEN; HO; NAM, 2019; QIAN; SANDOVAL-HERNANDEZ, 2016; VUONG; NGUYEN; PHAN, 2021). Among regional features that contribute to FDI inflows, the role of corruption (GROS; HENKE, 2022; LEDYAEVA; KARHUNEN; KOSONEN; WHALLEY, 2015; ONODY; GANDRA DE CARVALHO;

POLLONI-SILVA; ROIZ *et al.*, 2022; STEVENS; NEWENHAM-KAHINDI, 2021; VUONG; NGUYEN; PHAN, 2021) remains in the shadows, as the, studies that explore the impact of regional corruption standards on the attraction of FDI remain inconclusive (ABOTSI, 2018; KRIFA-SCHNEIDER; MATEI; SATTAR, 2022). Indeed, as supported by stakeholder and institutional theories, institutional dissimilarities between countries may impact MNCs' strategic choices regarding possible host-countries, since MNCs not used to deal with high corruption levels at home may find themselves dealing with it abroad (GODINEZ; GARITA, 2014; LUPTON; BAULKARAN; NO, 2022).

Among the main theories that discuss the nexus between corruption and FDI, the sand and grease hypothesis stand out. In one hand, corruption may deter FDI by making a host country unattractive to foreign investors via the high entry costs and uncertainty, and distorting incentives to invest. A robust body of empirical literature supports such negative effects of corruption on FDI (BARASSI; ZHOU, 2012; QIAN; SANDOVAL-HERNANDEZ, 2016; URBINA, 2020; WEI, 2000). Precisely, bribes paid by firms act as taxes, and the rent seeking activities facilitated by corruption result in waste of resources. Likewise, there are additional costs due to the inability to enforce contracts that result from the corruption practices (HABIB; ZURAWICKI, 2002; WEI, 2000).In this sense, according to (MAURO, 1995) view of economic development of “grease or throw sand in the wheels”, the widespread corruption in a region can act as “sand”, thus hurting FDI inflow.

An alternative proposition suggests that corruption act as a “grease to the wheels” (LEDYAEVA; KARHUNEN; KOSONEN; WHALLEY, 2015; YANG; CHENG; LIN, 2015). In this formulation, corruption practices would help MNCs to overcome institutional heterogeneity and complexity in regard to legal, accounting and tax issues present in emerging economies, thus facilitating the entrance, by extension, Zander (2021a) argues that corruption facilitates the valuable expansion of the shadow economy during critical periods such as recession. Emerging economies may face a particular challenge to deal with the attraction of FDI due to the high levels of corruption, where this issue is more prevalent than in developed nations (HELLMAN; JONES; KAUFMANN, 2000).The application of institutional theory provides valuable insights into this phenomenon. According to institutional theory, institutions are the formal and informal rules that shape human behavior within a society or organization (ROCHA; ÁVILA, 2015). In the context of FDI, that institutional weaknesses often manifest itself as corruption, bureaucratic inefficiencies, and regulatory uncertainties.

Therefore, multinational corporations from developed countries must grapple with these challenges, as they can significantly affect the ease of doing business and overall investment attractiveness. In Brazil, for instance, according to the Brazilian Atlas of FDI (MORALLES; POLLONI-SILVA; CAMIOTO; FERRAZ *et al.*, 2021), the majority of Foreign Direct Investment (FDI) comes from multinational corporations. Understanding the intricacies of this investment landscape involves acknowledging the institutional weaknesses prevalent in emerging economies. The challenge faced by FDI from developed countries lies in navigating and mitigating the impact of these institutional frailties (DA SILVA; VERDU; CRUBELLATE, 2020).

One key aspect of institutional theory is the distinction between formal and informal institutions. While formal institutions encompass laws, regulations, and government structures, informal institutions include cultural norms, social practices, and trust networks (ROCHA; ÁVILA, 2015). In developing economies, the interplay between formal and informal institutions obscures the business environment for foreign investors. For instance, corruption may be deeply ingrained in informal practices, influencing decision-making processes and creating an additional layer of complexity for multinational corporations. In this way, the institutional weaknesses observed within an emerging economy can represent a significant obstacle to Foreign Direct Investment from developed countries.

While several studies have examined the relationship between corruption and foreign direct investment in the host country, the literature indicates that there is no consensus on this relationship (GUPTA, 2019; KAMOWA; ARUNASALAM, 2020; LEAL; CAETANO; MARQUES, 2021; YOUNSI; BECHTINI, 2019). Factors such as regional institutions, governance, economic complexity, human capital, and technological frontier are studied in the literature and considered in the analysis of this relationship. Therefore, this study addresses the following research question (QR): How does the literature present the relationship between regional corruption attractiveness and Foreign Direct Investment (FDI) in emerging countries, and what is the main trend in these studies regarding the "sand or grease" hypothesis?

In this context, this study aims to conduct a Systematic Literature Review (SLR) on how corruption influences regional attractiveness of Foreign Direct Investment (FDI) in developing countries. It is worth noting that FDI has significantly increased in developing countries over the past two decades. This significantly increased importance has received special attention in uncovering the relationship between FDI and economic growth in the host country. Therefore, discovering the factors that impact the volume of FDI inflow into a

specific economy is crucial, as these impacts may be contingent on the host country. Specifically, this review provides a systematic overview of the plurality of results of the "sand or grease" hypothesis in emerging countries employed in contemporary articles from high-quality academic journals.

Therefore, this study has the following contributions in terms of theory and practice. Firstly, we offer a systematic review of the state of the art regarding Foreign Direct Investment (FDI) and corruption in emerging countries, encompassing 93 studies and analyzing the primary trend of the "sand or grease" hypothesis. Secondly, we utilize the perspectives from our analyses to suggest pathways for scholars interested in exploring various aspects of the topic. These recommendations provide important criteria for decision-making to future public policy makers. Specifically, the regional analyses on corruption will serve as benchmarks for a potential policy to enhance FDI attraction.

The sections of this review progress as follows. First, the article introduces theoretical aspects related to the topic for the subsequent review. Second, the methods section explains the process of selecting articles included in the review and the use of the Literature Systematic Review (SLR) technique. Following that, we present the conclusions of our study, followed by a final section with considerations for future research. Finally, limitations are briefly discussed.

2.2. Research method

A Systematic Literature Review (SLR) is based on a simplified description of studies and information on a particular subject. It has a narrative character and relies on the application of methods with a higher level of scientific rigor, aiming to achieve better results and reduce errors and bias on the part of the researcher responsible for conducting the investigation (COOK; GREENGOLD; ELLRODT; WEINGARTEN, 1997). SLR is a literature review method that conducts a standardized review in which a significant portion of papers on a specific topic are evaluated. It improves the validity of the findings and research rigor while minimizing biases (TRANFIELD; DENYER; SMART, 2003).

A SLR provides a methodical, explicit, and replicable synthesis of a given topic (REIM; PARIDA; ÖRTQVIST, 2015). It's also valuable in identifying gaps that new research may explore, or in summarizing previous findings to uncover patterns that can address a research question (REIM; PARIDA; ÖRTQVIST, 2015; TRANFIELD; DENYER; SMART, 2003).

We delved into existing literature that delves into the intricate relationship between corruption and its impact on the attractiveness of Foreign Direct Investment (FDI) in developing nations. Our research methodology involved utilizing two prominent databases, namely Scopus and Web of Science, to curate and represent the most pivotal studies within this specific research domain. The rationale behind selecting these databases lies in their extensive global repositories of academic papers and publishers, rendering them as authoritative sources for comprehensive literature reviews. Moreover, their widespread adoption in numerous systematic literature reviews further bolstered our confidence in their reliability and relevance to our research objectives.

To conduct this research, we adopted the method proposed by Tranfield, Denyer and Smart (2003), an SLR method adapted to other areas in order to maintain the rigor that an SLR requires, while making the method feasible for researchers outside the health area (TRANFIELD; DENYER; SMART, 2003). The authors divide systematics reviews into three stages, where each stage comprises several steps. Next shows the stages and steps where planning is the first one.

Stage 1 – Planning the review

- Step 1: Identification for the need for a review;
- Step 2: Development of a review protocol.

Stage 2 – Conducting a review

- Step 3: Section of studies and exclusion of duplicated papers;
- Step 4: Reading the abstracts and application of inclusion and exclusion criteria;
- Step 5: Study quality assessment;
- Step 6: Data extraction and monitoring progress;
- Step 7: Data synthesis

Stage 3 – Reporting

- Step 8: The report and recommendations

2.3. Systematic Literature Review

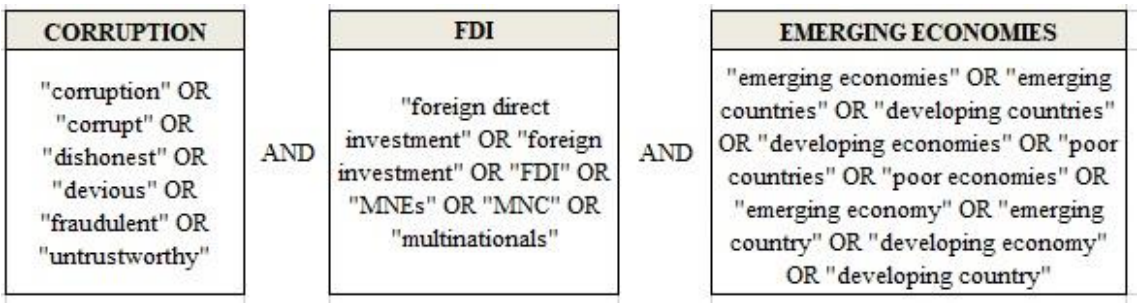
This section represents the methodological characterization of SLR (Systematic Literature Review) that was applied for the selection and analysis of studies.

2.3.1. Planning the review

This stage contains activities such as identification of the need for a review, development of protocol and validation of protocol (BRERETON; KITCHENHAM; BUDGEN; TURNER *et al.*, 2007). The review panel should help direct the process through regular meetings and resolve any disputes over the inclusion and exclusion of studies. The initial stages of systematic reviews may be an iterative process of definition, clarification, and refinement **(TRANFIELD; DENYER; SMART, 2003)**.Therefore, the authors must clarify and refine the general objectives of the research with a clear definition of the search bases, keywords, and criteria for inclusion and exclusion of studies (Table 2).

This SLR included only studies from journals indexed to internationally recognized, such as the Social Science Citation Index (Web of Science) and Scopus. We defined the keywords to begin the search. According to Tranfield, Denyer and Smart (2003a), the research strategy must be detailed enough to guarantee the replicability of the SLR. This study divided the keywords into three groups: 1) Corruption-related terms, 2) FDI-related terms, and 3) Emerging Economies-related terms. The English language was chosen to do the search due to its coverage. Figure 5 shows the keywords division.

Figure 4 - Keywords



Source: Author (2023).

2.3.2. Conducting the review

The second stage of an SLR consists of conducting the review, and its objective is the selection of studies, analysis, and data extraction. Conducting the review consists in the identifying of research, study selecting, making the quality assessment, extracting data, as well as synthesizing the data gathered. Reporting means documenting the review, which is writing the review and validating the report. For the correctness of the SLR, all of the steps

above need to be well performed (BRERETON; KITCHENHAM; BUDGEN; TURNER *et al.*, 2007; STEFANOVIC; HAVZI; NIKOLIC; DAKIC *et al.*, 2021)

The selection of studies is a crucial step to achieve a reliable database which represents the most important studies in a research field. We adopted the Parsifal software online tool designed to support researchers to perform systematic literature reviews within the context of Software Engineering) to manage the next steps of the SLR. The initial search included a sample of 479 papers, of which 95 were duplicates. To identify the main objectives and conclusions of the studies, we read the titles and abstracts of the 384 studies. This step is essential to confirm if the selected studies fit the search criteria and if they are directly related to the analyzed topic.

The second step of the second stage consists in reading the abstracts of the selected studies and apply the inclusion (first two) and exclusion criteria (last two): (i) Studies must be written in English; (ii) Contains more than three pages, since this systematic review sought to use only complete scientific studies, then the delimitation of a minimum number of pages aimed to eliminate any expanded reports or abstracts. (iii) It is not a scientific paper. This criterion was determined to discard book chapters, thesis, journalistic texts, etc. And finally, (iv) the paper does not fit the scope of the research. This step resulted in the removal of 283 papers.

The third step of stage two requires that the authors assess the quality of the studies by identifying if they present any methodological flaws or research bias. To evaluate the quality of the selected articles, it will be necessary to read all studies in their entirety, as well as evaluate the methods and integration with the developed theory. This step should be peer-reviewed. Tranfield, Denyer, and Smart (2003a; b) indicate that quality checking is part of a rigorous analysis method, essential for conducting a SLR.

The fourth step in conducting the review consists of extracting data from the articles. Therefore, it is necessary to read the selected articles and summarize their main methods and results. The fourth step of stage two and the entire stage three will be presented in the next topics.

In this sense, we employed a protocol with three groups of keywords applied to two research databases. Moreover, we did not limit the number of analyzed years to guarantee that all articles in this research field appear in our database. Our search shows that 283 articles are available. Table 2 summarizes our protocol.

Table 2- Selection of the gross articles bank

	International Portfolio
Gross Items Bank Selection	
Consulted databases	Scopus and Web of Science
Keywords	Corruption AND Foreign Direct Investment AND Emerging Economies
Delimitation	English language Contains less than three pages Type of publication: Journal article Scope of the research
Date of consultation	February 2023
Results	479 articles

Source: The authors, adapted Silveira et.al. (2021).

Despite the robust methodology provided by the Realist Synthesis Literature (RSL) method, it is crucial to acknowledge the limitations inherent in this study. One such limitation lies in the exclusion of the so-called "gray literature," which comprises non-conventional documents such as technical reports, theses, and governmental documents. The absence of this source of information may have led to the exclusion of potentially relevant studies, which could affect the breadth and representativeness of the results obtained.

Furthermore, as pointed out by Tranfield, Denyer, and Smart (2003), evaluating the quality of articles in research related to the management field can be challenging. The lack of precise and universally accepted criteria for assessing the quality of studies can introduce subjectivity into the analysis and compromise the validity of the results. This underscores the need for caution when interpreting and generalizing the conclusions of this study.

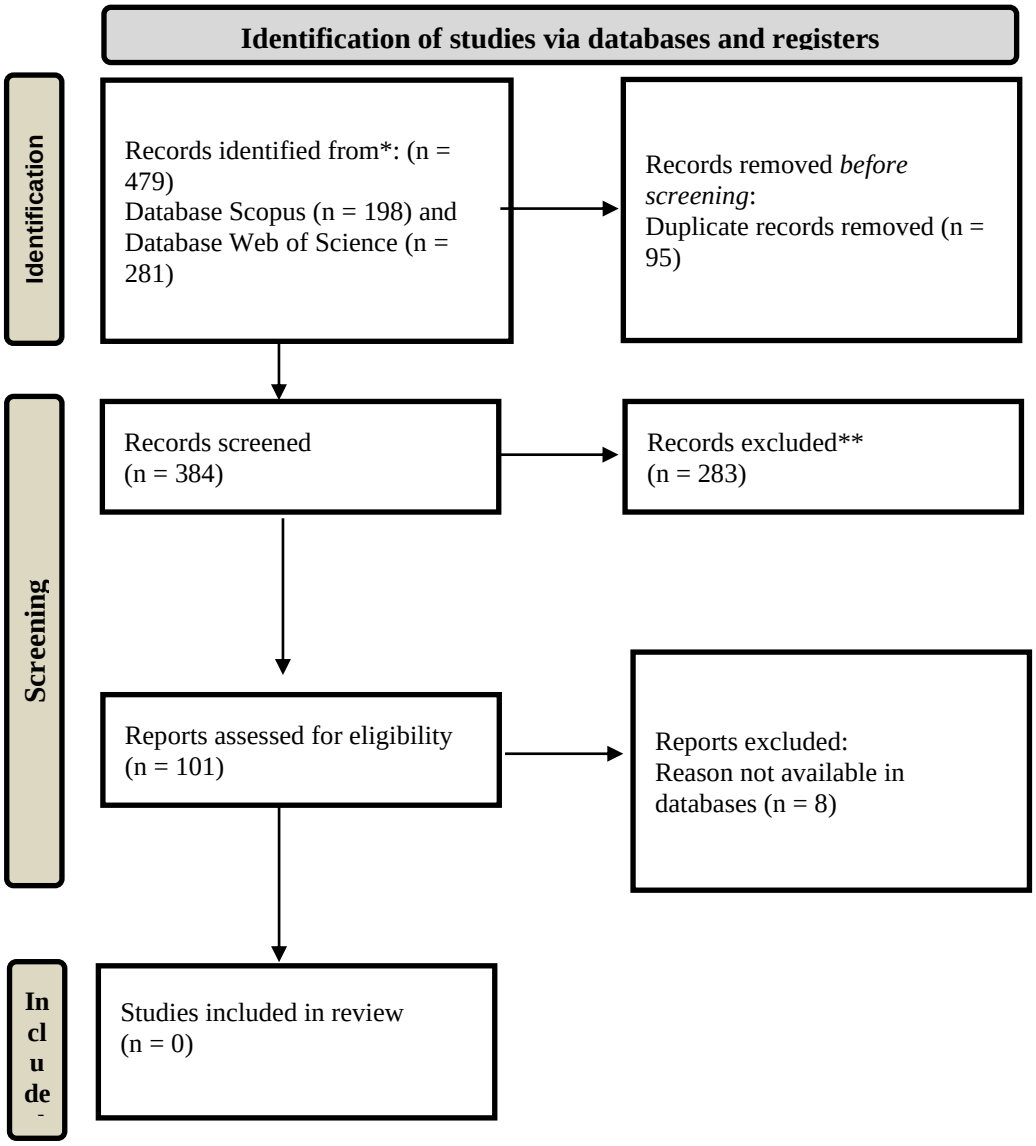
Regarding the methodological approach, it is important to highlight that two complementary methods of analysis were used: quantitative analysis and qualitative analysis. For the quantitative analysis, initially, 101 relevant articles were identified and selected. However, eight of these articles could not be located in the database used, resulting in the analysis of 93 documents.

For the qualitative analysis, all 93 documents were thoroughly examined, aiming to extract significant insights and identify emerging patterns in the data. This combined approach allowed for a more holistic and in-depth understanding of the phenomenon under study, thus enriching the analysis and interpretation of the results.

Lastly, it is pertinent to emphasize that the presentation of the Prisma Figure, following the guidelines proposed by Moher et al.(2009)., is a measure aimed at ensuring

transparency, replicability, and quality of the present study. These guidelines provide a set of essential items to be incorporated into systematic review reports, thereby strengthening the credibility and reliability of the findings presented. Furthermore, the results of this stage have been summarized and organized clearly in Table 3, providing an overview of the main results obtained so far.

Figure 5 - PRISMA



Source: The authors, adapted Moher et.al. (2009).

Table 3 - Results of the second stage

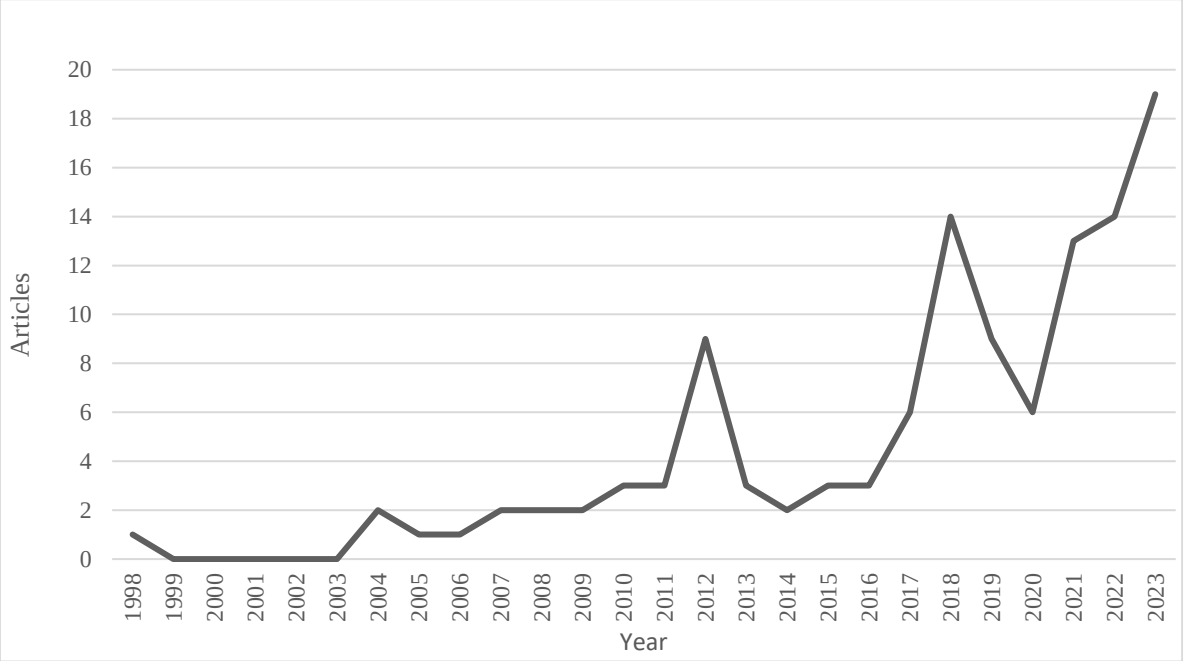
Criteria for analysis		Scopus	Web of Science
Selection of Studies	Articles identified with keywords	198	281
		479	
	Duplicated Studies	95	
Inclusion and Exclusion of criteria	Reading of Abstracts	384	
	Articles excluded after applying exclusion criteria	283	
	Studies Left	101	
	Full articles not available in database	8	
Quality Assessment	Full tex reading to asssess the quality of study	93	
	Studies Left	93	

Source: Author (2023)

2.3.2.1. Data extraction and monitoring progress

Part of the second stage of the fifth phase of SLR is data extraction and progress monitoring. In this session, we perform a descriptive analysis of the studies we found. From the yearly distribution of the selected articles shown in Figure 6, this study found that research in this domain has gained momentum in recent years. For example, 62% of the selected studies (58 out of 101) were published in the last five years between 2018 and 2023. This growing interest confirms that research in this thematic area is justified as the importance of global FDI has increased exponentially over the years.

Figure 6 - Annual Scientific Publication on the topic of FDI and corruption



Source: Author (2023)

Through the results in Figure 6 it is possible to see that over the decades, academic publications on Foreign Direct Investment (FDI) and corruption have shown significant evolution. Before 2004, there was limited interest, reflected in only one article in 1998 and none in the subsequent years until 2004.

Starting from 2008, during the Global Financial Crisis, there was a gradual increase in the number of published articles. This crisis highlighted crucial issues of corporate governance and transparency, catalyzing greater academic interest in understanding how corruption could impact economic stability and attractiveness for FDI.

In 2014, the Lava Jato scandal in Brazil brought deep concerns about corruption, particularly in strategic sectors such as energy and infrastructure, significantly influencing academic research and global debate on the topic.

Legislative changes in many countries to strengthen anti-corruption laws from the mid-2010s reflect a global movement towards greater transparency and accountability. These legal reforms spurred academic interest in understanding how these laws impact the investment environment and corporate governance.

The economic rise of emerging economies in Asia, such as China and India, has also sparked renewed interest in the role of FDI and corruption. As these countries become major

destinations for foreign investment, understanding how corruption can influence these investments has become essential for academics, policymakers, and entrepreneurs.

Since 2018, there have been notable peaks in publications, aligned with a growing global awareness of transparency, good governance, and the role of corruption in attracting investments. The implementation of stricter anti-corruption laws in many countries may have also stimulated this increase in research.

The COVID-19 pandemic, starting in 2020, further emphasized the importance of effective governance and transparency in managing economic crises and distributing large-scale economic stimulus funds. This has reinforced academic interest in understanding how corruption can affect government responses and the global investment environment.

In summary, the analysis of academic publications on FDI and corruption over the years shows significant evolution, shaped by historical events that underscore the critical relevance of these issues. These events have not only influenced the research agenda but also impacted public policies and global business practices.

From the selected articles, this study found that Busse (2007) is the most frequently cited article, which has been cited 788 times, with an average of almost 50 citations per year, followed by Uhlenbruck (2006) and Buchanan et al.(2012). A list of key articles in this research domain is shown in Table 4. Specificallly, Busse and Carsten Hefeker (Busse & Hefeker, 2007) explor the links between political risk, institutions and foreign direct investment flows in developing countries between 1984 and 2003. Its main conclusions show that in particular, government stability, internal and external conflicts, law and order, ethical tensions, democratic accountability, bureaucratic quality and corruption are important determinants of investment flows. This suggests that corruption effects may take some time to manifest themselves in developing countries.

Table 4 - Most Global Cited Documents

Paper	Total Citations
Busse M. (2007)	788
Uhlenbruck K. (2006)	294
Buchanan B. (2012)	238
Gastanaga V. (1998)	233
Pajunen K. (2008)	179
Javorcik B. (2009)	173
Xie E. (2017)	149
Bailey N. (2018)	117
Sabir S. (2019)	112

Source: Author (2023)

The 101 selected studies were published in 89 interdisciplinary journals. Most of them were contributed by leading journals, such as International Business Review (3), Sustainability (3), Economic Modelling (2), Emerging Markets Finance and Trade (2), and Global Strategy Journal (2).

Table 5 - Main journals where articles were cited

Sources	Citations
Journal of International Business Studies	379
International Business Review	130
World Development	110
Journal of World Business	97
Journal of Business Ethics	82
Strategic Management Journal	82
Journal of International Economics	78
The Quarterly Journal of Economics	62
The Review of Economics and Statistics	62
Academy of Management Review	61

Source: Author (2023)

The journal with the highest number of citations reviewed in this study was the "Journal of International Business Studies". This journal contains the fifth most cited article, which was written by Pajunen in 2008. This article, published in 2008, examines the essential

question of causal complexity and diversity related to the influence of institutions on the Foreign Direct Investments (FDI) of multinational enterprises from 1999 to 2003 (PAJUNEN, 2008).

Pajunen's (2008) findings reveal that institutional factors have diverse influences on regional attractiveness. The author examines institutional factors such as flexible labor regulation, non-corruption, a fair judicial system, political rights and civil liberties, favorable taxation, political stability, and property rights. These factors may be associated with different outcomes when examined across different regional categories of countries. Countries can be attractive or unattractive solely based on the presence or absence of a single institutional factor. This study underscores the significance of regional factors in the attractiveness of Foreign Direct Investment (FDI).

Table 6 - Most Cited Countries

Country	Number of Citations
USA	996
Germany	793
United Kingdom	473
China	384
Finland	215
Pakistan	142
Belgium	103
Jamaica	103
Canada	98
India	75
Spain	53
Malaysia	23
Vietnam	20
France	15
Tunisia	15

Source: Author (2023)

Although our study refers specifically to emerging or developing economies, the country with the highest number of citations in this study was the "United States of America (USA), revealing a great concentration of studies about FDI and Corruption in developed countries. Table 6 display the most cited countries reveal the predominance of articles focused on developed countries or those in the European, Western, and Asian developing regions. It is

noteworthy that only two countries from North America are highlighted, with no incidence of countries from Central and South America. The next topic will further explore the relationship between FDI and corruption, delving deeper into the analysis of the articles presented thus far.

Figure 7 - Distribution of Citations in the World

Source: Author (2024)

This analysis reveals a broad geographical distribution of the countries cited, spanning all major continents: North America (USA, Canada, Jamaica), Europe (Germany, United Kingdom, Finland, Belgium, Spain, France), Asia (China, India, Malaysia, Vietnam), and Africa (Tunisia).

In terms of economic development, most of the cited countries are considered developed, such as the United States, Germany, United Kingdom, Finland, Belgium, Canada, Spain, and France. These countries typically have strong institutions, low perceived corruption levels, and are attractive for foreign direct investment (FDI) due to their economic and legal stability. On the other hand, countries like China, India, Malaysia, Vietnam, and Jamaica are emerging or developing economies.

These countries face different challenges, including governance issues, transparency, and perceptions of corruption, which can affect their attractiveness for FDI. Developed economies, including the USA, Germany, United Kingdom, Finland, Belgium, Canada, Spain, and France, generally have robust institutions, predictable regulatory environments, and well-

established legal systems. This makes them preferred destinations for FDI due to their economic stability and low perceived risk.

Emerging and developing economies like China, India, Malaysia, Vietnam, and Jamaica are experiencing rapid economic growth but face challenges related to governance, corruption, and political stability. The perception of corruption in these economies can negatively impact investor confidence and investment decisions. This diversity reflects different perspectives and contexts in research on foreign direct investment and corruption worldwide.

While developed economies focus on maintaining high standards of governance and transparency, emerging and developing economies are striving to strengthen their institutions and improve practices to attract more foreign investment.

2.3.3. Systemic analysis

2.3.3.1. Country of the first author and research method

When examining the literature on the first authors of the studied articles, there is a recurrence of prominent countries as shown in Table 6. Confirming this, it is evident from the data in Table 7 that the main authors of the studied articles are from developed countries such as the USA, the United Kingdom, China, and India, reinforcing the significance and importance of this research topic globally.

Table 7 - Country of the first author

Country of the first author	Total articles
USA	17
United Kingdom	9
China	6
India	6
Germany	3
Spain	3
Africa	3
Pakistan	3

Source: Author (2023)

Upon examining the studies, it was possible to identify that the vast majority (79%) of the articles employed econometric techniques as their research method, 4% conducted an archival data review, 3% used a survey, and 3% employed a systematic literature review.

In the investigation of the research articles, we obtained only two papers that conducted a systematic literature review, which we will now discuss in terms of the topics covered. Therefore, Cooke et al. (2022) carries out the review in the analysis of the role of multinational enterprises (MNEs) as creators or recipients of corruption. The authors examined 139 articles from 75 English journals during the period from 1999 to 2020. This study is grounded in the literature that draws attention to the role of MNEs as active agents in corrupt practices. With a focus on Western North American companies, the study explores whether these companies play a significant role in instigating or actively sustaining corrupt practices. The study highlights several considerations, including the difficulty of promoting "clean" behavior in environments where corruption is pervasive.

The second literature review found was authored by Xie et al. (2017), which conducts a review of 250 articles examining the determinants of cross-border mergers and acquisitions. The authors explore the taxonomy of research published in the last three decades in international business, strategic management, finance, and economics. They present syntheses in seven dimensions: macroeconomic and financial market environment, institutional and regulatory environment, political environment and corruption, fiscal and tax environment, accounting standards and valuation guidelines, cultural environment, and geographical environment. Using the Origin-Host country, West-South, and South-West directional flows, the authors highlight some key findings from bibliometric analysis, providing a summary for each determinant at the country level.

The review suggests that improving the institutional laws of the host country regarding financial markets, taxation, and corporate governance will lead to a higher number of acquisitions. It emphasizes that geopolitical distance, regulatory distance, and cultural distance between developed and developing economies are more likely to be moderated by the target country's market size, resource base, and weak institutional laws, especially in corporate taxes and capital gains taxes (XIE; REDDY; LIANG, 2017).

This analysis displays that there are no papers employing a systematic literature review in order to analyze the specific relationship between corruption and FDI, considering that corruption may be a determinant factor to MNEs to choose a determined place to settle or begin operations. Furthermore, we highlight the originality of this study also lies in to conduct an RSL on the influence of corruption on the regional attractiveness of Foreign Direct Investment (FDI) in developing countries, especially regarding the “sand or grease” frameworks.

2.3.3.2. Unit of analysis and classification of the analyzed regions

When examining the literature on the effects of corruption on Foreign Direct Investment (FDI), it is not uncommon for studies to explore the entire country as the unit of measurement. After all, by exploring the country as a corruption holder, it is possible to reflect on the reasons why investors chose to invest in that territory (BHASIN & GARG, 2020; LEAL ET AL., 2021; SAMINA SABIR ET AL., 2019). Some of the studies included in this systematic review also address the national unit of analysis. As shown in Table 8, our sample includes studies that examine the unit of analysis and the classification of the analyzed regions: Country (Developed or developing; Year; Very poor, Poor, Medium, Rich, or Very rich), Region (Continent; Country; City), and Multinational Enterprise (Domestic or Foreign; Developed country or developing country).

Table 8 - Analysis unit and Classification of regions

Analysis unit	Classification of the analyzed regions	
Country	Developed or developing	(Busse & Hefeker, 2007; Chen & Jiang, 2021; Fatmawati et al., 2018; Freckleton et al., 2012; Simsek et al., 2010)
	Year	(Gros & Henke, 2022; Kamowa & Arunasalam, 2020; Osabutey & Okoro, 2015; Zhanatauova et al., 2018)
	Very poor, Poor, Medium, Rich or Very rich	(Al-Faryan, 2022; Samina Sabir et al., 2019)
Region	Continent	(Bissoon, 2012; Refakar & Gueyie, 2019)
	Provinces/State	(Drapkin et al., 2018; Ledyaeva et al., 2015; Vuong et al., 2021)
	City	(Onody et al., 2022)
multinational enterprise	Domestic or Foreign	(Ashyrov & Masso, 2020; Oh & Ryu, 2019)
	Developed country or developing country	(Stevens & Newenham-Kahindi, 2021)

Source: Author (2023)

According to Table 8, the authors conduct their research addressing the theme of FDI and Corruption at the national, regional, and sectoral levels, the latter utilizing multinational corporations. By identifying these niches in the studies, the scarcity of micro-regional depth in the investigations becomes evident. This may suggest a gap in the literature in terms of investigating the effects of corruption at the most localized level.

Understanding how corruption affects different levels of investment can influence the policies and strategies adopted by both governments and companies. Further investigations in

this regard can help identify specific areas where corruption has a more significant impact, allowing for the formulation of more targeted policies to combat this issue and promote a healthier and more transparent investment environment.

Additionally, understanding how corruption operates at more localized levels can provide valuable insights for companies seeking to invest in particular regions or sectors, enabling them to better assess risks and make more informed decisions about where and how to invest their resources.

2.4. Results and discussions

Through this item, we will present the main results of the articles in this study to the topic related to the influence of corruption on the regional attractiveness FDI in developing countries. We examined the key aspects and influencing factors contained in the articles. Overall, developed countries are the pioneers and the majority in research on the topic, focusing on a single country or a small selection of countries (DUTTA; KAR; SAHA, 2017; GASTANAGA; NUGENT; PASHAMOVA, 1998; LEDYAEVA; KARHUNEN; KOSONEN; WHALLEY, 2015; OSABUTEY; OKORO, 2015; PAJUNEN, 2008; QIAN; SANDOVAL-HERNANDEZ, 2016). The studies analyze various indicators to assess the attractiveness of FDI, among the main ones, it is possible to highlight institutional quality (ASIF; MAJID, 2018; BAILEY, 2018; BISSOON, 2012; CHEN; JIANG, 2021; DANG; NGUYEN, 2021; FAKIRI; CHERKAOUI, 2022; PERES; AMEER; XU, 2018; RAZZAQ; AN; DELPACHITRA, 2021; SABIR, SAMINA; RAFIQUE, ANUM; ABBAS, KAMRAN, 2019; SINGH, 2012) and governance indicators (KAYALVIZHI; THENMOZHI, 2018; LEAL; CAETANO; MARQUES, 2021; SUJIT; KUMAR; OBEROI, 2020), the latter emphasizing institutional laws and public services, for example, in Xie et al. (2017).

In relation to institutional indicators, it is observed that many authors investigate institutional policies (GASTANAGA; NUGENT; PASHAMOVA, 1998; PAJUNEN, 2008) and the political and financial risks of institutions (BUSSE; HEFEKER, 2007; DESBORDES, 2010; HAYAKAWA; KIMURA; LEE, 2013; JIANG; MARTEK; HOSSEINI; TAMOSAITIENE *et al.*, 2019; MUKHOPADHYAY; DAS, 2019; OSABUTEY; OKORO, 2015). Business indicators (ASHYROV; MASSO, 2020; GROS; HENKE, 2022; OESTERLE; RÖBER, 2017; YASSIN; ELFIKY; EL NIMER, 2020), highlighting the business environment, are extensively researched in the examined articles. Additionally, only a few of them used data that includes the most recent years from the early 2000s

(ASHYROV; MASSO, 2020; GUHA; RAHIM; PANIGRAHI; NGO *et al.*, 2020; ONODY; GANDRA DE CARVALHO; POLLONI-SILVA; ROIZ *et al.*, 2022; RASHID; CHOWDHURY; TALUKDAR; JYE, 2021; STEVENS; NEWENHAM-KAHINDI, 2021; VUONG; NGUYEN; PHAN, 2021).

Almost all studies analyze macroeconomic factors and emphasize their importance in attracting FDI. The choice of the dependent variable representing FDI differs depending on the sample country(s) as well as the main research question. Studies have used the unidirectional flow of FDI to host countries (DRAPKIN; MARIEV; CHUKAVINA, 2018; YOUNSI; BECHTINI, 2019), the net flow of FDI (OESTERLE; RÖBER, 2017; TUN; AZMAN-SAINI; LAW, 2012), the ratio between FDI flow and GDP (BRESLIN; SAMANTA, 2008), and the FDI stock (DESBORDES, 2010; GOODSPEED; MARTINEZ-VAZQUEZ; ZHANG, 2011; MAZOUZ; WOOD; YIN; ZHANG, 2021).

Finally, we found 6 studies that analyze corruption as the main impact indicator on FDI. For example, Krifa-Schneider et al. (2022) focuses on corruption and FDI, specifically analyzing their impact on the financial development of nations. By exploring this aspect, the authors aim to understand how corruption influences the overall economic landscape of countries, particularly in terms of financial development. Jiménez (2017) and Khamfula (2007) investigates the relationship between corruption and FDI by examining their effects on the economic growth of countries. Economic growth is a crucial indicator of a nation's overall prosperity, and understanding how corruption affects this growth can provide insights into the broader economic implications of corruption.

Javorcik & Wei (2009) takes a different approach by analyzing corruption and FDI at the firm level. By focusing on individual firms, the authors aim to understand how corruption impacts business operations and investment decisions. This micro-level analysis provides valuable insights into the specific challenges that firms face in environments characterized by corruption.

Unlike the other studies, Delgado et al. (2014) examines the influence of corruption on conditioning variables and GDP growth. By looking at how corruption affects various factors that condition economic growth, such as institutional quality and governance, the authors provide a comprehensive understanding of the mechanisms through which corruption impacts GDP growth. Finally, Onody et al. (2022) investigates the relationship between FDI and corruption at the individual sector level. By analyzing FDI flows and corruption levels in specific sectors, the authors aim to identify patterns and trends that may vary across different

industries. This sectoral analysis allows for a more nuanced understanding of how corruption affects investment decisions in different sectors of the economy.

Overall, these studies highlight the multifaceted nature of the relationship between corruption and FDI. By examining this relationship from various perspectives, researchers can gain a more comprehensive understanding of the mechanisms through which corruption influences investment decisions and economic outcomes. This understanding is essential for policymakers and practitioners seeking to develop effective strategies to combat corruption and promote sustainable economic development.

Through the analysis of the literature, it is possible to observe the diversity of aspects studied, with a focus on the relationship between corruption and FDI, and the divergence in the results of the studies. Based on this diversity of results, we will focus on the next stage of the objective of this document.

First, we examine the main approaches to systematic review, focusing on the state of the art regarding Foreign Direct Investment (FDI) and corruption in emerging countries. The systematic review aimed to compile, evaluate, and synthesize the results of existing empirical studies to answer a specific research question comprehensively and impartially. In the context of FDI and corruption in emerging countries, we seek to understand how corruption influences the attraction of foreign investments, classifying its effects as positive (grease hypothesis) or negative (sand hypothesis).

Next, we will discuss the analysis of 93 studies on the trend of the "sand or grease" hypothesis. This classification was performed by identifying characteristics in the results of the articles that mentioned or aligned with the grease or sand theory. In other words, corruption can be seen as a positive factor for attracting FDI (grease) or as an obstacle to investments (sand).

Table 9 - Analysis Trend of Theories: “Sand or Grease”

	Trend of Theories		
Unit of analysis	SAND	GREASE	SAND and GREASE
Developed Countries	2	0	0
Emerging Countries	26	8	6
Developed Countries and Emerging Countries	27	7	17
Total	**55**	**15**	**24**

Source: Author (2024)

This study assesses the congruence of results using the "Sand or Grease" theory regarding corruption and FDI in the articles analyzed in this research included in Table 9. We address this by first observing the unit of analysis in the studies, using country classification. Second, we examine the thematic relationships of the "Sand or Grease" theory and the results of the analyses in the articles.

2.4.1. Trend of Theories: “Sand”

We first address studies that concluded that corruption acts as "sand" in the attractiveness of FDI, thus representing friction or obstacles that hinder the smooth flow of FDI. Corruption can act as “sand” by creating barriers and increasing the costs associated with entering into a foreign market. Examples include bribes, legal uncertainties, and administrative hurdles that may discourage foreign investors.

The "Sand" theory resulted from 55 of all analyzed articles as presented in table 9. In these documents, countries with high levels of corruption may need to address these issues to create a more attractive environment for foreign investors. To obtain a more in-depth analysis of these results, we outlined the countries evaluated in these documents.

It is important to highlight that the only two documents focused their investigation exclusively on developed countries (BAILEY, 2018; SUJIT; KUMAR; OBEROI, 2020), both supporting the "Sand" hypothesis. The vast majority of studies conducted the analysis considering emerging countries, and of these, 26 pieces of research emphasized the conclusion that corruption acts as an impediment or obstacle to FDI.

Contributing to reinforcing the "Sand" hypothesis, we found 27 documents that analyzed both developed and emerging countries that supported the "sand" hypothesis, highlighting that FDI represents a series of challenges that negatively impact a country's attractiveness to foreign investors.

2.4.2. Trend of Theories: “Grease”

As presented in Table 9, studies pointing towards the “grease” hypothesis constitute 15 of the total. Therefore, the "lubrication" in this hypothesis symbolizes the idea that corruption can sometimes facilitate or "grease" the wheels of business. In some situations, corrupt practices may expedite processes, provide shortcuts through bureaucracy, or give companies an unfair advantage. This could attract foreign investment in environments where corruption is perceived as a means to navigate complex regulatory landscapes.

For instance, applying econometric models, Bhasin (2020) tested the impact of institutional indicators and other variables on FDI flows and the stock in 23 emerging economies from 2006 to 2015. They concluded that the motivations for foreign investors to invest in emerging economies involve taking advantage of their weak laws, norms, and values.

Other authors highlight studies in Malaysia, Africa, Russia, and China, revealing a positive relationship between corruption and FDI (FALASTER; FERREIRA; LI, 2021; HAYAKAWA; KIMURA; LEE, 2013; KAMOWA; ARUNASALAM, 2020; NNADI; SOOBAROYEN, 2015; SINGH; KAPURIA, 2022).

2.4.3. Trend of Theories: “Sand and Grease”

Recent studies present conclusions about a non-monotonic relationship between FDI and corruption, shed light on the complexity of this interaction (FLETA-ASÍN; MUÑOZ, 2023; SABIR, S; RAFIQUE, A; ABBAS, K, 2019; STEVENS; NEWENHAM-KAHINDI, 2021). For example, by applying econometric models of corruption to 80 advanced and emerging economies, Krifa et al. (2022) observed that the effect is not uniform across all economies, as it varies depending on the levels of financial and economic development of the country. This points to a nonlinear nexus between FDI and corruption, with emerging economies presenting a higher level of tolerance for corruption compared to advanced ones.

Asín and Muñoz (2023), Sabir et al. (2019), Stevens and Kahindi (2021), emphasize that the impact of corruption on FDI is not uniform across all economies. Instead, it varies

based on the unique circumstances of each country, particularly in terms of financial and economic development.

The work by Fakiri and Cherkaoui (2022), explores the relationship between corruption, institutional quality, and FDI across 141 countries, adds further nuance to our understanding. Their findings suggest that the impact of corruption control on FDI flows is crucial for high-income countries but is not significant for medium-high-income nations. Interestingly, corruption control is deemed important for medium-low-income countries and is even considered detrimental to low-income countries.

As scholars continue to delve into this complex interplay between corruption and FDI, the findings not only contribute to academic knowledge but also provide valuable insights for policymakers and businesses seeking to navigate the intricate landscape of global investments in different economic contexts.

2.5. Conclusion and policy implications

This article presented a systematic literature review on FDI and corruption through a bibliometric analysis of 93 articles published in relevant journals. The scientific mapping contributed to filling the methodological gap on this subject. Thus, we examined the impact of corruption on FDI inflows at the regional level in developing countries.

Our Systematic Literature Review (SLR) indicates that research on macroeconomic factors is the most addressed determinant in the articles. It is understood that these factors include institutional quality, governance, political and financial institutional risk, and business environments. Corruption is demonstrated in many studies as an indicator to be considered among other researched factors. The topic studied in developed countries is highly significant (40 out of 93 articles). In these studies, institutional quality is highly relevant, followed by governance indicators, policies and institutional factors, business environments, and indicators of political and financial risk. This reflects the investigation of corruption as a determinant among these macro aspects of study.

The review, focusing on analyzing the main trend of the "sand or grease" hypothesis in emerging countries, finds that the influence of corruption on the attractiveness of FDI points towards corruption being perceived as "sand" in this relationship. In other words, the literature is corroborating that corruption may be seen as an obstacle or barrier to FDI attraction in developing countries.

This interpretation suggests that corruption can act as a deterrent to foreign investments, hindering the entry of foreign companies into emerging markets. Companies may face bureaucratic hurdles, bribery demands, and a lack of transparency, which, in turn, can discourage investments.

This finding has significant implications for policies and business practices in emerging countries. Understanding corruption as a "sand" factor underscores the need for efforts to combat corruption and improve the business environment by promoting transparency and effective governance.

The conclusion of this review can guide policymakers, businesses, and researchers in formulating strategies to enhance the attractiveness of FDI in emerging countries by addressing challenges associated with corruption and fostering an environment conducive to foreign investments.

Based on the review conducted FDI and corruption, some trends for future research could include:

1. **Sectoral Impact of Corruption:** Explore how corruption affects specific sectors in emerging countries. Some sectors may be more susceptible to the negative effects of corruption, while others may find strategies to mitigate these impacts.
2. **Longitudinal Analysis:** Conduct long-term studies to analyze changes over time in the relationship between corruption and FDI. This would capture dynamics and adaptations in the business environment over significant periods.
3. **Regional Comparison:** Investigate how the relationship between corruption and FDI varies in different regions of the world. Cultural differences, political contexts, and economic structures may influence this dynamic in distinct ways.
4. **Multilevel Approach:** Examine the influence of corruption at different levels, from central government to local administrations. This may offer more detailed insights into how corruption impacts the business environment on various scales.
5. **Qualitative Study:** Complement quantitative analyses with qualitative studies to understand the specific perceptions and strategies adopted by companies in response to corruption in emerging markets.
6. **Interventions and Solutions:** Investigate effective interventions and solutions to mitigate the negative effects of corruption on FDI. This may include government initiatives, ethical business practices, and the implementation of anti-corruption policies.

7. **Technological Innovations:** Explore how technological innovations, such as blockchain and artificial intelligence, can be applied to combat corruption and improve transparency in business processes.
8. **Investor Perception:** Analyze how investors' perception of corruption influences their investment decisions and how companies can effectively manage this perception.

These are just some suggestions, and as research progresses, new questions and approaches may emerge to deepen the understanding of the complex interaction between corruption and FDI.

A systematic review conducted in this study contributes to a better understanding of the role of regional corruption in FDI in developing countries. However, similar to previous studies in this area, our study has its limitations. The decision to use the Systematic Literature Review (SLR) methodology in our study, focusing on online databases and predefined search strings, was guided by the pursuit of a comprehensive and systematic analysis of the existing literature. Nevertheless, it is crucial to acknowledge that, although we aimed to include a diverse range of sources, the inherent limitations associated with the specific choice of databases may impact the breadth and representativeness of the identified studies. A more detailed analysis of the reasoning behind the selection of these databases and search strings could provide additional insights into the robustness of our methodological approach.

Furthermore, it is important to highlight that the dynamics between regional corruption and FDI may be subject to changes over time. While we attempted to address this issue in our analysis, it is crucial to recognize that historical, political, and economic events may have influenced the studied relationship. This temporal consideration adds a layer of complexity to the interpretation of the results and underscores the ongoing need for research that captures the evolution of these relationships in specific contexts.

As our article constitutes a theoretical review of existing research on corruption and regional FDI in developing countries, we provide some recommendations for national policymakers and multinational managers. In summary, the review suggests that the economic environment, business environment, and institutional environment have different effects on the incidence of corruption.

At a political level, it is important for the government to improve the institutional framework and law enforcement to attract a significant amount of FDI. It is crucial when policymakers identify regulatory gaps and institutional weaknesses. It's worth emphasizing that governments can enhance FDI inflow through institutional policies and regional

cooperation. For managers, a profound understanding of economic and institutional factors can help strike a balance with the corruption element.

CHAPTER 3: CORRUPTION AND FDI IN BRAZIL: CONTESTING THE "SAND" OR "GREASE" HYPOTHESES

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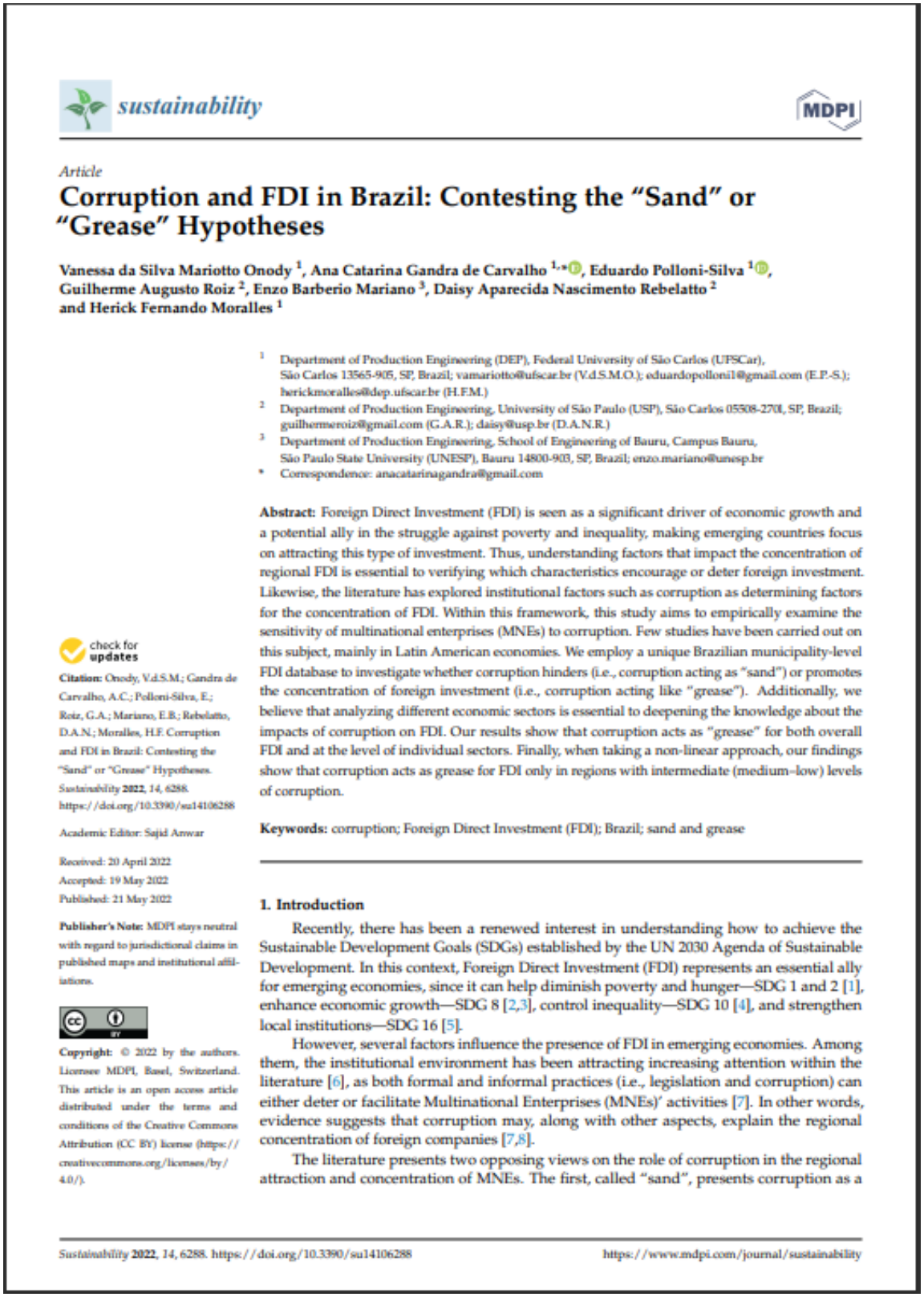
Besides the journal link, the text is presented below. The main distinction between the journal version and this version lies in how authors are referenced, as the journal Sustainability requires a numerical reference style. Additionally, the numbering of figures and tables in this study follows a single sequence. Minor adjustments were made to comply with the guidelines of the ABNT (*Brazilian Association of Technical Standards*), which are mandatory in Brazil.

Figure 8 - First page of the published paper in Sustainability



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Corruption and FDI in Brazil: Contesting the "Sand" or "Grease" Hypotheses

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Abstract: Foreign Direct Investment (FDI) is seen as a significant driver of economic growth and a potential ally in the struggle against poverty and inequality, making emerging countries focus on attracting this type of investment. Thus, understanding factors that impact the concentration of regional FDI is essential to verifying which characteristics encourage or deter foreign investment. Likewise, the literature has explored institutional factors such as corruption as determining factors for the concentration of FDI. Within this framework, this study aims to empirically examine the sensitivity of multinational enterprises (MNEs) to corruption. Few studies have been carried out on this subject, mainly in Latin American economies. We employ a unique Brazilian municipality-level FDI database to investigate whether corruption hinders (i.e., corruption acting as "sand") or promotes the concentration of foreign investment (i.e., corruption acting like "grease"). Additionally, we believe that analyzing different economic sectors is essential to deepening the knowledge about the impacts of corruption on FDI. Our results show that corruption acts as "grease" for both overall FDI and at the level of individual sectors. Finally, when taking a non-linear approach, our findings show that corruption acts as grease for FDI only in regions with intermediate (medium–low) levels of corruption.

Keywords: corruption; Foreign Direct Investment (FDI); Brazil; sand and grease

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1. Introduction

Recently, there has been a renewed interest in understanding how to achieve the Sustainable Development Goals (SDGs) established by the UN 2030 Agenda of Sustainable Development. In this context, Foreign Direct Investment (FDI) represents an essential ally for emerging economies, since it can help diminish poverty and hunger—SDG 1 and 2 [1], enhance economic growth—SDG 8 [2,3], control inequality—SDG 10 [4], and strengthen local institutions—SDG 16 [5].

However, several factors influence the presence of FDI in emerging economies. Among them, the institutional environment has been attracting increasing attention within the literature [6], as both formal and informal practices (i.e., legislation and corruption) can either deter or facilitate Multinational Enterprises (MNEs)' activities [7]. In other words, evidence suggests that corruption may, along with other aspects, explain the regional concentration of foreign companies [7,8].

The literature presents two opposing views on the role of corruption in the regional attraction and concentration of MNEs. The first, called "sand", presents corruption as a

Source: MDPI, 2024

3.1. Introduction

Foreign Direct Investment (FDI) represents an important channel for competitiveness and overall economic growth for emerging economies (KAULIHOWA; ADJASI, 2018; RJOUB; ABU ALRUB; SOYER; HAMDAN, 2016; SOTHAN, 2017), as it may generate virtuous effects on the host's economy, including regional development, economic diversification, and productivity gains through knowledge and technology spillovers (POLLONI-SILVA; MORALLES; REBELATTO; HARTMANN, 2021).

However, the institutional environment has increasingly been attracting attention within the literature (BARASSI; ZHOU, 2012), as both formal and informal practices (i.e., legislation and corruption) can either deter or facilitate Multinational Enterprises (MNEs)' activities (MEYER; NGUYEN, 2005). In other words, evidence suggests that corruption may, along with other aspects, explain the regional concentration of foreign companies (FRECKLETON; WRIGHT; CRAIGWELL, 2012; MEYER; NGUYEN, 2005).

The literature presents two opposing views on the role of corruption in the regional attraction and concentration of MNEs. The first, called "sand", presents corruption as a constraining factor. Thus, according to Barassi; Zhou (2012) corruption can be viewed as "sand in the wheels of commerce", as it creates costs, uncertainty, and distortion towards the activities of international enterprises. Wei (2000) argues that corruption is costly for firms, as it is no different than an additional unofficial tax that directly reduces MNEs' profits. In addition, Kaufmann (1997) states that the costs caused by corruption would not lie only in the bribe paid to the government in exchange for services, but also in the time and effort that MNEs have to spend on dealing with corrupt public officials.

The second view is called "grease". Within this idea, corruption can attract foreign investors since it may serve as a "helping hand" to foreign investors, as bribes could circumvent restrictions and regulations (URBINA, 2020). It holds especially for emerging economies (e.g., Brazil, Latin American countries) since they tend to present extremely complex and inefficient legal, accounting, and taxes systems. Thus, corruption can be seen as an "efficient grease" that helps foreign firms to overcome rigid regulations and excessive government intervention within the host region (BARDHAN, 1997).

Given the aforementioned literature, by employing regional Brazilian data, our study aims to challenge the dichotomous idea of "sand" or "grease" views within the scope of emerging economies. We argue that MNEs may tolerate some levels of corruption to gain location-specific advantages such as access to a consumer market, cheap labor, or tax heaven

(DRIFFIELD; JONES; KIM; TEMOURI, 2021). Thus, the main issue to be investigated here goes beyond the "sand" or "grease" hypotheses, but lies in the investigation of what is the level of corruption that marks the change from grease to a sand effect, which is equivalent to answering the following question: To what extent does MNEs are willing to tolerate corruption?

Regional-level research on FDI in Brazil and other emerging economies is still limited. To our knowledge, regional investigations on the effects of FDI on the host are almost nonexistent in Brazil, with only a few exceptions (MORALLES, H. F.; MORENO, R., 2020; POLLONI-SILVA; MORALLES; REBELATTO; HARTMANN, 2021). These exceptions, however, do not address the relationship between FDI and corruption. Thus, we try to deepen the knowledge about such connections within the most important Latin American economy.

Our results show that when employing a linear econometric model to evaluate the dichotomous approach of "Sand or Grease", corruption tends to act as "grease" for FDI. In other words, FDI intensity should be higher in regions with higher levels of corruption. However, when we adopt a non-linear approach, our findings show that corruption acts as grease for FDI only in regions with intermediary (low-medium) levels of corruption. Our results are innovative for the theory that analyzes the effects of corruption on the local economy. Also, our findings can serve as a basis for the elaboration of Brazilian public policies aimed at combating corruption and encouraging FDI.

This article is structured as follows. Section 2 discusses the theoretical background of corruption, FDI, and emerging countries. Section 3 presents the data and methods. In Section 4, we present the results. Finally, in Section 5, we discuss the results and implications of our findings for firms and policymakers.

3.2. Literature Review

3.2.1. FDI and corruption in emerging economies

Several studies identify FDI as a significant driver of economic growth both in emerging (KAULIHOWA; ADJASI, 2018; RJOUB; ABU ALRUB; SOYER; HAMDAN, 2016; SUNDE, 2017) and transition economies (ASHUROV; OTHMAN; ROSMAN; HARON, 2020; DHRIFI; JAZIRI; ALNAHDI, 2020; ZHUMAKANKYZY; MINTAYEVICH, 2017). Some authors assume that the positive effects of FDI on the

economy come from the increase in the capital stock of the host economy, (DHRIFI; JAZIRI; ALNAHDI, 2020), while others postulate that this growth derives from positive externalities, such as knowledge spillovers (LIN; KWAN, 2016) and its associated productivity gains from domestic firms (LEE, 2013).

In the context of emerging countries, FDI assumes an even more critical role as it is identified as a potential ally in the fight against poverty and inequality (AGARWAL; ATRI; KUNDU, 2017; UTTAMA, 2015). Although recent studies point out that the benefits of FDI for emerging countries must be analyzed with caution, other variables must be taken into account. Indeed, the country's economic context and the proxy used to measure poverty are among them (GANIĆ, 2019; KAULIHOWA; ADJASI, 2018; MAGOMBEYI; ODHIAMBO, 2018).

Likewise, it is widely accepted that creating and promoting an attractive environment for FDI is complex and varies from one country to another (ASHUROV; OTHMAN; ROSMAN; HARON, 2020). Some authors point out that one of the main attractions for FDI entry into an emerging country is the abundance of natural resources in the host region (CHEUNG; QIAN, 2009; KOLSTAD; WIIG, 2012), while others focus on market openness (ROGMANS; EBBERS, 2013), financial factors (PUATWOE; PIABUO, 2017) and social variables (SAFAEE; GERAYLI, 2017) as determinants of FDI. However, our study highlights the importance of institutional and policy factors. Hoang et al. (2022) argue that the level of social security and legal institutions play an important role in attracting FDI. Moreover, according to Wan (2005) institutions can affect the probability of success of foreign firms, since MNEs tend to adapt their strategies according to the host institutional environment (CHARPIN; POWELL; ROTH, 2021; KETTENI; KOTTARIDI, 2019).

Therefore, institutional factors affect not only the performance of MNEs in the country but also how the concentration and the inflow of foreign capital impact the local economy. In this sense, Chaudhry et al. (2022) suggest that the efficiency of local institutions affects economic development and reduces the ecological footprint of MNEs in the host region. Slesman et al. (2021) argue that depending on hosts' level of institutional capacity, FDI can be harmful (at lower levels) or beneficial (at higher levels) to domestic firms. Further, Chih et al. (2022), show that the impact of FDI on economic growth is non-linear, and it also depends on the democratic level of the country, indicating how complex the relation between FDI and its impact on (or how it is affected by) characteristics of the host region, especially on emerging economies. Nevertheless, despite the complexity of this relationship, it is essential

to explore it due to its potential to bring both economic and social benefits (or harm) to the host region.

Our study brings to light one of the factors that affect the complex relationship between FDI and its effect in emerging economies: corruption. The effects of corruption have been a topic of debate among economists and policymakers for at least 50 years (KRAMMER, 2019) since it can impact the decision-make process, access to public resources, and information (WELLALAGE; THRIKAWALA, 2021). In this sense, understanding corruption in a deeper way is essential to explore its impact on the regional economy.

There are many definitions for the word “corruption”. In this context, Tanzi and Davoodi (1997) defined it as the acceptance or extortion of money for personal benefit by government officials; this perspective, although widely used, only addresses the public (SVENSSON, 2005) or government corruption (UHLENBRUCK; RODRIGUEZ; DOH; EDEN, 2006). In the organizational sphere, other authors state that corruption occurs when someone misdirects resources or subverts organizational policies or routines to obtain personal gains (MARTIN; JOHNSON; CULLEN, 2009; ZYGLIDOPOULOS; FLEMING; ROTHENBERG, 2009). Additionally, accepting a strong private-public dichotomy is essential to explain the aforementioned concept of public and organizational corruption (TORSELLO; VENARD, 2016). Here, we choose to use a broader definition: “corruption is any practice that violates important rules for personal or organizational gain” (ZYGLIDOPOULOS; FLEMING; ROTHENBERG, 2009). By choosing a broader definition of corruption, we accept that it happens whenever there is an abuse of power. This vision is aligned with Transparency International, a non-governmental organization responsible for estimating the Corruption Perception Index (CPI).

Although corruption may present different manifestations, bribery is the most common one according to Svensson (2003). Moreover, while scholars agree that the global monetary effects of bribes are significant Kaufmann; Kraay, and; Mastruzzi (2009), emerging markets such as Brazil are at the forefront of those bribing activities.

The literature has extensively investigated the problem of corruption in emerging countries. Kotabe; Jiang and Murray (2017) emphasize the political network's importance in reducing timing and uncertainty in high bureaucratic and volatile emerging markets. Krammer (2019) findings corroborate these results by showing that corruption and bribery enhance innovation levels in emerging economies. Nevertheless, Habiyaremye and Raymond (2013) state that corruption has a contrary effect on innovation since it undermines the foundations of

institutional trust. Later, the same author found that the relationship between corruption and innovation is not necessarily linear. The type of corruption (petty or grand) affects emerging markets firms' propensity to innovate (HABIYAREMYE; RAYMOND, 2018).

Recently, Ojide et al. (2022) investigated the corruption impact in the battle against the effects of COVID-19 in Nigeria, recommending measures to control corruption as an essential part of economic recovery policies in the country. On the other hand, Soh et al. (2021) analyzed the relationship between corruption and public debt, noting that government efficiency can be an obstacle to reducing this debt in emerging countries. The authors state that a highly efficient country tends to have lesser levels of corruption. This reality was contrary to that found in developed economies, emphasizing the particularities of elaborating public policies in countries with different stages of economic development.

3.2.2. FDI and corruption – The “Sand or Grease” theory

Although the corruption impact on the economy is highly accepted in the literature (FUNGÁČOVÁ; KOCHANOVA; WEILL, 2015; OJIDE; AGU; OHALETE; CHINANUIFE, 2022; WELLALAGE; THRIKAWALA, 2021), it remains a point of debate as to whether such illegal payments are harmful to economic activities (KRAMMER, 2019) such as FDI inflows and its regional concentration (BARASSI; ZHOU, 2012; CHEWAKA; ZHANG, 2021; FRECKLETON; WRIGHT; CRAIGWELL, 2012; GHOSH; NARAYAN; SHYAAM PRASADH; THENMOZHI; KETTENI; KOTTARIDI, 2019; MEYER; NGUYEN, 2005).

According to Cutzach (2014), corruption is not unusual in international business, especially in emerging economies. Meyer and Nguyen (2005) show that formal and informal practices (i.e. legislation and corruption) may either deter or ease the investment incentives of foreign investors.

However, the literature on corruption is divided into two branches. The first one assumes that corruption acts as an agent that obstructs economic activities ('sand in the wheels') by i) imposing additional costs on firms (FISMAN; SVENSSON, 2007; FUNGÁČOVÁ; KOCHANOVA; WEILL, 2015; MAURO, 1995; REINIKKA; SVENSSON, 2005; WEI, 2000), ii) increasing uncertainty (GLAESER; KALLAL; SCHEINKMAN; SHLEIFER, 1992; SARTOR; BEAMISH, 2018), iii) decreasing foreign investments (CUERVO-CAZURRA, 2006) by dissuading potential foreign participation in joint ventures (JADHAV; KATTI, 2012), and iv) hinder the process of innovation of processes and products (WELLALAGE; THRIKAWALA, 2021).

Thus, Qian and Sandoval-Hernandez (2016) asserted that corruption is harmful and therefore configures a deterrent factor of FDI. For instance, Hakimi and Hamdi (2017) found that corruption is a serious hurdle for 15 Middle East and North African (MENA) countries since it disturbs investment activities and FDI inflows. Recently, (CHEWAKA; ZHANG, 2021) found that corruption can be a trap for the smooth growth of firms, even in good potential markets. Additionally, Bouzahzah (2022) findings show that high levels of corruption get in the way of environmental regulations on multinationals.

The second and opposite branch of the literature on corruption believes that it acts as an enabling agent ("grease the wheels") by i) benefiting firms suffering from obstructive private monopolies and government practices (GOEDHUYS; MOHNEN; TAHA, 2016; KABADURMUŞ, 2017), ii) reducing the waiting time to obtain licenses (TORSELLO; VENARD, 2016) and iii) increasing the speed of product innovation (KRASTANOVA, 2014).

Urbina (2020) states that corruption can act as a “helping hand” to foreign investors, as bribes could circumvent restrictions and regulations. Furthermore, Sidki et al. (2016) found evidence that corruption can help MNEs circumvent political instabilities. Additionally, Helmy (2013) did not find any evidence that corruption hinders FDI inflows and emphasizes that policies that aim to eradicate corruption should be cautious not to affect the economy's freedom and openness.

However, here we challenge the idea that the corruption impact can be measured only as positive or negative ("Sand or Grease") to FDI. Instead, we ask: To what extent does MNEs are willing to tolerate corruption?

The literature shows that the impact of corruption on FDI changes according to its type and the response of firms to this process. Sartor and Beamish (2018) found that different types of corruption have different effects on MNE responses. Further, Galangm (2012) findings show heterogeneous results in the firm’s performance according to their responses to public corruption.

Using firm-level data, Ghosh et al. state that the illegality of corrupt practices hinders any way of measuring it at an individual level in companies; for this reason, many studies choose to analyze corruption at a regional level. Additionally, Ketteni and Kottaridi (2019) suggest that the FDI effects on the economic development of host economies can vary significantly in the same country over time. The authors further suggest that this variation strongly depends on the status of regional regulations.

In light of the arguments above, we believe that investigating the effect of FDI at microscales is fundamental to understanding the impact of corruption on these companies. We also believe in a non-linear model and a non-binary relationship between corruption and FDI performance. Accordingly, we make the following hypothesis:

Hypothesis 1: FDI regional intensity has a non-linear relationship with corruption.

Moreover, the impact of corruption on FDI regional concentration may vary depending on the sector analyzed (ZHU, 2013), since MNEs inserted in highly corrupt sectors may be more indulgent in higher levels of regional corruption. One explanation for the variation in levels of corruption in different sectors is the type of regulation that each economic activity needs to function. Zhu (2013) assumes that the more a firm or sector needs government support or approval, the more likely it is to be involved in corrupt practices such as bribery.

The literature expands the field of economic sectors by analyzing foreign direct investment and corruption. For example, Phan and Nguyen (2020), examine the effect of FDI and corruption on the development of public service in 10 ASEAN countries. They found that although FDI positively impacts the development of public sectors, this impact can be null in highly corrupt regions. Similarly, Rygh; Torgersen, and Benito (2022), investigate the role of institutions in attracting FDI in agricultural and extractive activities, finding some evidence that corruption deters FDI in both primary subsectors. Additionally, some researchers argue that when anti-corruption policies are in place, foreign investors feel safer investing in highly corrupt sectors. (NGUYEN ET AL, 2021).

Corruption in different economic sectors can also hamper entrepreneurial activities. Berdiev and Saunoris (2018) argue that corruption can harm or increase the propensity for entrepreneurial activities, and the determining factor for this is each sector's level of formality. They found that corruption deters formal sectors entrepreneurship while boosting entrepreneurial activities in informal sectors. Even more, there is evidence that firms inserted in corrupt sectors tend to mimic this behavior and naturalize corruption (GAO, 2010).

Kouneva-Loewenthal and Vojvodic (2012) found that corruption can both deter or enhance FDI inflows depending on the economic sector. In other words, while corruption can harm (“sand”) foreign investments in the manufacturing sector, it can also benefit (“grease”) the energy sector. The authors also suggest that the analysis of the relationship between FDI and corruption ought to be contextualized and complemented by sectoral-level research, however, studies that analyze the FDI disaggregated by sectors are still scarce. Based on the literature mentioned, we believe that analyzing different economic sectors is essential to

deepen knowledge about the impacts of corruption on FDI. Finally, the sectoral analysis can capture different effects of corruption on the attraction of FDI due to the particularities (e.g., regulation, formality) and tolerance of corruption in each economic activity. Our study goes beyond assessing aggregate FDI at the regional level by analyzing FDI disaggregated by economic sector and region.

3.3. Methods

3.3.1. Data sources and variables

Our study focuses on the state of Sao Paulo – Brazil. This choice lies in the fact that it hosts almost 40% of all foreign investments according to the Brazilian Central Bank. Moreover, regional statistics on emerging economies such as Brazil are not readily available, making the present study deal with two challenges.

First, regarding the corruption variable, corruption data were collected in 31 Judicial Subsections of the state of Sao Paulo - Brazil, from 2012 to 2016. The division of the state into 31 Judicial Subsections serves as a reference for the operation of the Ministério Público Federal (Federal Public Ministry), which is, among others, responsible for combating corruption in Brazil. As a proxy for regional corruption levels, we followed the regional-level studies of Fredriksson et al. (2003) and Cole; Elliott; and Zhang (2009) which employed a normalized number of convictions of public officials to proxy regional corruption. Thus, we employed the number of lawsuits against Brazilian public servants each year within the microregion of the state of Sao Paulo at the “Judicial Subsections of the Sao Paulo State”. Such data are made available by the Brazilian Federal Public Ministry (MPF), which uses tools that allow citizens to view statistical data on judicial and extrajudicial actions in the fight against corruption. Thus, by using the aforementioned measure, we intend to proxy corruption as an institutional characteristic and its interplay with regional inward FDI.

The second challenge is concerned with the regional FDI intensity statistic. Thus, we employed a unique export-related FDI proxy available for Brazilian municipalities as presented in equation (1) (MORALLES, H. F.; MORENO, R., 2020; POLLONI-SILVA; SILVEIRA; FERRAZ; DE MELLO *et al.*, 2021; POLLONI-SILVA; MORALLES; REBELATTO; HARTMANN, 2021). Specifically, the aforementioned municipal database was modified to match the “Judicial Subsections” by summing the “*r*” municipalities of every judicial subsection “*s*”.

$$FDI_{st} = \sum_{r=1}^{n} \sum_{i=1}^{k} W_{ijt} \left(\frac{MNC_{jt}}{T_{jt}} \right), \text{ for each region j.} \quad (1)$$

where,

MNC is the number of exporting multinational companies in the region "j";

T is the regional whole population of exporting companies (domestic and foreign) in the region j;

W is the adjustment weight (based on its exporting value) for each company i;

k is the total number of companies in each region;

s represents each of the 31 regions Judicial Subsections of the Sao Paulo state.

Finally, our study also employs three sets of control variables to account for regional-level characteristics that may affect FDI regional intensity. The first set deals with economic characteristics such as per capita GDP and the share of industrial activities in the municipality (industry, services, and agriculture). The second aims to capture the local education structure through the share between citizens with higher and primary education (Education H/P). Lastly, Firjan Fiscal Management Index (IFGF) is a proxy for local governance. This index is calculated to identify the challenge many municipalities face in allocating their resources. Descriptive statistics are presented in Table 10.

Table 10 - Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
FDI	155	315.96	468.65	0.00	2339.33
Corruption	155	32.42	26.72	2.00	146.00
GDP PC	155	373.38	254.33	103.52	1574.48
Urbanization	155	1583.22	1139.27	391.76	6181.65
Industry Share	155	343.71	238.53	57.99	1537.48
Agriculture Share	155	17800000	21200000	2290843	113000000
Service Share	155	682.54	440.90	187.45	2635.67
Education H/P	155	0.89	0.62	0.09	4.97
IFGF	155	5.87	7.06	0.00	36.65

3.3.2. Econometric model and estimation strategy

To test the regional "sand and grease" hypothesis, equations (2) and (3) are proposed. Specifically, equation (2) presents a baseline linear model to be estimated by traditional fixed (FE) and random effects (RE), along with panel data techniques that account for non-spherical disturbances like the Driskoll–Kraay (DK) method (DRISCOLL; KRAAY, 1998). Indeed, given the geographical nature of our study, the DK approach will be the main technique employed for our baseline analysis since it deals with heteroscedasticity and autocorrelation problems, being also robust to general forms of cross-sectional (spatial) and temporal dependence.

Still, given that FE estimators tend to perform poorly when there is little within-subject variability (WILLIAMS, 2018), we also estimated equation (2) through Feasible Generalized Least Squares (FGLS) to ensure robustness. Indeed, FGLS was employed considering the specific autocorrelation process of each specific entity along with controlling for heteroskedasticity. By extension, Fixed Effects Generalized Least Squares (FEGLS), a modified fixed-effects approach of FGLS was also applied to double-check our results (CROISSANT; MILLO, 2008; WOOLDRIDGE, 2010).

Moreover, panel-corrected standard errors (PCSE) were also considered since FGLS variance-covariance estimates tend to be anticonservative (BERK; KATZ, 1995). Finally, corruption and all the controls are lagged to reduce possible endogeneity issues and for functional adequacy.

As previously mentioned, we challenge the binary concept of the sand or grease hypothesis, arguing that different regional levels of corruption may display distinct effects on FDI concentration. Thus, following (HANSEN, 2000) non-linear approach, we employ a triple fixed-effects panel threshold model presented in equation (3), where corruption is both the threshold and the regime-dependent variable. Finally, the baseline estimation of equation (2) will support the threshold model of equation (3) since such a method splits the sample to calculate the threshold parameter, thus causing some subsets to exhibit low variability and resulting in insignificance parameters.

$$FDI_{st} = \beta_0 + \beta_1{}'X_{it-1} + \beta_2 C_{st-1} + a_i + \varepsilon_{it} \quad (2)$$

$$FDI_{st} = \beta_0 + \beta_1{}'X_{it-1} + \sum_{j=2}^{J} \beta_j C_{st-1} I(\gamma_{j-1} < C_{st} \leq \gamma_{j-1}) + a_i + \varepsilon_{it} \quad (3)$$

where,

FDI: Foreign direct investment;

X: Regional-level controls;

C: Corruption proxy;

I(.): Is an indicator function;

a_i: Regional time-invariant characteristics (Fixed Effects);

γ_i: Thresholds to be estimated;

ε: Stochastic disturbance.

3.4. Results

Before estimating the model, we discarded the 2% top and bottom values for corruption and FDI variables to ensure that outliers are not leading us to misguided conclusions. Also, the calculated variance inflation factor (VIF) was 6.71 for the baseline fixed-effects model, indicating that multicollinearity is not overinflating the estimated standard errors. Thus, according to Table 11, a reasonable number of controls were statistically significant, as the corruption variable is positive and statistically significant in all estimated models. Consequently, according to the sand or grease hypothesis within a linear model, corruption in Brazil acts as grease for FDI, which would lead us to infer that more corrupt regions will tend to concentrate more foreign companies.

Table 11 - Main results - Dependent variable: FDI

Variables	(1) FE	(2) RE	(3) DK FE	(4) DK RE	(5) FGLS	(6) FEGLS	(7) PCSE
Corruption	0.0914***	0.122**	0.0914**	0.122**	0.172***	0.0403***	0.249***
	(0.0309)	(0.0479)	(0.0191)	(0.0311)	(0.0277)	(0.0132)	(0.0660)
GDP PC	0.345	0.342	0.345**	0.342**	0.161*	0.159***	0.0808
	(0.227)	(0.251)	(0.0665)	(0.0834)	(0.0950)	(0.0587)	(0.188)
Urbanization	0.0229	-0.514***	0.0229	-0.514**	-0.524***	-0.903	-0.852***
	(2.509)	(0.196)	(1.118)	(0.135)	(0.0773)	(0.656)	(0.184)
Industry Share	-0.127	0.0822	-0.127**	0.0822	0.253***	-0.106***	0.638***
	(0.139)	(0.165)	(0.0229)	(0.0771)	(0.0773)	(0.0337)	(0.226)
Agriculture Share	-0.344***	0.0296	-0.344***	0.0296	0.574***	-0.289***	0.570***
	(0.0959)	(0.183)	(0.0430)	(0.0248)	(0.0633)	(0.0494)	(0.0872)
Service Share	-0.0406	-0.0149	-0.0406	-0.0149	0.116***	0.0219	0.107
	(0.148)	(0.0870)	(0.0712)	(0.0765)	(0.0351)	(0.0640)	(0.0946)
Education H/P	0.000629	-9.62e-05	0.000629	-9.62e-05	6.95e-06	0.000160	-0.00157
	(0.000537)	(0.00152)	(0.000372)	(0.00086 1)	(0.00238)	(0.000343)	(0.00525)
IFGF	0.0228	0.0489***	0.0228**	0.0489** *	0.0446***	0.00234	0.0794*
	(0.0233)	(0.0161)	(0.00543)	(0.00530)	(0.0135)	(0.00546)	(0.0455)
Constant	0.0939	0.124***	0.0939	0.124**	-0.00979	-0.000888	-0.000783
	(0.522)	(0.0413)	(0.223)	(0.0366)	(0.00788)	(0.000732)	(0.0198)
Observations	112	112	112	112	111	111	112
R-squared	0.206						0.671
Number of id	31	31	31	31	30	30	

Robust standard error in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

To ensure robustness, equation (2) was also estimated using the SYS-GMM method to ensure that lagged FDI is not violating strict exogeneity (ARELLANO; BOND, 1991), thus finding insignificant values for it (p-value = 0.740).

A relevant concern lies in the possible endogeneity between FDI and corruption variables within the proposed models due to potential reverse causality. Therefore, shocks may affect both covariates simultaneously, especially in the context of developing economies, which are constantly prone to instabilities and institutional weaknesses.

The chosen method to evaluate endogeneity was the LIML (Limited Information Maximum Likelihood) instrumental variables model, as it tends to perform better with small samples and weak instruments (SCHAFFER, 2020). De facto, external instruments are considered desirable to deal with reverse causality. However, the literature recognizes the difficulties in finding adequate exogenous instruments (RAZZAQ; AN; DELPACHITRA, 2021), with several studies using lagged values of the independent variable as an internal instrument (WANG, GU ET AL. 2013, ASHRAF; HERZER; NUNNENKAMP, 2016; DRIFFIELD; JONES; KIM; TEMOURI, 2021).

Likewise, by employing the aforementioned strategy, C-statistic (inference of two Sargan-Hansen statistics) points out that corruption is indeed exogenous (p-value = 0.771).To verify the effect of corruption on FDI for various regional corruption levels, thus challenging the “sand” or “grease” binary view, the fixed-effects triple threshold model accounted for four regimes: low corruption, medium-low corruption, medium-high corruption, high corruption. Therefore, Table 12, presents that only the second regime (medium-low) is significant, while threshold 2 is not significant, implying that the four-regime threshold model may collapse into a three-regime one (low corruption, medium corruption, high corruption). Thus, Figure 8 presents the three-regime results (delimited by the 1st and 3rd threshold), indicating that only medium-level corruption regions will tend to concentrate on foreign enterprises.

However, these results should be interpreted with caution, since the fixed-effects threshold method employs a bootstrap to calculate the threshold parameters. In addition, the small sample size can also induce low variability that affects the threshold parameters. Likewise, we argue that although Table 12 indicates three regimes given the statistical insignificance of threshold 2. However, we can suspect that the same results may be pointing to the concentration of FDI in regions with medium-low corruption levels. Therefore, Figure 9 presents the four-regime corruption levels, where it is possible to observe the medium-low corruption regions, i.e., the ones where there is evidence that corruption can act as grease to FDI.

Table 12 - Fixed-Effects panel threshold regression.

Variables	FE Panel Threshold
Low corruption	-0.0995
	(0.111)
Medium-low corruption	0.305***
	(0.106)
Medium-high corruption	0.0456
	(0.0529)
High corruption	-0.0731
	(0.0803)
GDP PC	0.447
	(0.278)
Urbanization	-0.903
	(3.394)
Industry Share	-0.120
	(0.167)
Agriculture Share	-0.354***
	(0.0793)
Service Share	-0.253
	(0.300)
Education H/P	0.000392
	(0.000634)
IFGF	-0.0136
	(0.0371)
Constant	0.365
	(0.652)
Threshold 1 (λ1)	0.298*
Threshold 2 (λ2)	0.305
Threshold 3 (λ3)	0.597***
Observations	124
Number of id	31
R-squared	0.431

Robust standard error in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure 9 - Regional corruption level in 2016 – divided in three regimes

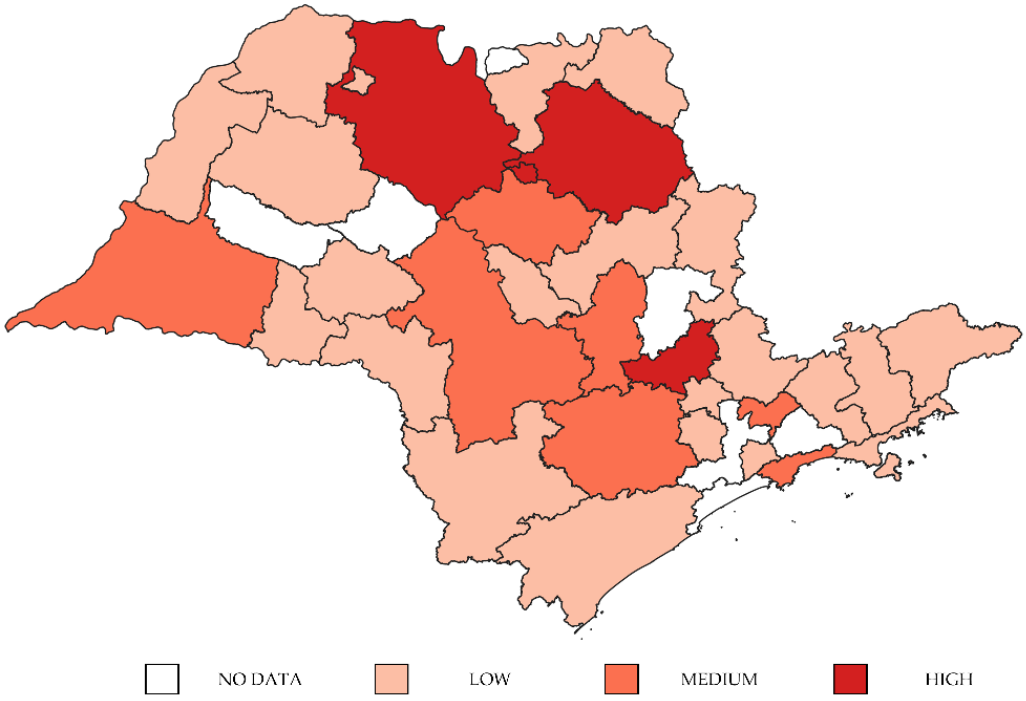
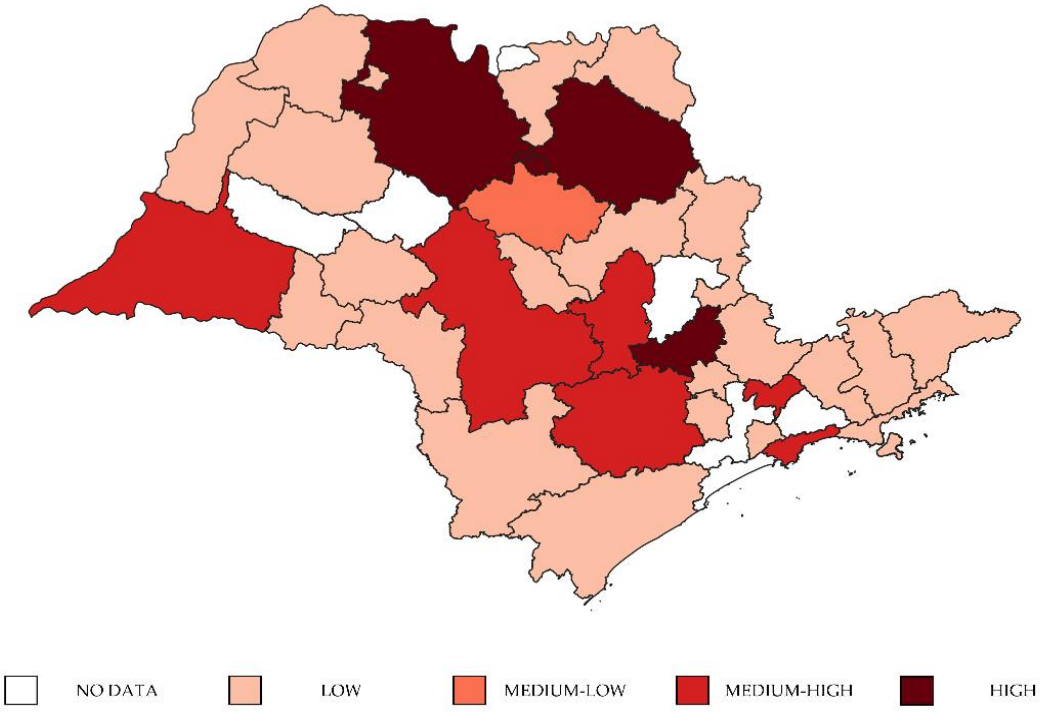


Figure 10 - Regional corruption level in 2016 – divided in four regimes



As previously mentioned, our study deepens the analysis of the effect of corruption on the regional concentration of FDI by identifying the behavior patterns of this relationship in different economic sectors. To this end, we divided the FDI concentration into 21 groups of economic activities according to the Brazilian CNAE (National Classification of Economic Activities) sectoral classification. Table 14 shows the sectoral divisions of the CNAE and the name of the FDI variables for each sector. Then, we developed several econometric models to verify the effect of corruption in each economic sector.

In table 14, are the results of the econometric analysis. Corruption acts as a "grease" for FDI in all statistically significant models. This result corroborates our previous analysis. Additionally, several sectors were omitted from the analysis due to collinearity. This behavior occurs due to the large volume of regions without the presence of FDI in several sectors. In Table 13, we can see the sectoral distribution of FDI by region, where a high concentration of foreign investment can be seen in specific economic activities such as transformation industries (Sector C), agriculture, livestock, forest production, fisheries, and aquaculture (Sector A) and trade; repair of motor vehicles and motorcycles (Sector G).

Table 13 - CNAE Economic Sectors

Sector	Activity
A	Agriculture, livestock, forest production, fisheries and aquaculture
B	Extractive industries
C	Transformation industries
D	Electricity and gas
E	Water, sanitation, waste management and decontamination activities
F	Construction
G	Trade; repair of motor vehicles and motorcycles
H	Transport, storage and mail
I	Accommodation and meals
J	Information and communication
K	Financial, insurance and related services activities
L	Real estate activities
M	Professional, scientific and technical activities
N	Administrative activities and complementary services

O	Public administration, defense and social security
P	Education
Q	Human health and social services
R	Arts, culture, sports and recreation
S	Other service activities
T	Domestic services
U	International organizations and other extraterritorial institutions

Table 14 - Sectoral Analysis

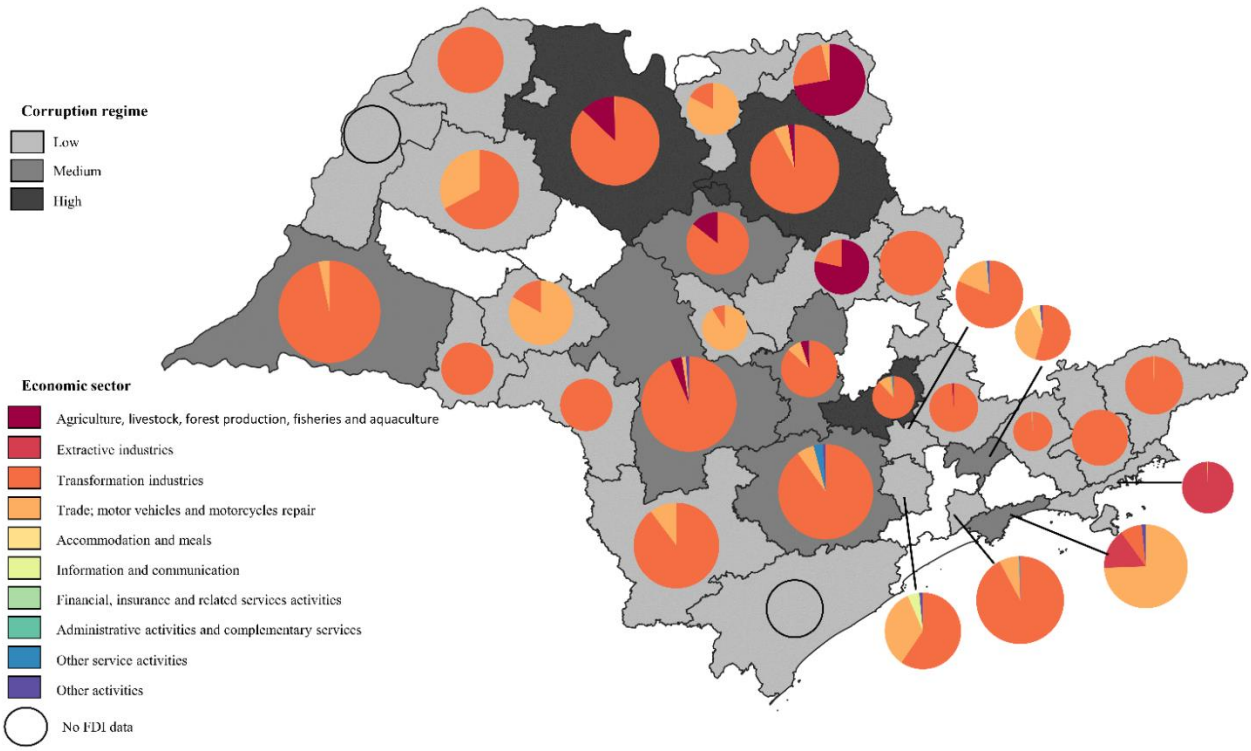
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	FE	RE	DK FE	DK RE	FGLS	FEGLS	PCSE
Corruption	0.0454**	-0.000530	0.0454**	-0.000530	0.0145***	0.00665*	-0.0422
	(0.0170)	(0.0423)	(0.00960)	(0.0256)	(0.00461)	(0.00356)	(0.0446)
GDP PC	0.260*	-0.171	0.260**	-0.171	0.0291***	0.0218	-0.259**
	(0.129)	(0.187)	(0.0739)	(0.110)	(0.0112)	(0.0156)	(0.101)
Urbanization	-0.382	0.0896	-0.382	0.0896	-0.0343***	0.0431	0.130
	(0.900)	(0.151)	(0.377)	(0.0778)	(0.0108)	(0.155)	(0.110)
Industry Share	-0.107	0.0457	-0.107*	0.0457	0.0112	-0.00716	0.0848
	(0.0887)	(0.0746)	(0.0416)	(0.0417)	(0.00943)	(0.0135)	(0.115)
Agriculture Share	-0.156**	0.142	-0.156**	0.142**	0.0328***	-0.0721***	0.185***
	(0.0636)	(0.127)	(0.0351)	(0.0260)	(0.00535)	(0.0241)	(0.0438)
Service Share	0.0427	0.0182	0.0427	0.0182	0.00712	0.0117	0.0204
	(0.0785)	(0.0240)	(0.0319)	(0.00809)	(0.00469)	(0.0221)	(0.0447)
Education H/P	0.000463*	0.00212	0.000463**	0.00212*	0.000351	7.33e-05	0.00211
	(0.000252)	(0.00204)	(9.71e-05)	(0.000872)	(0.000285)	(0.000224)	(0.00262)
IFGF	0.0106	-0.00689	0.0106***	-0.00689	0.00504***	0.00143	-0.00700

	(0.00900)	(0.0161)	(0.00134)	(0.00948)	(0.00183)	(0.00286)	(0.0231)
FDI Sector A	0.143***	0.130***	0.143***	0.130***	0.134***	0.152***	0.125***
	(0.00410)	(0.00542)	(0.00597)	(0.00523)	(0.00271)	(0.0108)	(0.0189)
FDI Sector B	0.157***	0.186***	0.157***	0.186***	0.175***	0.182***	0.206***
	(0.0483)	(0.0309)	(0.0134)	(0.0201)	(0.0110)	(0.0220)	(0.0261)
FDI Sector C	0.120***	0.143***	0.120***	0.143***	0.141***	0.129***	0.148***
	(0.00868)	(0.0128)	(0.00627)	(0.00962)	(0.00213)	(0.00400)	(0.00688)
FDI Sector D	-	-	-	-	-	-	-
FDI Sector E	-	-2.756	-	-2.756	-0.307	13.40***	-5.328
		(4.050)		(1.579)	(0.700)	(1.469)	(3.334)
FDI Sector F	-	-	-	-	-	-	-
FDI Sector G	0.0202	0.0651**	0.0202	0.0651**	0.0886***	0.0739***	0.0692***
	(0.0608)	(0.0314)	(0.0347)	(0.0145)	(0.00426)	(0.0151)	(0.0229)
FDI Sector H	0.877***	0.407	0.877**	0.407	0.627	0.840	1.451
	(0.312)	(1.226)	(0.167)	(0.684)	(0.440)	(0.559)	(2.120)
FDI Sector I	0.368**	0.0690	0.368**	0.0690	0.455***	0.0937	-0.0155
	(0.137)	(0.403)	(0.0767)	(0.140)	(0.0552)	(0.125)	(0.422)
FDI Sector J	-0.0250	-0.815	-0.0250	-0.815	-0.0884	-0.0261	-1.224**
	(0.263)	(1.093)	(0.0470)	(0.443)	(0.0785)	(0.114)	(0.489)
FDI Sector K	0.171	-0.699	0.171**	-0.699	0.287	-0.323	-0.271
	(0.197)	(1.967)	(0.0484)	(1.194)	(0.388)	(0.298)	(1.907)
FDI Sector L	-	-	-	-	-	-	-
FDI Sector M	0.894	2.952*	0.894***	2.952	2.494***	1.090***	4.052***
	(0.580)	(1.722)	(0.0261)	(1.306)	(0.412)	(0.243)	(1.184)
FDI Sector N	0.184***	0.0774	0.184***	0.0774	-0.582***	0.219***	0.336
	(0.0475)	(0.510)	(0.0216)	(0.591)	(0.0747)	(0.0276)	(0.315)
FDI Sector O	-	-	-	-	-	-	-
FDI Sector P	-	-	-	-	-	-	-
FDI Sector Q	-	-	-	-	-	-	-
FDI Sector R	-7.081**	9.323	-7.081**	9.323	1.887	0.545	5.584
	(3.068)	(13.75)	(2.190)	(5.633)	(2.956)	(3.907)	(16.07)

FDI Sector S	-0.0430	0.381	-0.0430	0.381**	0.132	0.106	0.731
	(0.0395)	(0.407)	(0.0860)	(0.0872)	(0.0890)	(0.0836)	(0.465)
FDI Sector T	-	-	-	-	-	-	-
FDI Sector U	-	-	-	-	-	-	-
Constant	0.0824	-0.00758	0.0824	-0.00758**	-0.00331***	-0.000190	-
	(0.189)	(0.00616)	(0.0737)	(0.00151)	(0.000895)	(0.000260)	
Observations	112	112	112	112	111	111	112
R-squared	0.914						0.962
Number of id	31	31	31	31	30	30	

Robust standard error in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure 11 - Sectoral distribution of FDI - 2012 to 2016



3.5. Discussion

This study empirically examines the relationship between corruption and FDI intensity at the regional level in Brazil. This analysis is aligned with the “sand or grease” theory, where corruption can act to enhance or deter economic activities. However, we do not limit our analysis to a linear or dichotomous approach, instead, we advance the discussion through a non-linear analysis using different levels of corruption.

The first stage of our empirical results shows that corruption acts as a "grease" for FDI intensity at the regional level. This result goes against Wellalage; Thrikawala (2021) findings, who found that corruption acts as "sand in the wheels" when analyzing innovation at the firm level in other Latin American countries. However, our results are not surprising when considering Brazil's institutional characteristics, such as regulatory inconsistency and lack of transparency (ARMIJO; RHODES, 2017). According to Lakshmi; Saha; Bhattarai (2021), markets that have weak institutional practices harm investor confidence. This loss of confidence increases uncertainty and risk when investing in the country. Thus, it is common for MNEs to pay bribes to circumvent political uncertainties and instabilities (SIDKI DARENDELI; HILL, 2016).

This result holds when we disaggregate FDI into different sectors. Our sectoral analysis shows that corruption acts as a "grease" in attracting FDI in all statistically significant relationships. This result shows that, although, at different levels, the analyzed sectors have a certain tolerance for corruption.

Regarding the control variables, our models show multiple non-significant coefficients. However, we still find some interesting results. We see a positive and significant relationship between GDP PC and FDI intensity in almost all models. This result corroborates (SABIR; RAFIQUE; ABBAS, 2019), findings, which show that higher levels of GDP PC favor FDI inflows in emerging countries, contrary to developed countries.

Concerning the urbanization variable, we noticed a negative and significant relationship between urbanization and FDI intensity, similar to (ERDOGAN; UNVER, 2015) results. This may be due to the preference of MNEs to invest in medium-sized cities with lower rates of urbanization.

Not surprisingly, there is a positive relationship between local governance (measured by the variable IFGF) and FDI intensity. This relationship can be explained by the relationship between better local governance and firms' productivity (TAN; TRAN; TAN,

2017) and adds to the theory that MNEs prefer locations with higher productivity rates, especially in emerging countries.

Although the result of the first stage of our empirical analysis points out that corruption has a positive and significant relationship with FDI, there are indications that it is especially significant in regions with intermediate (low-medium) levels of corruption. This result can be partially explained by investors' ability to identify different types and levels of corruption and, in this case, adjust their corporate strategies according to the institutional reality of each region (SARTOR; BEAMISH, 2018). In other words, investors may be indifferent to very low levels of corruption. In the same way, investors may avoid regions with high levels of corruption. What remains a topic of discussion is: why does only an intermediate level of corruption attract foreign investment?

Emerging countries' local institutional characteristics can hinder foreign companies' development due to their underdeveloped legal environments and deficient resource allocation (ZHOU; XU, 2012). According to Goedhuys; Mohnen and Taha (2016), corruption can be the key to overcoming those institutional obstacles. In addition, the bureaucracy present in Brazilian institutions makes obtaining licenses often lengthy. In this case, it is not uncommon to speed up this process by paying bribes (CHIH; KISHAN; OJEDE, 2022; KABADURMUŞ, 2017), which certainly helps reduce the operating costs of these firms. Then, we argue that certain levels of corruption can be not only accepted but also desired.

Yet, higher levels of corruption negatively affect the concentration of FDI by increasing firms' production costs (FUNGÁČOVÁ; KOCHANOVA; WEILL, 2015), which may undermine the regional attractiveness for FDI. This indicates that corruption levels are only tolerated to a certain extent. Which explains why the relationship between corruption and the intensity of FDI has not been confirmed in regions with high levels of corruption.

Our results are valuable but limited since our sample only points to the reality of the state of Sao Paulo. We suggest reproducing this study with a larger sample, perhaps analyzing the entire national territory, to verify if the results are maintained. However, in our case, the desirability of intermediate levels of corruption may be an indication that legislation that regulates foreign firms may be outdated or has become an obstacle to these firms. Nevertheless, the changes in the legal and institutional framework need to be based on procedures that are able to guarantee the maintenance of the freedom of investment and future FDI as well as fighting corruption (HELMY, 2013). Further, Delgado; Mccloud and Kumbhakar (2014) found that the impact of FDI on economic growth can be moderated by the levels of corruption. The author states that a lower level of corruption enhances FDI’s

effectiveness in improving growth rates. A reduction in the high level of legislative complexity would aid the economy (DI VITA, 2021). Finally, it is necessary to analyze the impacts of Brazilian regulations on MNEs in a deeper and at the same time broader way to propose legislative flexibility. Therefore, here we state that governance improvement in Brazil is necessary to attract FDI, reduce political corruption and boost economic growth.

CHAPTER 4: FINAL CONSIDERATIONS

This thesis aimed to analyze the effects of Foreign Direct Investment (FDI) in Brazil, specifically regarding the impact of corruption on the attractiveness of this type of investment in local economies. The research not only expands the debate in international literature, but also aims to initiate political discussions based on a deeper understanding of the potential benefits of FDI and the factors that can be used to attract more foreign investments to the country.

As a result, Chapters 2 and 3 function as complementary essays on the relationship between FDI and corruption. These chapters explore data that had not been previously used in Brazilian studies, opening the door for innovative discoveries.

In summary, Chapter 2 addresses the topic comprehensively, presenting a systematic review of the literature on FDI and corruption through a bibliometric analysis of articles published in reputable academic journals. This scientific mapping helps fill methodological gaps in the study of the topic. Two key contributions emerge from this analysis. First, the importance of the debate on corruption and FDI in developed countries is significant, indicating that discussions in this area cover issues such as corporate governance, transparency, and business ethics. The analysis of the relationship between FDI and corruption in these countries can offer valuable insights for strategies to combat corruption and create environments more conducive to investment.

Second, the analysis reveals a clear negative effect of corruption on the attractiveness of FDI, confirming the idea that corruption can act as a barrier to attracting foreign investments in developing countries. These results highlight the need to better understand the relationship between corruption and FDI to formulate more effective policies that can create a healthier investment environment while effectively combating corruption. Chapter 2 concludes with some suggestions for future research, pointing out areas for additional studies that could further deepen the understanding of the impact of corruption on FDI in Brazil and other emerging regions.

In Chapter 3, we examined the relationship between corruption and Foreign Direct Investment (FDI) in Brazil, particularly at the regional level. The results revealed a statistically significant relationship between corruption and the intensity of FDI, supporting the "sand or grease" hypothesis, which suggests that corruption can act as a facilitator or an obstacle to investment.

We found that, in certain contexts, corruption can facilitate foreign investment, especially in regions with intermediate levels of corruption. This effect may occur because corruption allows companies to bypass bureaucracy and institutional inefficiencies. In contrast, in regions with high levels of corruption, the attractiveness for FDI decreases, likely due to higher costs and risks associated with such environments.

The sectoral analysis indicated that corruption can have a positive impact on attracting foreign investment in various sectors, suggesting that some sectors may tolerate corruption more than others, depending on the economic context. However, this tolerance seems to have a limit, as high levels of corruption can increase production costs, making the region less attractive to foreign investors.

Additionally, other key variables were considered in the study. For example, the relationship between GDP per capita and FDI intensity was positive and significant, indicating that regions with higher economic development tend to attract more foreign investment. Urbanization, however, had a negative relationship with FDI, pointing to a possible preference among multinational companies for investing in medium-sized cities where urban density is lower. Local governance also showed a positive relationship with FDI intensity, reinforcing the idea that companies prefer areas with higher productivity and stability.

However, the study had some limitations. The sample was limited to the state of Sao Paulo, and the corruption proxy was the number of lawsuits against public servants, which can be influenced by the effectiveness of the judicial system. Future studies should expand the scope to include the entire Brazilian territory and use different corruption measures to validate our results. Modernization of bureaucratic processes and updates to the legal system could be allies in combating corruption and creating a more conducive environment for foreign investment.

In summary, the analysis in Chapter 3 highlighted the complexity of the relationship between corruption and FDI in Brazil. Combating corruption, improving governance, and streamlining bureaucracy are essential actions to make Brazil more attractive to foreign investors and promote a healthier and more stable business environment.

Overall, this thesis contributes significantly to the understanding of the relationship between corruption and Foreign Direct Investment (FDI) in Brazil, particularly at the regional level. The findings suggest that corruption can have both facilitating and hindering effects on FDI, depending on its intensity and context. The concept of "sand or grease" encapsulates this complex relationship, with intermediate levels of corruption potentially facilitating FDI by

allowing companies to bypass bureaucratic hurdles, while high levels of corruption act as barriers due to increased costs and risks.

Chapters 2 and 3 offer comprehensive insights into this dynamic, with implications for policymakers, business leaders, and academics. The analysis indicates the importance of improving governance, streamlining bureaucratic processes, and addressing institutional inefficiencies to create a more favorable environment for FDI in Brazil. While the study had some limitations, such as a restricted sample and a specific proxy for measuring corruption, it opens avenues for future research to explore these relationships further across a broader scope and with diverse indicators.

The findings underscore the need for a balanced approach in combating corruption, focusing on both reducing harmful practices and fostering a transparent, efficient environment for business. This balance is crucial for attracting foreign investment while promoting economic growth and stability in Brazil. Ultimately, the insights gained from this research can guide efforts to create a healthier and more sustainable investment climate in Brazil and other emerging regions.

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