

THE EFFECT OF NATURAL DISASTERS ON DIRECT FOREIGN INVESTMENT FROM COUNTRIES

 Joseli König Ramos¹  Juliano Krug²  Paula Carolina Ferretti³  Adriana Kroenke⁴

¹MBA in People Management, Fundação Getúlio Vargas – FGV, Joinville, Santa Catarina – Brasil. jkramos@furb.br

²Master of Administration, Universidade Regional de Blumenau – FURB, Blumenau, Santa Catarina – Brasil. juliano.krug@gmail.com

³Master of Administration, Universidade Regional de Blumenau – FURB, Blumenau, Santa Catarina – Brasil. paulaferrettic@gmail.com

⁴PhD in Numerical Methods in Engineering, Universidade Federal do Paraná – UFPR, Curitiba, Paraná – Brasil. akroenke@furb.br

Abstract

Objective: This study aims to analyze the influence of natural disasters on countries' FDI.

Method: We used data from 137 countries, considering the period from 2011 to 2017. The secondary data used to measure Foreign Direct Investment are from the UNCTAD - United Nations Conference on Trade and Development following the study by Alfaro et al. (2004). For data on natural disasters, the EM-DAT database - The International Disaster Database provided by CRED - Center for Research on the Epidemiology of Disasters was used, based on the studies by Toya & Skidmore (2007) and Escaleras & Register (2011). The analysis was performed through Linear Regression of panel data.

Originality/Relevance: This study points to a direction of research for those interested in expanding the flows of Foreign Direct Investment in their countries, being significant in the field of business, government, public policy makers and the third sector.

Results: The results show that when an economy suffers from natural disasters that cause deaths and, consequently, a reduction in human capital, foreign investors can negatively portray this fact. On the other hand, the number of occurrences and the loss in millions of dollars when analyzed individually do not discourage FDI and the presence of multinationals in the affected country. The variables: total of injured, total of affected, and total of homeless have no relation with FDI in the analyzed sample. It is indicated that, in the face of a natural disaster, countries create opportunities for the replacement and reconstruction of infrastructure and human capital.

Theoretical contribution: We seek to contribute theoretically to the recent increase of studies that verify the relationship between natural disasters and FDI in the light of the institution-based view. We direct greater understanding to the premise that natural disasters affect a country's economy as they cause FDI reduction, and we provide the foundation for future studies. While previous studies are concerned with FDI determinants, being tax incentives and property rights, this study focuses specifically on the different variables that aggregate natural disasters. In addition, the study aims to expand the perception of decision makers, belonging to the government, private entities and the third sector, so that they can reduce and prevent the occurrence of natural disasters, thus attracting FDI flows in their countries.

Keywords: Natural disasters. Foreign direct investment. International Strategy.

O EFEITO DOS DESASTRES NATURAIS NO INVESTIMENTO ESTRANGEIRO DIRETO DOS PAÍSES

Resumo

Objetivo: Este estudo tem como objetivo analisar a influência dos desastres naturais no Investimento Estrangeiro Direto dos países.

Método: Foram utilizados dados de 137 países, considerando o período de 2011 a 2017. Os dados secundários utilizados para mensurar o Investimento Estrangeiro Direto são da UNCTAD - United Nations Conference on Trade and Development seguindo o estudo de Alfaro et al. (2004). Para os dados dos desastres naturais utilizou-se a base de dados da EM-DAT - The International Disaster Database fornecido pelo CRED - Centre for Research on the Epidemiology of Disasters, tendo como base os estudos de Toya e Skidmore (2007) e Escaleras e Register (2011). A análise deu-se por meio de Regressão Linear de dados em painel.

Originalidade/Relevância: Este estudo aponta uma direção de pesquisa para os interessados em ampliar os fluxos de Investimento Estrangeiro Direto em seus países, sendo esses presentes no campo dos negócios, do governo, dos formuladores de políticas públicas e do terceiro setor.

Resultados: Os resultados apontam que quando uma economia sofre com desastres naturais que ocasionam mortes e, consequentemente redução do capital humano, os investidores estrangeiros podem caracterizar esse fato negativamente. Por outro lado, o número de ocorrências e o prejuízo em milhões de dólares quando analisados individualmente não desmotivam o IED e a presença das multinacionais no país afetado. As variáveis: total de feridos, total de afetados e total de desabrigados não possuem

relação com o IED na amostra analisada. Indica-se que, diante de um desastre natural, os países criem oportunidades de substituição e reconstrução de infraestrutura e capital humano.

Contribuição teórica: Busca-se contribuir teoricamente para a recente expansão dos estudos que verificam a relação entre os desastres naturais e o IED à luz da Teoria Econômica Institucional. Direcionar maior entendimento para a premissa de que os desastres naturais afetam a economia de um país à medida em que provocam redução do IED, fornece base para estudos futuros. Enquanto estudos anteriores preocupam-se com determinantes de IED, sendo incentivos fiscais e direitos de propriedade, este estudo concentra-se especificamente nas diferentes variáveis que agregam os desastres naturais. Em adicional, o estudo visa expandir a percepção dos tomadores de decisões, pertencentes ao governo, as entidades privadas e ao terceiro setor, para que possam diminuir e prevenir as ocorrências dos desastres naturais, atraindo assim, os fluxos de IED em seus países.

Palavras-chave: Desastres naturais. Investimento estrangeiro direto. Estratégia internacional.

EL EFECTO DE LOS DESASTRES NATURALES SOBRE LA INVERSIÓN EXTRANJERA DIRECTA DEL PAÍS

Resumen

Objetivo: Este estudio tiene como objetivo analizar la influencia de los desastres naturales en la inversión extranjera directa de los países.

Método: Se utilizaron datos de 137 países, considerando el período de 2011 a 2017. Los datos secundarios utilizados para medir la Inversión Extranjera Directa son de la UNCTAD - Conferencia de las Naciones Unidas sobre Comercio y Desarrollo siguiendo el estudio de Alfaro et al. (2004). Para los datos sobre desastres naturales se utilizó la base de datos EM-DAT - La Base de Datos Internacional de Desastres proporcionada por CRED - Centro de Investigación sobre la Epidemiología de los Desastres - basada en los estudios de Toya y Skidmore (2007) y Escaleras and Register (2011). El análisis se realizó mediante Regresión Lineal de datos de panel.

Originalidad / Relevancia: Este estudio apunta a un rumbo de investigación para aquellos interesados en expandir los flujos de Inversión Extranjera Directa en sus países, estando presentes en el ámbito empresarial, gubernamental, políticos y del tercer sector. **Resultados:** Los resultados muestran que cuando una economía sufre desastres naturales que provocan muertes y, en consecuencia, una reducción del capital humano, los inversionistas extranjeros pueden caracterizar negativamente este hecho. Por otro lado, la cantidad de ocurrencias y la pérdida en millones de dólares cuando se analiza individualmente no desalienta la IED y la presencia de multinacionales en el país afectado. Las variables: total de heridos, total de afectados y total de personas sin hogar no tienen relación con la IED en la muestra analizada. Se indica que, ante un desastre natural, los países generan oportunidades para el reemplazo y reconstrucción de infraestructura y capital humano.

Aporte teórico: Buscamos contribuir teóricamente a la reciente expansión de estudios que verifiquen la relación entre desastres naturales e IED a la luz de la Teoría Económica Institucional. Dirigir una mayor comprensión a la premissa de que los desastres naturales afectan la economía de un país ya que provocan la reducción de la IED, proporciona la base para estudios futuros. Si bien los estudios anteriores se refieren a los determinantes de la IED, como los incentivos fiscales y los derechos de propiedad, este estudio se centra específicamente en las diferentes variables que agregan los desastres naturales. Además, el estudio tiene como objetivo ampliar la percepción de los tomadores de decisiones, pertenecientes al gobierno, entidades privadas y el tercer sector, para que puedan reducir y prevenir la ocurrencia de desastres naturales, atrayendo así flujos de IED en sus países.

Palabras clave: Desastres naturales. La inversión extranjera directa. Estrategia internacional.

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1 Introduction

Natural disasters cause human, material, environmental damages, and also consequent economic and social damages (Castro, 1998; Yang, 2008). The frequency with which such disasters are occurring has grown, thus expanding the interest in this theme (Pelling, Özerdem, & Barakat, 2002), with repercussions on this issue among governments and international institutions (Sulaiman & Aledo, 2016). Natural disasters affect economic progress, human capital and the competitiveness of countries (Klomp & Valckx, 2014), unlike other risks, the control of natural disasters becomes more difficult (Katoka, 2020). Local country conditions can target the potential benefits generated by FDI (Alfaro, Chanda, Kalemli-Ozcan & Sayek, 2004). When disasters cause declines and risks to expected rates of return, Foreign Direct Investment (FDI) can be undermined (Yang, 2008).

In a scenario of major natural disasters, foreign investors tend to rethink their investments, thus being able to affect the FDI levels of that region. Multinational companies promote increases in employment rates, expansion of technological innovation and increase in human capital. However, when a natural disaster occurs, the number of local suppliers is reduced, causing higher costs for the acquisition of inputs, which means that multinationals rethink whether the country is still profitable, being able to choose to cancel its investments in the region (Jaramillo, 2009; Kato & Okubo, 2018; Toner-Rodgers & Friedt, 2020). Even in the face of this context, the literature on the effect of natural disasters on the economy is in its first steps (Doytch, 2019).

FDI is considered a flow of foreign direct investment from one country to another. Doing business abroad depends, to a large extent, on local conditions offered, including location and lower costs (Oh & Oetzel, 2011; Alfaro et al., 2004). Since FDI is an important driver for the development of countries (OECD, 2002), investigating the factors that intensify FDI empirically is of interest to international economic literature (Blonigen, 2005). Furthermore, in the face of climate change, the debate on natural disasters is considered a current topic (Khan, Chenggang, Khan & Muhammad, 2020).

Although natural disasters and FDI affect different social and economic contexts, there are few studies that evaluate these variables together (Anuchitworawong & Thampanishvong, 2015). The results obtained in the literature for the effects of natural disasters on FDI are diverse. While for some authors the number of foreign subsidiaries does not decrease in response to natural disasters (Oh & Oetzel, 2011; Katoka, 2020), or even, natural disasters cause positive long-term effects on FDI (Kato & Okubo, 2018; Doytch, 2019), others conclude that greater severity associated with natural disasters tends to reduce FDI flows (Yang, 2008; Anuchitworawong & Thampanishvong, 2015; Escaleras & Register, 2011; Khan et al. 2020; Toner-Rodgers & Friedt, 2020).

It can be seen that previous studies on this topic investigate different contexts, based on large European multinationals (Oh & Oetzel, 2011), on only one type of natural disaster, such as hurricanes (Yang, 2008) or in only one country (Anuchitworawong & Thampanishvong, 2015; Toner-Rodgers & Friedt, 2020; Oh, Oetzel, Rivera & Lien, 2020). The study closest to the one proposed by the present

article, was based on the analysis of 94 countries between the years 1984 to 2004 (Escaleras & Register, 2011), necessitating to be updated in relation to the analysis of countries and the years investigated. In addition, in the study by Escaleras and Register (2011), specific natural disasters were observed, such as: earthquakes, floods, volcanoes, landslides and windstorms, limiting the sample to more serious disasters, determined by the number of deaths. The present study, however, intends to analyze variables that go beyond the number of deaths, considering for example the total number of people injured and the total losses in millions of dollars, understanding that these can also be factors that affect the decision of the FDI. For the analysis, the number of deaths represented the human capital and the loss in millions of dollars represented the financial capital.

Other studies emerged after Escaleras and Register (2011). Doytch (2019) investigated manufacturing FDI from 1980 to 2011 in 69 countries, distinguishing disasters in meteorological, climatic, hydrological and geophysical. The discovery was that natural disasters negatively affect FDI in the short term and positively in the long term (Doytch, 2019). Katoka (2020) analyzed 44 countries in Sub-Saharan Africa between 1970 to 2018, noting that the total number of disasters that occurred in a period prior to 3 years does not significantly affect FDI inflows. In studying the countries that belong to Belt & Road, Khan et al. (2020) concluded that serious natural disasters negatively influence FDI. Toner-Rodgers and Friedt (2020) checked the case of India and comprehended that natural disasters increased the risk of investing in the affected regions, negatively impacting FDI.

The above findings provide a recent discussion on the relationship between natural disasters and FDI. According to Toner-Rodgers and Friedt (2020), over the past 15 years, FDI and natural disasters have been central elements for the development of economies. The frequency with which natural disasters are occurring worldwide has worsened, and their consequences for the economy cannot be ignored (Khan et al., 2020; Toner-Rodgers & Friedt, 2020). Likewise, FDI has increased dramatically in recent decades (Kato & Okubo, 2018). In view of the increasing frequency and severity of natural disasters, managers of multinationals are being pressured to develop strategies that manage the effects of natural disasters on their companies (Oh et al., 2020). In this perspective, the following research question emerges: Can the damage to human and financial capital resulting from natural disasters influence countries' Foreign Direct Investment?

In order to achieve the objective of this study of analyzing the influence of natural disasters on foreign direct investment, FDIs from many countries that occurred between 2011 and 2017 were analyzed. For this, the quantitative method used is the linear regression and panel data, being the FDI the dependent variable. As independent variables, we used the number of occurrences of natural disasters, the total number of deaths, the total number of people injured, the total number of people affected, the total number of homeless, and the total of losses in millions of dollars; all representing natural disasters. The collection instrument is documentary and occurs through UNCTAD databases, for data referring to FDI flows and from CRED EM-DAT, which compose data on natural disasters, being all secondary data.

The aim is to contribute theoretically to the recent expansion of studies that verify the relationship between natural disasters and FDI in the light of Institutional Economic Theory. Directing greater understanding to the premise that natural disasters affect a country's economy as they cause FDI reduction, provides a basis for future studies. While previous studies are concerned with FDI determinants, these being tax incentives and property rights, this study focuses specifically on the different variables that aggregate natural disasters. In addition, the study aims to expand the perception of decision makers, belonging to the government, private entities and the third sector, so that they can reduce and prevent the occurrence of natural disasters, thus attracting FDI flows in their countries.

The article is organized as it follows. Section 2 covers a brief review of the literature on Institutional Economic Theory, natural disasters and FDI; Section 3 describes the data and the method; Section 4 presents the analysis of the results; Section 5 discusses the empirical results, and Section 6 concludes the research.

2 Theoretical framework

This section deals with the main topics that will contribute to support the object of this study. Thus, natural disasters and Foreign Direct Investment stand out.

2.1 Theoretical positioning: institution-based view

According to North (1990, p. 13), “institutions are rules of the game in a society”. More precisely, it is the restrictions that individuals assume and that form human interaction (North, 1990). Institutional theory is not limited to organizational studies only, but has an important role in explaining changes at national, transnational and global levels (Scott, 2005). This theory suggests that institutions influence economic results, as they interfere in decisions about work, savings, investment and innovation (Greif, 2006). Within the institutional field, Institutional Theory recognizes that there are different responses to institutional practices, due to internal and external forces (Dillard, Rigsby & Goodman, 2004).

The way countries, organizations and managers react in the midst of global changes, are not only reflections of progress or oppression, but of reactions and orientations that arise from existing institutions (Dacin, Goodstein & Scott, 2002). Host countries that have weak institutions, for example, tend to reduce FDI (Bailey, 2017). Multinational companies prefer to invest in countries that have strong institutions (Contractor, Dangol, Nuruzzaman & Raghunath, 2020). Environmental situations, such as destination region and competitive environment, should be explored as moderating factors between FDI and institutions (Bailey, 2017).

According to Sabir, Rafique and Abbas (2019), institutional quality is an important determinant for attracting FDI, being just as important as macroeconomic issues. For Blanton

and Blanton (2007), emerging countries that respect human rights more broadly attract FDI, signaling greater stability and predictability in the host country and providing an environment conducive to the development of human capital, which, in turn, refers to qualified labor, being one of the attributes observed by foreign investors.

In addition to the effects that institutions have on FDI, for Ghimire (2020), the poor performance of institutions, especially public ones, causes natural disasters, and this also affects institutions in a way that makes them ineffective to combat them. Ghimire (2020) calls this situation a vicious circle. Thus, relating institutional theory to studies of the natural environment seems to be somewhat of a paradox, however, important to be considered, since this theory may help to conduct a structure that explores cultural and institutional bases adapting to a new social and environmental reality (Jennings & Hoffman, 2017).

In this perspective, using Institutional Economic Theory as a background is specifically suitable for this study because it allows observing how institutions can shape organizational decisions (Dillard, Rigsby & Goodman, 2004). The decision of organizations to invest in foreign countries can be modified as local institutions deal with the prevention and causes of natural disasters. Multinationals, as organizations, observe the institutional quality of countries before investing in the regions. More specifically for the context of the study, if national institutions cannot effectively deal with natural disasters, it is possible that they will affect their FDI.

2.2 Natural disasters

Natural disasters are defined as the result of adverse events, natural or man-made, on an ecosystem, causing human, material and/or environmental damage and consequent economic and social damage (Castro, 1998; Yang, 2008; Klomp & Valckx, 2014; Botzen, Deschnes & Sanders, 2019; Kato and Okubo, 2018; Khan et al., 2020; Botzen, Deschnes & Sanders, 2019). These phenomena are occurring commonly around the world (Jaramillo, 2009; Khan et al., 2020; Toner-Rodgers & Friedt, 2020) and their consequences differ by culture, infrastructure and policies (Bergholt & Lujala, 2012), which can destroy different types of institutions allocated in the countries (Pelling et al., 2002).

As the frequency and severity of disasters occur and increase, interest in this topic has expanded (Pelling et al., 2002; Oh et al., 2020). Many empirical studies have sought to identify the impact of increased natural disasters on economic development; however, the empirical evidence is somewhat inconclusive (Klomp & Valckx, 2014), and research dealing with disasters and their effects is still scarce (Oh & Oetzel, 2011; Toner-Rodgers & Friedt, 2020).

The context in which disasters happen seems to be necessary to understand their impact on business, which can affect companies in their normal course of operations (Oh & Oetzel, 2011), which

in turn, refers to local conditions that can limit the potentials benefits of FDI for the host country (Alfaro et al., 2004). The search for an understanding of what are the consequences caused by natural disasters is essential for many people and countries, including international development agencies and public policy makers (Bergholt & Lujala, 2012), since natural disasters are related to numerous costs for companies, which is the case of damages caused to raw materials, production stoppage and damage to fixed and capital assets (Katoka, 2020).

Thus, it is also relevant to see how countries behave in the face of the effects of natural disasters (Yang, 2008). Although disasters are perceptible at global and personal levels, national levels have a strong role in development planning (Pelling et al., 2002), as well as raising awareness of a governance policy for environmental problems (Sulaiman & Aledo, 2016).

Severe natural disasters pose not only a serious risk to human life, as the terrible tsunami in 2004 near Sumatra revealed, which claimed the lives of around 150,000 people just in Indonesia. These events are also devastating to the ability of a country or region to produce, through their effects on physical capital stocks, labor forces, transport infrastructure, agricultural resources and stocks, among other productive resources (Escaleras & Register, 2011; Katoka, 2020).

Natural disasters can affect from long-term growth rates to natural resource prices (Kahn, 2005), due to the failure of emergency management systems and problems in social support systems, especially for the poorest (Sulaiman & Aledo, 2016), in which natural disasters tend to cause greater damage (Toya & Skidmore, 2007; Toner-Rodgers & Friedt, 2020). This does not mean that richer economies suffer less disasters, but there are fewer deaths, meaning that economically developed countries provide greater security against disasters from nature (Kahn, 2005).

Toya and Skidmore (2007), investigated the level at which human and economic losses, caused by natural disasters, can decrease as countries develop. The income of the economies is not the only one to reduce deaths from natural disasters. The educational level, the openness of the economy, a strong financial sector and a smaller government contribute to these reductions.

According to Neumayer, Plümper and Barthel (2014), there are three factors that explain the damage caused by disasters. The first is the size of the economic loss, which will depend on the magnitude of the event and the natural risk that caused the disaster. The second corresponds to the economic cost according to the existing wealth in the area affected by the natural disaster; that is, the higher the level of wealth exposed in the area affected, the greater the damage to economic costs. The third factor is related to adequate protection measures that can prevent or reduce the damage caused by disasters, making countries or regions able to withstand such events more easily (Neumayer, Plümper & Barthel, 2014).

There is a constant interest in accounting for the replacement values of physical infrastructure, however, it is known that there are greater systemic impacts for economies affected by disasters (Pelling et al., 2002), such as the impact on FDI (Escaleras & Register, 2011; Katoka, 2020; Doytch, 2019; Oh et al., 2020). There are different types of disasters that can result in primary, secondary or tertiary

damage, according to Pelling et al. (2002), being possible to cogitate some predictions about the level of damage caused by disasters.

Sudden onset disasters, such as floods, generate losses mainly for productive capital, which can destroy infrastructure, means of production, and stocks. Slow-onset disasters, such as droughts, have more destructive and long-term impacts, since they erode savings, investment, domestic demand and productive capacity rates. Compound disasters, are the junction of disasters of sudden and slow onset, which is the case of volcanic activity, where the active period of risk can last for many years, increasing uncertainty and repressing investment (Pelling et al., 2002).

Thus, disasters can interrupt all components of a market economy: production, distribution, commercialization and consumption, directly threatening a country's development strategy and its socioeconomic performance, which can be seen in economic indicators such as GDP, trade, and employment (Vermeiren, 1989; Pelling et al., 2002, Botzen, Deschenes & Sanders, 2019). Natural disasters also have budgetary implications, due to the fact that there is no strategic economic planning that foresees these events (Benson, 1997), as well as other direct effects on business, homes, infrastructure and agriculture, or even on the physical and mental health of the population (Botzen, Deschenes & Sanders, 2019). In this perspective, the competitiveness of countries can also be affected by natural disasters due to the destruction of production capacities. Imports increase and exports decrease, generating a trade deficit (Klomp & Valckx, 2014).

Despite the above, some authors (Kato & Okubo, 2018; Doytch, 2019), emphasize that the negative effects of natural disasters can change according to the analysis of time, causing even improvements in the local economy. In contrast, Pelling et al. (2002) points out that in the first moment, natural disasters tend to increase growth in the construction sector; however, these gains are generally restricted to a period of six months after the disaster. This period of opportunity is insufficient to compensate for all losses arising from natural disasters. For some groups of countries, disasters have an effect of two to five years on the economy, which is precisely the period in which reconstruction and adaptation takes place. However, in countries that have a history of devastating natural disasters, the impact of these events can be permanent; foreign investors may perceive that the damage caused to the region's infrastructure represents obstacles to the normal functioning of their business (Jaramillo, 2009).

2.3 Foreign direct investment and natural disasters

FDI is an integral part of an open and effective international economic system, being an important catalyst for the development of countries (OECD, 2002). Economies that have bigger national markets and fast growth are main targets for FDI (Escaleras & Register, 2011). Emerging economies and countries in transition have increasingly seen FDI as a source of economic development and modernization, income, and employment growth (OECD, 2002; Doytch, 2019). Thus, there is an interest in the literature to investigate empirically the fundamental factors that drive FDI (Blonigen, 2005).

The constant search for FDI in the countries is due to the fact that there are numerous positive points linked to this action. Among them, we highlight the gain in productivity, the introduction of new processes, networks, and market access (Alfaro et al., 2004), as well as greater employability (Lankes & Venables, 1996; Toner-Rodgers & Friedt, 2020), accelerated diffusion of new technologies and modernization of the national economy (Alfaro et al., 2004), qualified labor, internationalization of R&D, appreciation of human capital, and encouragement of internal competition (OECD, 2002).

FDI occurs when an entity present in an economy decides to invest in a company resident in another economy, different from its own, usually involving a long-term relationship (Alfaro et al., 2004), and therefore, including multinational companies (Bailey, 2017). The host country is the one that receives the multinational (Katoka & Okubo, 2018), but before that, in its risk management, the multinational performs a careful analysis on the desirability of investing in that country, considering the potential for risk, including the observation of natural disasters (Oh et al., 2020).

Doing business abroad requires higher costs; therefore, one aspect observed by investors is the location of the companies that will receive the FDI, checking if the advantages of doing business in this location will be greater than the costs generated by the operation (Oh & Oetzel, 2011; Oh et al., 2020). It is understood, then, that local conditions are strong drivers to attract FDI (Alfaro et al., 2004; Bailey, 2017; Katoka & Okubo, 2018).

Like much of the macroeconomics, FDI is influenced by climate change, the latter being conducive to increasing the frequency of natural disasters (Doytch, 2019). A country that has a history of natural disasters can prevent a company from entering the foreign market, thereby reducing FDI (Katoka, 2020). It remains to analyze which damages caused by a natural disaster can cause a greater reduction in FDI, such as the number of deaths or losses in millions of dollars, for example. Several institutional factors have been observed to be attractive to FDI.

For Bailey (2017), the host countries that are most successful in FDI offer at least a stable, reliable and honest political environment. Likewise, a strong rule of law reduces risks and protects multinationals. Political and civil freedom can favor policies for multinationals to act. On the other hand, high tax rates increase costs for multinationals and prevent FDI (Bailey, 2017). In this sense, the quality of countries' institutions is a determining factor for FDI activities (Blonigen, 2005; Bailey, 2017; Sabir et al., 2019).

Considering this context, some consequences of natural disasters can affect different factors of an economy and at different times. According to Toner-Rodgers & Friedt (2020), multinational companies after having losses in places where natural disasters occur, usually pass on their FDI to other regions, which can even be allocated in proximity to the affected region.

A few studies have observed the relationship between natural disasters and FDI, obtaining different results. In the study by Escaleras & Register (2011), the authors approach FDI and natural disasters systemically. Their analysis shows the rapid growth that has occurred in relation to FDI in recent decades, and comes to the conclusion that there is a measurable and statistically significant

negative effect of natural disasters on FDI. Following this line of research, Yang (2008), Anuchitworawong & Thampanishvong (2015), and Khan et al. (2020) address that a higher level of severity associated with natural disasters tends to reduce FDI flows to the country.

Contrary to the studies mentioned above, Oh & Oetzel (2011) identified that the number of foreign subsidiaries does not decrease in response to natural disasters, regardless of the severity of the event. The explanation for this result is that most cities recover quickly after a disaster due to strong political pressure. According to Kato & Okubo (2018), the shock suffered by a natural disaster can generate an improvement in the social welfare of the host country, because despite the multinationals leaving the country, the local industry ends up intensifying. This fact is called creative destruction and usually occurs if the capital and technology present in the host country is greater than in foreign countries.

For Doytch (2019) the initial impact on an economy in the face of a natural disaster is negative when observed in the short term; however, in the long term due to the reconstructions in the economy there may be a recovery with GDP levels even higher than before the disaster. After a natural disaster, the country can put aside obsolete technologies and incorporate, through reconstruction, updated technologies. Likewise, Katoka (2020) when investigating Sub-Saharan Africa identified that FDI was not reduced in the face of natural disasters; this can be explained because multinationals may choose to remain in the affected regions, which will depend on whether the damage directly impacts the sector of the industry.

For Botzen, Deschnes & Sanders (2019), the economic impacts of natural disasters should encourage improvements in local policies. Government decision-makers could, for example, encourage risk management policies for natural disasters, evacuation, construction, and infrastructure policies. Thus, improvements in education, openness and development in the financial sector must be part of long-term disaster reduction policies (Toya & Skidmore, 2007).

The studies mentioned in this topic suggest that there is no linear result for the relationship between FDI and natural disasters; on the contrary, the discussion is still on the agenda, thus promoting the need for further studies that collaborate with the analysis of positive, negative or neutral effects. Specifically, when observing that there are different variables affected by natural disasters.

Based on the aforementioned information pertinent to the objective of this study - to analyze the influence of natural disasters on foreign direct investment in countries, the hypothesis to be tested in this research is presented: The damage to human and financial capital resulting from natural disasters influence FDI in countries.

3 Method

This research is classified as descriptive because it presents structured plans, describing characteristics of a sample through a research question (Hair et al., 2005). The approach is characterized

as quantitative because it is one of the ways in which objective theories can be tested in order to verify the relationship between the variables. Thus, the variables can be measured using instruments, allowing the data to be tested statistically (Creswell, 2003).

In the case of this research, quantitative methods are used, more precisely, we used linear regression to analyze influences, considering fixed effects and based on secondary data from two databases using the SPSS@23 software. The data will be analyzed using panel data. The use of panel data makes it possible to arrange the spatial heterogeneity that manifests itself in the coefficients through the intercept, using three different techniques for the development of linear regression analysis. Among these, there is the model with fixed effects (Gujarati, 2006). The Fixed Effects Model allows variables omitted from the panel data to be controlled when they vary between individuals, but not over time. This model has n different constants for each individual that can be observed by binary variables or indicators (Stock & Watson, 2004).

To achieve the objective proposed in this study, two worldwide reports were used, these being the EM-DAT, which comprises the data on Natural Disasters and the UNCTAD, which constructs the data related to the FDI flow available. Both reports were filtered for the years 2011 to 2017. This period was selected as an answer to update some studies regarding the impact of natural disasters on Foreign Direct Investment as in Anuchitworawong & Thampanishvong (2015), Escaleras & Register (2011) and Yang (2008) who addressed fewer current periods.

Data related to natural disasters are available on the EM-DAT - The International Disaster Database prepared by CRED - Center for Research on the Epidemiology of Disasters, with the possibility of free access according to the purpose of using the data. Data related to the flow of Foreign Direct Investment are available through UNCTAD - United Nations Conference on Trade and Development, also available for free access.

3.1 Sample

A study sample refers to the relatively small subset extracted from the investigated population (Hair et al., 2005). Thus, the study sample consists of 137 countries, which refer to the period of this study from 2011 to 2017 as shown in table 1.

Table 1 - Sample data

Sample Countries	Number of Years Available by Country	Number of Natural Disaster Occurrences	% of Natural Disaster Occurrences	Number of Countries
China	7	231	12,37%	1
India	7	107	5,73%	1
Indonesia	7	90	4,82%	1
Japan	7	61	3,27%	1
Mexico	7	46	2,46%	1
Vietnam	7	45	2,41%	1
Afghanistan	7	40	2,14%	1
Pakistan	7	40	2,14%	1
Bangladesh	7	35	1,87%	1
Brazil	7	34	1,82%	1
Haiti	7	32	1,71%	1
Peru	7	31	1,66%	1
Thailand	7	31	1,66%	1
Guatemala	7	30	1,61%	1
Colombia	7	29	1,55%	1
Nepal	7	28	1,50%	1
Australia	7	27	1,45%	1
Sri Lanka	7	26	1,39%	1
Chile	7	25	1,34%	1
Italy	5	23	1,23%	1
Myanmar	7	23	1,23%	1
Nigeria	7	23	1,23%	1
Kenya	7	22	1,18%	1
Argentina	7	21	1,12%	1
Mozambique	7	19	1,02%	1
Others	438	749	40,10%	112
Total	611	1868	100%	137

Source: Research data.

In this selection, 40.10% of the sample is composed of countries that did not present more than 1% of occurrences (Others) of natural disasters when compared to the sample size. It can be seen immediately in Table 1 that the majority of countries with the highest occurrence of natural disasters are emerging or underdeveloped countries.

When grouping data on natural disasters and FDI, it was noted that countries were not available uniformly for the entire period selected in the EM-DAT and UNCTAD reports. Thus, in the EM-DAT database, a total of 204 countries were obtained, while in the UNCTAD database, 1,415 countries were added. In order to align the countries that contained data for both samples, the data was filtered, and a valid N of 137 countries was reached, as shown in Table 1.

In table 2, it is possible to see the number of countries analyzed each year with the databases on FDI and natural disasters already grouped.

Table 2 - Number of countries per year based on EM-DAT and UNCTAD

Year	Number of countries
2011	88
2012	81
2013	82
2014	83
2015	96
2016	88
2017	93

Source: Research data.

It is worth noting that because it is panel data, each year has different countries; for example, Brazil may be in the sample for 2011, but it may not be in the sample for 2012. However, 137 countries were observed.

3.2 Dependent variable

The dependent variable of this study is called Foreign Direct Investment flow, considering inward (internal) flows. Inward flows were selected because it was necessary to obtain investment data for the country from which the natural disaster had occurred. Data related to foreign direct investment flows inward were collected from UNCTAD (2018), based on the organization's World Investment Report. In 2018, the organization made available data related to the years 1990 to 2017. These data are classified as FDI inflows, comprising the capital provided by a foreign direct investor to a company in the host country.

UNCTAD (2018) defines FDI as an investment that occurs in the long term; this investment starts from an international company towards a company located in an economy different from that of the investor. According to Alfaro et al. (2014, p. 90), “FDI shares are the value of the equity interest and reserves of foreign companies (including retained earnings) attributable to the parent company plus the net debt of affiliates to the parent company”.

A parent company is defined as a company that controls assets of other entities in countries other than its country of origin, generally because it holds a certain interest in the share capital. A foreign affiliate is a company incorporated or not incorporated in which an investor, who is resident in another economy, has a stake that allows a lasting interest in the company's management (Alfaro et al., 2004). In this research, data from UNCTAD for FDI were used, following the study by Alfaro et al. (2004).

3.3 Independent variables

Six variables were used to measure the impact of natural disasters on foreign direct investment. All variables used were obtained by CRED - Center for Research on the Epidemiology of Disasters in

its EM-DAT database - The International Disaster Database. The variables obtained were: (1) number of natural disaster occurrences; (2) total of deaths; (3) total of people injured; (4) total of people affected; (5) total of homeless people and (6) total of losses in millions of dollars. The number of occurrences was selected following Escaleras & Register (2011) in their study on natural disasters and the impact on FDI, as well as the estimated damage in millions of dollars. The death toll was followed by the study of Toya & Skidmore (2007), which used the data to measure natural disasters. The variables “total of people injured”, “total of people affected” and “total of homeless people” were added to this study in order to offer a new way of measuring natural disasters.

EM-DAT is a country-level database for natural disasters, based on the occurrence of more than 21,000 disasters in the world since 1900. The criteria established by EM-DAT for disasters are at least one of the following: 10 or more people killed, 100 or more people affected, a declaration of a state of emergency, and/or a call for international assistance. The report data is compiled through sources such as the UN, governments and the International Federation of the Red Cross (EM-DAT, 2020).

Regarding the variables, it is worth noting that the total death variable adds the number of deaths plus missing persons. The total of injured people variable refers to individuals who have suffered physical injuries, traumas or illnesses that need immediate medical assistance. The total of people affected variable is the sum of all people who are injured, affected (people who require immediate assistance during an emergency situation), and homeless. In the variable “total of homeless people”, it is considered the number of people who were left homeless because the house was destroyed or damaged in the disaster, needing shelter after the event (EM-DAT, 2020).

The choice for the EM-DAT report was because it is a data set widely used in scientific research when it comes to natural disasters (Doytch, 2019; Oh & Oetzel, 2011), providing detailed information on different types of disasters (Katoka, 2020; Toner-Rodgers & Friedt, 2020). In addition, it is an open data source developed by the Center for Research in Disaster Epidemiology of the School of Public Health at the Université Catholique de Louvain, located in Brussels, Belgium (Khan et al., 2020).

Considering the dependent variable and the independent variables presented, the linear regression model was used, analyzing the years in a longitudinal way, as it aims to verify the correlation between the variables in a given sequence of points in time (Wooldridge, 2009). According to Woodridge (2009) the model for fixed effects, is presented according to the equation:

$$Y_{it} = \beta_0 + \beta_i X_{i,t} + \alpha_1 d_1 + \alpha_2 d_2 + \dots + \alpha_n d_n + \varepsilon_{i,t}$$

with $i = 1, \dots, n$ being the observations and α_i the intercepts, which can be represented in matrix form by:

$$Y = \beta X + \alpha D + \varepsilon$$

The variables that represent the years were created in a dichotomous way. For each year in which the disaster and the FDI occurred, the variable received a value of 1. If it is not related to that year, then the variable received a value of 0. Thus, the seven years used in this research were made as dichotomous variables. The model used for linear regression is as follows:

$$FDI = \beta_0 + \beta_1 NO + \beta_2 TD + \beta_3 TI + \beta_4 TA + \beta_5 TH + \beta_6 TLD + \beta_i Ano_i + \varepsilon; i = 2011, 2013, \dots, 2017$$

Where:

FDI = Foreign Direct Investment

NO = Number of occurrences of natural disasters

TD = Total of deaths

TI = Total of people injured

TA = Total of people affected

TH = Total of homeless people

TLD = Total losses in millions of dollars

4 Presentation and analysis of results

This chapter analyzes the results found within the proposed model. Table 3 presents the summary of the model. The variables are named FDI for dependent variable, and for independent ones: (1) Occurrences; (2) Deaths; (3) Injured; (4) Affected; (5) Homeless and (6) Loss. The R^2 of the model presented is 0.367. The R^2 or coefficient of determination is popularly used as one of the measures of the quality of adjustment (Marôco, 2014). Thus, there is a correlation of 36.70% between the dependent variable Foreign Direct Investment and the independent variables shown in table 3.

One of the diagnoses of the absence of serial autocorrelation in the residues is the Durbin-Watson test (Corrar, Paulo & Dias Filho, 2007). According to Gujarati and Porter (2011), to meet the assumption, the Durbin-Watson test should result in statistical values that are close to 2.0. As a result of the Durbin-Watson described in table 3, there is no causality between the residues, which means that the correlation between the residues of the independent variables is zero, with no dependence between them.

Table 3 - Model Summary^b

Model	R	R squared	Adjusted R-squared	Standard error of estimate	Durbin-Watson
1	,606 ^a	0,367	0,354	16587,15	2,084

a. Predictors: (Constant), Y2017, Occurrences, Y2012, Injured, Y2013, Deaths, Homeless, Y2014, Affected, Y2011, Y2016, Loss
b. Dependent Variable: FDI

Source: Research data.

The model is statistically significant with a p-value of less than 0.05, presenting a significant model regarding the data observed in this research. To check the multicollinearity, the Variance Inflation Factor (VIF) test was performed, wherein from 1 to 10 there is acceptable multicollinearity and above that multicollinearity is problematic (Gujarati & Porter, 2011). According to table 4, the multicollinearity for the variables in this study is acceptable.

Table 4 - Model Coefficients and Regression^a

	Unstandardized Coefficient		Std. Coef.	t	Sig.	95.0% Confidence Interval for B		Collinearity statistics	
	B	Error	Beta			Inferior limit	Superior limit	Tol.	VIF
(Constant)	100860,09	1794,167		56,22	0,000	97336,45	104383,72		
Occurrences	2778,58	196,751	0,570	14,12	0,000	2392,17	3164,99	0,651	1,537
Deaths	-2,95	1,123	-0,144	-2,62	0,009	-5,15	-0,74	0,354	2,826
Injured	-0,10	0,083	-0,043	-1,26	0,209	-0,27	0,06	0,921	1,086
Affected	0,00	0,000	0,055	1,49	0,135	0,00	0,00	0,790	1,265
Homeless	0,00	0,007	0,007	0,19	0,851	-0,01	0,01	0,881	1,135
Loss	0,00	0,000	0,120	2,17	0,031	0,00	0,00	0,344	2,909
Y2011	1089,45	2469,339	0,019	0,44	0,659	-3760,18	5939,08	0,599	1,669
Y2012	-993,80	2510,467	-0,016	-0,40	0,692	-5924,21	3936,60	0,621	1,609
Y2013	-1412,26	2500,719	-0,023	-0,56	0,572	-6323,52	3499,00	0,620	1,614
Y2014	-1298,85	2490,850	-0,022	-0,52	0,602	-6190,73	3593,02	0,618	1,617
Y2016	-939,53	2463,928	-0,016	-0,38	0,703	-5778,53	3899,48	0,602	1,662
Y2017	-816,46	2422,571	-0,014	-0,34	0,736	-5574,24	3941,32	0,595	1,682

Source: Research data. Subheading: Coef. = Coefficient. Std. = Standardized. Tol. = Tolerance

Table 4 shows the statistical significance of each independent variable over the dependent variable, as well as the collinearity statistics. The model was not statistically significant for the number of injured, the number of affected, and the number of homeless. Thus, it cannot be deliberated that these variables fully represent the effect of natural disasters.

Despite this, the model showed statistical significance for the following variables: occurrences, deaths and losses. These variables are significant, indicating that they influence the flow of the FDI. Thus, the number of occurrences of natural disasters within an economy, the number of deaths caused by the natural disaster, and the total loss in millions of dollars of this disaster impact the FDI. However,

given the beta shown in table 4, it is understood that the number of occurrences and the loss in the total of millions of dollars positively influences the FDI, while the number of deaths negatively influences it.

It can be seen, in general, that natural disasters can influence the flow that an economy receives from international investments; however, this relationship is not always negative. This fact supports the hypothesis suggested in this study: The damage to human and financial capital resulting from natural disasters influences the FDI in countries. However, the results indicate that the loss of human capital (deaths) can reduce FDI, while financial capital (loss in millions of dollars) can serve as an incentive for FDI in the host country. This finding will be discussed in the next section.

In order to be able to identify the influence of natural disasters on FDI over the years studied, we used the constant, that is, β_0 and added it up with each β of the year. It can be seen from table 4 that in the first year there is a greater effect of natural disasters on FDI and this relationship gradually decreases until reaching the last year, in which there is a small increase.

5 Discussion

Unlike previous research, this study used six variables to test the relationship between natural disasters and FDI, and therefore, our results are different from other studies because we observe each variable in isolation. In general, it was found that there is an influence between natural disasters and FDI; however, depending on the variable analyzed, this relationship can be positive, negative or insignificant. It is worth mentioning a plausible discussion regarding the results.

Going in contradiction of the studies of Yang (2008), Escaleras & Register (2011), Anuchitworawong & Thampanishvong (2015), Katoka (2020) and Khan et al. (2020), in this study the result obtained for the variables of occurrences of natural disasters and losses in millions of dollars proved to be significantly positive for the flow of FDI in the countries investigated. Thus, the frequency of natural disasters occurrences and financial losses do not necessarily discourage FDI flows. As Oh & Oetzel (2011) mentioned, the strong political pressures for the recovery of an economy do not allow the affected countries to take time to recover; therefore, regardless of the occurrence of natural disasters, the subsidiaries of multinational companies are not reduced. Likewise, Kato & Okubo (2018) explained that as a result of a natural disaster, countries can improve their local conditions through creative destruction. In addition, the reduction of FDI can be avoided if multinationals observe how the affected country is facing the crisis and if the government has the necessary resources to carry out such actions, there is no need to retreat, but to analyze the situation (Oh & Oetzel, 2011).

Although, it is possible to associate the results of this study with the statements of Jaramillo (2009), that in the year in which a disaster occurs, growth is likely to be registered in the country. After all, the losses due to the disaster are not included in the national accounts, but the growth resulting from reconstructions are. In the same way, Pelling, Özerdem & Barakat (2002) pointed out that in the stages

of recovery and reconstruction, the external current account may even show improvements, due to reinsurance payments, foreign aid, debt relief, and private transfers.

In this perspective, Doytch (2019) points out that in the face of a natural disaster, reconstructions in the economy are put into practice, which may even cause an increase in GDP. The fact that FDI is high in the condition of financial losses and natural disasters may be linked to the decision of multinationals to remain in the affected area, as the losses recorded in the country do not always directly impact the company's sector of activity (Katoka, 2020). Thus, it is understood that in the year in which a disaster occurs, investments to recover damage may suggest an illusory growth (Jaramillo, 2009).

Regarding the influence observed over the years in relation to the natural disasters on FDI, differently from what was proposed by Jaramillo (2009), the years following the year that the greatest natural disasters occurred are not as significant compared to the first year of the disaster. This can be explained by the literature that describes the long-term differences in the impact of natural disasters on FDI. At first, the effect may be negative, however, the countries affected during its reconstruction may receive a boost for updated infrastructure, technology and human capital. It may even demand activities from outside the host country through multinationals (Doytch, 2019; Kato & Okubo, 2018).

When looking at the number of deaths, FDI is significantly and negatively influenced by this variable. As stated by Jaramillo (2009), the number of people killed in a natural disaster can impact the relationship between human capital and labor. Likewise, the real impact of a natural disaster is most noticeable by the ration of recorded mortality. In the face of a natural disaster, a country's capacity to produce is reduced; this is due to the fact that the workforce is shaken (Escaleras & Register, 2011; Katoka, 2020), and there is a loss of professional qualification (Klomp & Valckx, 2014). Such attributes are constantly observed by foreign investors (Blanton & Blanton, 2007). After all, they can harm the normal functioning of multinationals (Jaramillo, 2009). In this way, it is understood that FDI flows can be affected as a result of the reduction of human capital, causing the investments of multinationals to be rethought (Kahn, 2005).

When verifying the variables that make up the EM-DAT separately, differently from what was expected, the number of injured, affected, and homeless people were not significant in relation to the influence on FDI flows. Such a result may be associated with the fact that in the first months after the occurrence of a natural disaster, the government has a greater focus on helping affected, injured, and homeless people, being able to repair the damage in a few months (Jaramillo, 2009). If investors realize that the impacts of the disaster are temporary, it is possible that their decision to invest in the host country will not be affected (Anuchitworawong & Thampanishvong, 2015).

As mentioned by Oh & Oetzel (2011), strong political pressure can instigate cities to recover quickly. These actions can be associated with the efficiency of institutions in economies, as these variables are subject to immediate reparations, which is different, for example, from the total number of deaths that a natural disaster can cause. Then, the institution-based view is observed; that is, institutions determine how countries react in the midst of changes (Dacin, Goodstein & Scott, 2002), and

organizational decisions (Dillard, Rigsby & Goodman, 2004), which can be drivers in a natural disaster scenario.

The results evidenced in this study return to the conception that policy makers should promote disaster risk reduction and prevention, in order to obtain greater FDI flows from other countries. This analysis must take place through long-term economic planning (Khan et al., 2020). In addition, governments, when faced with natural disasters, need to identify replacement and reconstruction opportunities to improve their infrastructure and human capital, and this will be possible through policies and incentives. In this situation, FDI can be attracted as a source of technological knowledge, necessary to guarantee the updating and reconstruction of the country (Doytch, 2019).

Previous literature has concluded that the number of people affected reduces FDI flows (Anuchitworawong & Thampanishvong, 2015). However, in this research, by separating the variables that can compose a natural disaster, it is empirically proven that the factor that most affect FDI decisions is the number of deaths. The Escaleras & Register (2011) study found that natural disasters are negatively and significantly associated with a country's FDI (Escaleras & Register, 2011). However, they mainly focused on disaster counting. This situation can be changed when the variables are disaggregated, analyzing the losses in human capital.

6 Conclusion, limitations, & future research

With the results found in this study, it is understood that when an economy suffers from natural disasters that cause deaths and consequently reduction of human capital, foreign investors can negatively characterize this fact, since there will be a loss of labor, production and professional qualification, making it impracticable for FDI investments. On the other hand, the results suggest that the number of occurrences and the loss in millions of dollars when analyzed individually, do not discourage FDI investments, and the presence of multinationals in the affected country. The variables: total of injured, total of affected and total of homeless have no relation with FDI in the analyzed sample. This can be explained, as these events demand immediate solutions, not impacting the decision made by FDI investments.

Thus, this research indicates that the loss of human capital caused by natural disasters may be more sensitive to Foreign Direct Investment decisions than financial capital, since multinationals tend to analyze whether the affected area really impacts their business or, how the country deals institutionally in the face of a natural disaster. Therefore, it is understood that human capital, once lost, takes more time to be rebuilt, including training and personal updates, while financial losses can be restored even by political pressure or by the effort to quickly reconstruct lost values. It is evident that the decision of international managers takes into account two situations: financial capital and human capital. However, the lack of human capital can reduce FDI investments, since knowledge is an essential factor for industries to function, while the loss in a country's financial capital can favor the need for

foreign aid, new technologies and structure, elements that a multinational can spread within the host country.

The results of the present study must be observed considering some limitations, such as the data set, and the sample scope. The CRED data, although a report frequently used in studies, includes as a disaster criterion the report of more than 10 people killed, so it is likely that the larger the population of a country, the greater the likelihood of 10 deaths occurring, which may be a disproportionate comparison to reality. Still considering the data, investment decision makers will certainly observe and give greater weight to larger events with hundreds or thousands of deaths.

As for the sample, the countries highlighted in this research were taken from the UNCTAD and CRED EM DAT databases. It is known that the total number of countries generated does not reflect the total number of countries in the world, since a larger sample could generate more robust results and more specific comparisons between countries. It is suggested, then, that future studies concretize the use of other reports on natural disasters, that measure other variables such as education, infrastructure, institutional quality among others that can help to verify if the results remain the same. It would also be possible to expand the number of countries to be analyzed, allowing for possible comparisons between developed and emerging economies. Another proposal could occur with the use of control variables such as GDP, to test the relationship between natural disasters and FDI.

This study points to a direction of research for those interested in expanding the flows of Foreign Direct Investment in their countries, these being present in the field of business, government, public policy makers and the third sector. The results intensify empirically and theoretically that the damage caused by natural disasters can influence the choices of investors in the countries where most natural disasters occur; this effect being different when looking at human capital (number of deaths) and financial capital (losses in millions of dollars). Thus, it is intended that efforts to prevent or combat such disasters are evaluated with relevance, as they result in human and material damage, and may influence the expansion of various sectors and the economic development of the country.

References

- Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2004). FDI and economic growth: the role of local financial markets. *Journal of international economics*, 64(1), 89-112.
- Anuchitworawong, C., & Thampanishvong, K. (2015). Determinants of foreign direct investment in Thailand: Does natural disaster matter?. *International Journal of Disaster Risk Reduction*, 14, 312-321.
- Benson, C. (1997). *The economic impact of natural disasters in Fiji*. Overseas Development Institute (ODI).
- Bergholt, D., & Lujala, P. (2012). Climate-related natural disasters, economic growth, and armed civil conflict. *Journal of Peace Research*, 49(1), 147-162.

- Blanton, S. L., & Blanton, R. G. (2007). What attracts foreign investors? An examination of human rights and foreign direct investment. *The Journal of Politics*, 69(1), 143-155.
- Blonigen, B. A. (2005). A review of the empirical literature on FDI determinants. *Atlantic Economic Journal*, 33(4), 383-403.
- Botzen, W. W., Deschenes, O., & Sanders, M. (2019). The economic impacts of natural disasters: A review of models and empirical studies. *Review of Environmental Economics and Policy*, 13(2), 167-188.
- Castro, A. L. C. D. (1998). Glossário de defesa civil estudos de riscos e medicina de desastres. rev. Brasília (DF): Ministério da Integração Nacional, Secretaria Nacional de Defesa Civil.
- CRED. (2019) Centre for Research on the Epidemiology of Disasters. Acessado em 20 de julho de 2019. Disponível em: https://www.emdat.be/emdat_db.
- Contractor, F. J., Dangol, R., Nuruzzaman, N., & Raghunath, S. (2020). How do country regulations and business environment impact foreign direct investment (FDI) inflows?. *International Business Review*, 29(2), 101640.
- Corrar, L. J., Paulo, E., & Dias Filho, J. M. (2007). *Regressão logística. Análise multivariada: para os cursos de administração, ciências contábeis e economia*. São Paulo: Atlas.
- Creswell, J. W. (2003). Projeto de Pesquisa: métodos qualitativo, quantitativo e misto. (LO Rocha, Trad.) Porto Alegre: Artmed. *Obra original publicada em*.
- Dacin, M.T., Goodstein, J., & Scott, W. R. (2002). Teoria institucional e mudança institucional: Introdução ao fórum especial de pesquisa. *Academy of management journal*, 45 (1), 45-56.
- Dillard, J. F., Rigsby, J. T., & Goodman, C. (2004). The making and remaking of organization context. *Accounting, Auditing & Accountability Journal*.
- Doytch, N. (2019). Upgrading destruction?: How do climate-related and geophysical natural disasters impact sectoral FDI. *International Journal of Climate Change Strategies and Management*, 12(2), 182-200.
- Escaleras, M., & Register, C. A. (2011). Natural disasters and foreign direct investment. *Land Economics*, 87(2), 346-363.
- Ghimire, K. M. (2020). Natural Disasters and Weak Government Institutions: Creating a Vicious Cycle that Ensnarers Developing Countries. *Law and Development Review*, 1(ahead-of-print).
- Greif, A. (2006). *Institutions and the path to the modern economy: Lessons from medieval trade*. Cambridge University Press.
- Gujarati, D. (2006). *Econometria Básica*. ed. Campus e Elsevier, Rio de Janeiro.
- Hair, J., Babin, B., Money, A., & Samouel, P. (2005). *Fundamentos de métodos de pesquisa em administração*. Bookman Companhia Ed.
- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2005). *Análise Multivariada de Dados*, ed. 5ªth.
- Jaramillo, C. R. (2009). Do natural disasters have long-term effects on growth?. *Documento CEDE*, (2009-24).

- Jennings, P. D., & Hoffman, A. J. (2017). Institutional theory and the natural environment: Building research through tensions and paradoxes. *The SAGE Handbook of Organizational Institutionalism*, 2nd edition (London: Sage Publications), 759-785.
- Kahn, M. E. (2005). The death toll from natural disasters: the role of income, geography, and institutions. *Review of economics and statistics*, 87(2), 271-284.
- Kato, H., & Okubo, T. (2018). The impact of a natural disaster on foreign direct investment and vertical linkages. *Available at SSRN* 2983835.
- Katoka, B. (2020). Do Natural Disasters Reduce Foreign Direct Investment in Sub-Saharan Africa?. *In Economic Effects of Natural Disasters* (pp. 529-546). Academic Press.
- Khan, A., Chenggang, Y., Khan, G., & Muhammad, F. (2020). The dilemma of natural disasters: Impact on economy, fiscal position, and foreign direct investment alongside Belt and Road Initiative countries. *Science of The Total Environment*, 743, 140578.
- Klomp, J., & Valckx, K. (2014). Natural disasters and economic growth: A meta-analysis. *Global Environmental Change*, 26, 183-195.
- Lankes, H. P., & Venables, A. J. (1996). Foreign direct investment in economic transition: the changing pattern of investments. *Economics of Transition*, 4(2), 331-347.
- Morôco, J. (2014). Análise estatística com o SPSS Statistics. *report, 6th ed., Lisboa*.
- Neumayer, E., Plümper, T., & Barthel, F. (2014). The political economy of natural disaster damage. *Global Environmental Change*, 24, 8-19.
- North, D. C. (1990). Institutions, institutional change and economic performance.
- OECD. Publishing. (2002). *Foreign direct investment for development: Maximising benefits, minimising costs*. Organisation for Economic Co-operation and Development.
- Oh, C. H., & Oetzel, J. (2011). Multinationals' response to major disasters: how does subsidiary investment vary in response to the type of disaster and the quality of country governance?. *Strategic Management Journal*, 32(6), 658-681.
- Oh, C. H., Oetzel, J., Rivera, J., & Lien, D. (2020). Natural disasters and MNC sub-national investments in China. *Multinational Business Review*.
- Pelling, M., Özerdem, A., & Barakat, S. (2002). The macro-economic impact of disasters. *Progress in Development Studies*, 2(4), 283-305.
- Sabir, S., Rafique, A., & Abbas, K. (2019). Institutions and FDI: evidence from developed and developing countries. *Financial Innovation*, 5(1), 8.
- Scott, W. R. (2005). Institutional theory: Contributing to a theoretical research program. *Great minds in management: The process of theory development*, 37(2), 460-484.
- Stock, J. H., & Watson, M. W. (2004). Econometria. *AGRICULTURA EM SAO PAULO*, 51(2), 85.
- Sulaiman, S. N., & Aledo, A. (2016). Desastres naturais: convivência com o risco. *Estudos Avançados*, 30(88), 11-23.
- Toner-Rodgers, A., & Friedt, F. (2020). Natural Disasters, *FDI and Intra-National Spillovers: Evidence from India*. FDI and Intra-National Spillovers: Evidence from India (July 11, 2020).Toya,

H., & Skidmore, M. (2007). Economic development and the impacts of natural disasters. *Economics letters*, 94(1), 20-25.

UNCTAD. (2019) United Nations Conference on Trade and Development. Acessado em 05 em 05 de julho de 2019. Disponível em: <https://unctad.org/en/Pages/DIAE/FDI%20Statistics/FDI-Statistics.aspx>.

Vermeiren, J. C. (1989). *Natural disasters: linking economics and the environment with a vengeance*. Organization of American States.

Wooldridge, J. M. (2009). Part 1: Regression Analysis with Cross Sectional Data. *Introductory econometrics: a modern approach (4th ed.)*. Cengage Learning.

Yang, D. (2008). Coping with disaster: The impact of hurricanes on international financial flows, 1970-2002. *The BE Journal of Economic Analysis & Policy*, 8(1).