

**UNIVERSIDADE FEDERAL DE SÃO CARLOS
CENTRO DE CIÊNCIAS EXATAS E TECNOLOGIA
DEPARTAMENTO DE ENGENHARIA DE PRODUÇÃO
PROGRAMA DE PÓS-GRADUAÇÃO EM ENGENHARIA DE PRODUÇÃO**

**FOREIGN DIRECT INVESTMENT, HOME COUNTRY INSTITUTIONS, AND
LOCAL HUMAN DEVELOPMENT IN BRAZIL**

EDUARDO POLLONI SILVA

SÃO CARLOS – SP

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EDUARDO POLLONI SILVA

Dissertação apresentada ao Programa de Pós-Graduação em Engenharia de Produção da Universidade Federal de São Carlos, como parte dos requisitos para a obtenção do título de Mestre em Engenharia de Produção.

Orientador: Dr. Herick Fernando Moralles

Co-orientador: Dr. Dominik Hartmann

SÃO CARLOS – SP

2020



UNIVERSIDADE FEDERAL DE SÃO CARLOS

Centro de Ciências Exatas e de Tecnologia
Programa de Pós-Graduação em Engenharia de Produção

Folha de Aprovação

Assinaturas dos membros da comissão examinadora que avaliou e aprovou a Defesa de Dissertação de Mestrado do candidato Eduardo Polloni Silva, realizada em 14/02/2020:

Prof. Dr. Herick Fernando Moralles
UFSCar

Profa. Dra. Daisy Aparecida do Nascimento Rebelatto
USP

P/

Prof. Dr. Enzo Barberio Mariano
UNESP

Certifico que a defesa realizou-se com a participação à distância do(s) membro(s) Enzo Barberio Mariano e, depois das arguições e deliberações realizadas, o(s) participante(s) à distância está(ao) de acordo com o conteúdo do parecer da banca examinadora redigido neste relatório de defesa.

Prof. Dr. Herick Fernando Moralles

Look
If you had
One shot
Or one opportunity
To seize everything you ever wanted
In one moment
Would you capture it
Or just let it slip?

Marshall Mathers "Eminem"

ACKNOWLEDGEMENTS

Agradeço à minha mãe, Neiva Marisa Polloni Silva, meu pai, Geide Silva Junior, e minha irmã, Juliana Polloni Silva, por todo o apoio que recebi quando decidi sair de casa, mais uma vez, para estudar. Obrigado por tudo!

Aos meus amigos de Andradina, obrigado pelas risadas e apoio por tantos anos. Em especial, Fernando, Paulo, Tiago, Tarso e Amanda. Vocês são demais. Aos amigos de Dourados, em especial Fernanda, obrigado pelo carinho.

To my friends in São Carlos, thank you for supporting me through these years. We had many challenges. Fortunately, we were able to laugh them off together. Especially, I'd like to thank Igor, Giovana, Luiz, and Anderson. Also, thank you Najela and Diego for helping me in this adventure called econometrics. Let this be only the beginning.

To my advisor, Herick, who gladly guided me into the world of science. You helped me overcome many challenges, and you know that. Without you, all the challenges I faced would be a thousand times harder. Thank you! I am now a better engineer and researcher. It was all worth it.

To my co-advisor, Dominik, who showed me science could be bigger, better and more inclusive. Thank you for helping me look at my challenges and search for solutions in an open-minded way.

To Professors Daisy and Enzo for encouraging me throughout this process. Thank you for all the support both of you showed me even before my qualifying exam. You were great!

To all my colleagues at PPGEF-UFSCar and at EESC-USP for supporting me throughout this degree. To all professors who taught me how to write, to think, and for allowing me to grow while studying at UFSCar.

This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001.

ABSTRACT

Multinational companies (MNCs) are influenced by their home country institutions. But how does the interaction between home country and host region institutions affect human development in countries with significant regional disparities? To address this question, we collected a unique dataset of FDI from 52 countries in 92 Brazilian municipalities and created a Home Country Institutional Index (HCII). Econometric analyses show that a higher share of foreign companies from countries with high levels of human development is positively associated with local education, health, and income. However, this effect is non-linear and more pronounced in institutionally weak regions.

Keywords: Human Development; Foreign Direct Investment; Home Country Institutions; Regional Institutions; Threshold Regression.

RESUMO

Empresas multinacionais são influenciadas pelas instituições do país de origem. Contudo, como a interação entre as instituições do país de origem e da região anfitriã afetam o desenvolvimento humano em países com diferenças regionais significativas? Para responder esta questão, este estudo coletou uma base de dados de Investimento Direto Estrangeiro (IDE) de 52 países diferentes em 92 municípios brasileiros e criou um "Índice Institucional de Origem" (*Home Country Institutional Index - HCII*). Análises econométricas demonstram que uma maior participação de empresas estrangeiras de países com bons níveis de desenvolvimento humano está positivamente associada com os níveis locais de educação, saúde e renda. Entretanto, este efeito é não-linear e mais pronunciado em regiões institucionalmente fracas.

Palavras-chave: Desenvolvimento Humano; Investimento Direto Estrangeiro; Instituições de Origem; Instituições Regionais; Regressão por limiar.

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LIST OF ABBREVIATIONS

- BCB - Brazilian Central Bank (*Banco Central do Brasil*)
- BRICS – Brazil, Russia, India, China and South Africa
- BRL – Brazilian Real
- CSR – Corporate Social Responsibility
- FDI – Foreign Direct Investment
- FGLS – Feasible Generalized Least Squares
- GDP – Gross Domestic Product
- HDI – Human Development Index
- IBGE - Brazilian Institute of Geography and Statistics
- IFDM – Firjan Municipal Development Index
- IFGF - Firjan Fiscal Management Index
- IMF - International Monetary Fund
- LIML – Limited Information Maximum Likelihood
- MNC – Multinational Company
- NACE - Nomenclature of Economic Activities
- NGO - Non-governmental organizations
- SISCOMEX – Integrated System of Foreign Trade
- UK - United Kingdom
- UNCTAD - United Nations Conference on Trade and Development
- UNDP - United Nations Development Programme
- USA – United States of America
- USD – United States Dollar
- MERCOSUL – *Mercado Comum do Sul*

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CHAPTER 1: INTRODUCTION

1.1. DISSERTATION STRUCTURE

This dissertation is presented in 3 parts. In sum, Chapter 1 introduces the main subject (*i.e.* institutions) and its implications for the research problem (*i.e.* local human development). Chapter 2 presents the issue-specific literature review, methods, results, and discussion. Thus, Chapter 2 displays the research development process. Finally, Chapter 3 concludes the research and presents its implications.

1.2. THEME PRESENTATION

A large number of researchers are currently examining the interaction between different countries and the interplay between their companies. This is the goal of a variety of researches involving Foreign Direct Investment (FDI) (*e.g.* BOGLIACCINI; EGAN, 2017; CHEN; YU; ZHANG, 2019; LIN; KIM; WU, 2013; REITER; STEENSMA, 2010; YAPRAK; YOSUN; CETINDAMAR, 2018). Indeed, FDI rapid growth worldwide is a noteworthy phenomenon and a relevant product of globalization (CHEN; YU; ZHANG, 2019). In addition, Meyer and Thein (2014) declare that FDI has been a topic of notable interest by many scholars, especially by studying multinational corporations (MNCs) and their activities abroad.

Despite the growing interest on the topic, the literature has found inconclusive results on the effects of FDI in the host country. Years ago, Borensztein, De Gregorio and Lee (1998) pointed out that FDI has a positive overall effect on economic growth, although this effect depends on the level of human capital available in the host economy. Casson (2007) declared that many governments seek high-technology MNCs believing they will generate positive knowledge spillovers in the country. In recent years, Lehnert, Benmamoun and Zhao (2013) found significant evidence of FDI generating positive outcomes on the host country's welfare. Meyer and Sinani (2009) found similar results. However, Nkonde (2018) studied the presence of Chinese MNCs in Zambia and found that these companies do not facilitate knowledge transfer or other positive outcomes. Additionally, Wang, Gu, Tse and Yim (2013) declare that MNCs may "crowd out" local firms and dominate the market. The authors also point to FDI causing employment reduction and pollution. Similar concerns were suggested by Doh, Rodrigues, Saka-Helmhout and Makhija (2017).

Alongside the topic of foreign investment and its outcomes, part of the literature focuses on institutions and their role in moderating the effects of FDI. Institutions were explained by North (1990) as the "rules of the game" as in a competitive team sport. According to the author, institutions consist of formal rules and informal codes that are restraining the activities of all involved. Still on the competitive game analogy, institutions represent the set of rules both teams need to respect, such as not deliberately injuring a key player on the opposing team. In other words, North (1990) declare that institutions are a guide to human interaction. Using more practical cases, North uses examples such as borrowing money, forming a business, buying oranges or even greeting friends. These activities would occur differently depending on where they happen. Doing transactions in the USA or in Bangladesh are completely different activities, due to the contrasting institutional environments both countries present.

Again, institutions are commonly separated between formal and informal. Chen, Saarenketo and Puumalainen (2018) claim that formal institutions refer to the objective constraints and incentives emerging from formal laws, regulations, and policies capable of restraining individual and organizational actions. In addition, informal institutions are informal rules constructed by society, usually cultural and slowly changing. In sum, institutions are the formal laws and cultural traditions of a country. In the words of Muralidharan and Pathak (2017), informal institutions "especially refer to culturally shared understanding associated with cultural values, and social expectations about appropriate actions". According to Gertler (2010), these institutions exert a certain influence on the character and evolutionary trajectory of regional economies. The author also declares that this influence may be subtle or imperative, but it is undeniable.

Moreover, Scott (1995) categorized institutions into three pillars: regulative, normative and cognitive. The regulative pillar usually represents explicit regulative processes related to rule-setting, monitoring, and sanctioning activities, thus supporting or punishing those involved to influence their behavior. In other words, this pillar is most commonly linked to rules and formal laws. The normative pillar represents both the values and norms of a society. By values, Scott (1995) means the conceptions of the preferred or desirable behavior standards, and by norm the legitimate means to pursue valued ends such as making a profit or winning a game, complementing the competitive game analogy given by North (1990). Finally, the cognitive pillar represents the "nature of reality and frames through which meaning is made" (Scott, 1995). In summary, this pillar relates to the symbols and beliefs that are culturally embodied in society. Usually, these institutions are taken from granted, as they are culturally supported and usually studied by sociologists.

Thus, it is possible to define institutions as structural incentives in human exchange, therefore shaping the way societies evolve through time, as well as their political, social or economic contexts. Additionally, institutions may be created, as the United States Constitution, or evolve over time, as culture and the common law do (North, 1990).

The reason why North argues on the importance of institutions is that they are responsible for the economic growth of nations. To further understand why it is necessary to go back to Ronald Coase's ideas. Coase (1937) argues that firms were developed to efficiently transform land, labor, and capital into goods and services. Amongst these things, firms emerged due to the difficulties involved in coordinating buyer-seller exchanges via price signals. The author argues that the market mechanism is not cost-free. Instead, it involves transaction costs. These costs represent the costs of searching for opportunities, bargaining, and decision-making, as well as the costs involving in policing and enforcing contracts or agreements. In addition, Coase pointed out that these transaction costs are undetermined. Thus, any negotiation carries a degree of uncertainty.

Institutional economists, like Douglas North, added institutions to this discussion. North (1990) argues that institutions "reduce uncertainty by providing a structure to everyday life", which can be expanded to business and policy. The author declares that the major role of institutions is to reduce uncertainty by establishing a structure for human interaction. Therefore, a good set of formal and informal institutions can reduce uncertainty and, therefore, reduce the transaction costs involved in buyer-seller activities. That is the reason why North argues that institutions are responsible for the economic growth of nations.

To exemplify, North suggests that third world countries are poor because they present institutional constraints that do not encourage production and business activities. In opposition, first world countries have long been aware of the importance of formal laws, taxes, regulations, judicial decisions and trade unions, amongst other specific institutional characteristics. Once the institutions play a passive role in constraining the actions of individuals, firms do not have the information to make correct choices. The transaction costs increase, and economic growth decreases.

Considering that institutions may reduce uncertainty and influence business activities, the literature now uses institutions while studying foreign investments and the companies involved. Focusing on MNCs, it is common to argue that institutions do affect a firm's strategic choices, operations and governance structures (CHACAR; NEWBERRY; VISSA, 2010). Also, scholars recognize institutions as a key set of variables capable of influencing MNCs' activities (MEYER; THEIN, 2014). However, institutions are a complicated subject. Usually, the

literature suggests that institutions are differentiated between home and host country institutions. Home country institutions represent the MNC's own set of rules and culture, and they influence how a firm operates outside the boundaries of its country of origin (Meyer Thein, 2014). Home country institutions may be considered the key drivers and constraints of a firm's activities (CHACAR; NEWBURY; VISSA, 2010). For example, governance quality at home can serve as support for MNCs to improve their commitment to host countries. Therefore, country-level factors should be taken into account when formulating international strategies, in addition to firm-specific characteristics (CUI; HE, 2012). Moreover, the FDI-related theoretical debate argues in favor of multiple different reasons why FDI can generate impacts (positive or not) in the host economy. Some argue the “institutional background” gets imprinted upon the MNC, and that this phenomenon will influence MNCs' behavior abroad (EISENHARDT; SCHOONHOVEN, 1990; KRIAUCIUNAS; KALE, 2006; MARQUIS; TILCSIK, 2013; SHINKLE; KRIAUCIUNAS, 2012; SHIRODKAR; KONARA; MCGUIRE, 2017).

Thus, the recent FDI literature is differentiating MNCs according to their home countries. Up to now, possible differences that MNCs from developed economies and emerging economies may present were ignored. *De facto*, most studies were focused on MNCs from developed economies in which pro-outward internationalization policies and regulations (*i.e.* institutions) are taken for granted (PENG; WANG; JIANG, 2008; SUN; PENG; LEE; TAN, 2015). On the other hand, emerging economies present a wider range of institutional characteristics, and these nations are usually under political and institutional instability (MINGO; JUNKUNC; MORALES, 2018; PENG; WANG; JIANG, 2008). As pointed by Li, Quan, Stoian and Azar (2018), MNCs from emerging economies are in a different stage of internationalization. Accordingly, great attention has been given to MNCs from emerging economies, and to emerging economies as hosts for inward FDI. This new internationalization process calls for new theories (SUN; PENG; LEE; TAN, 2015). As a result, the debate on whether emerging economies follow the same internationalization path as the developed economies did decades ago is spread across the literature (YANG, 2018). Therefore, the current FDI-related literature, in which this study is included, now differentiates MNCs from well-developed economies from MNCs with poorly-developed backgrounds. Here, this differentiation is done according to the MNCs' original institutional background.

Finally, scholars are also considering the host country institutions and sub-national differences across the country as relevant in the interaction between FDI and its host region. Mingo *et al.* (2018) declare that the most important implication of their research is that understanding the effects of the home country cannot be achieved by isolating the host country

conditions. Lehnert *et al.* (2013) argue that the host's national governance can have a significant impact on the capability of FDI inflow to change the host's welfare. As pointed out by Doh *et al.* (2017), both foreign and local firms may influence corrupt governments to obtain preferential treatment and deter competition. In essence, FDI evokes reciprocity and interrelationships between foreign investments, the MNCs' origins and the host country's circumstances (LEHNERT; BENMAMOUN; ZHAO, 2013; MEYER, 2004). Therefore, more complete studies on FDI should account for both home and host country institutions.

1.3. RESEARCH PROBLEM AND GOALS

This study aims to analyze the effects of Foreign Direct Investment in Brazil. More specifically, the intent is to empirically evaluate the impacts of inward FDI on local human development. By employing such an analysis, it is possible to investigate if FDI is capable of improving welfare in Brazil through different human development dimensions.

To accomplish this analysis, this study employs institutions as moderators of FDI activities. Particularly, both home and host country institutions are included in the investigation. Thus, the research question guiding this study is: "*Are home country and host regional institutions capable of moderating the local FDI-driven human development in Brazil?*".

Consequently, this study's main goal is to verify if FDI is a vector capable of transferring institutions from the home to the host country. At the same time, it analyzes if FDI is positively or negatively associated with local human development in Brazil. Furthermore, this investigation assesses the role of Brazilian regional institutions in moderating the outcomes of FDI.

Starting from the presented research question and the main goal, it is possible to define specific goals that this study contemplates:

- i) To verify if Brazil experiences local FDI-driven human;
- ii) To verify if the pool of institutions brought in by the MNCs is significant for the FDI-driven development relationship;
- iii) To present a method of investigation on FDI impacts that considers the MNCs' origins, and therefore their home country institutions;
- iv) To verify if regional institutions are significant moderators in this process;
- v) To contribute to the FDI literature with the first empirical research on FDI and local human development in Brazil.

1.4. MOTIVATION

As described earlier, emerging economies have been receiving attention within the FDI literature. By doing that, scholars are able to contribute to the FDI-development nexus. However, the subject is far from being fully comprehended (CHEN; SAARENKETO; PUUMALAINEN, 2018). Despite scholars recognizing the importance of institutions, the subject is still underappreciated by part of the economics literature (GERTLER, 2010). Nevertheless, Brazil, as an emerging economy, is an appealing study subject as a host nation for foreign investments. As a large emerging economy, a BRICS country, and the largest economy in Latin-America, Brazil receives a lot of attention from foreign investors, and therefore a large amount of FDI (see Figure 1).

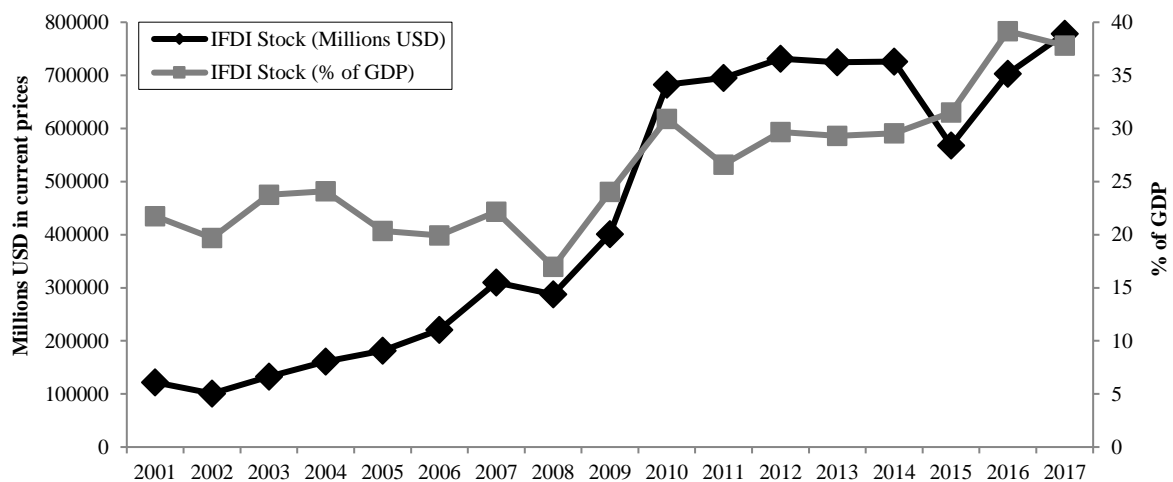


Figure 1 – Inward FDI in Brazil
Source: (UNCTAD, 2019)

However, as earlier described, emerging economies are characterized by a wider range of institutional aspects across sub-national regions, and are constantly under political and institutional instability (MINGO; JUNKUNC; MORALES, 2018; PENG; WANG; JIANG, 2008; YANG, 2018). Despite any difficulties Brazil may present, Mingo *et al.* (2018) argue that emerging economies are also associated with great investment opportunities, as long as investors keep in mind that both their home country conditions, the host country conditions and the interplay between these two institutional backgrounds will affect the outcomes of investing abroad.

For the FDI-related debate, Brazil presents itself as an interest study subject due to its sub-national differences. Yang (2018) points to emerging economies as markets with a larger variety of subnational institutions than developed economies. In fact, Brazil's differences across regions have been historically documented, and problems such as inequality and other institutional aspects appear throughout time and space in the country (REIS, 2014). Even in modern times, any evolution regarding socio-economic development does not happen equally through the country (COSTA; MACHADO; AMARAL, 2018). Thus, from the development perspective, Brazil's inner regions present contrasting development levels, and these regional-characteristics should be accounted for to analyze local FDI effects. Moreover, from the institutional-based view, Brazil presents diverging institutions, levels of governance quality, and culture across regions. As local governance (*i.e.* institutions) can influence MNCs' activities, a study considering these regional aspects may lead to new results. To exemplify Brazil's subnational differences, the Firjan Index for Education (representing human development) and the Fiscal Management Index (representing regional institutions) can be used. The later measures the municipalities' governance status. As shown in Figure 2, the majority of the country present unsatisfactory development and institutional levels.

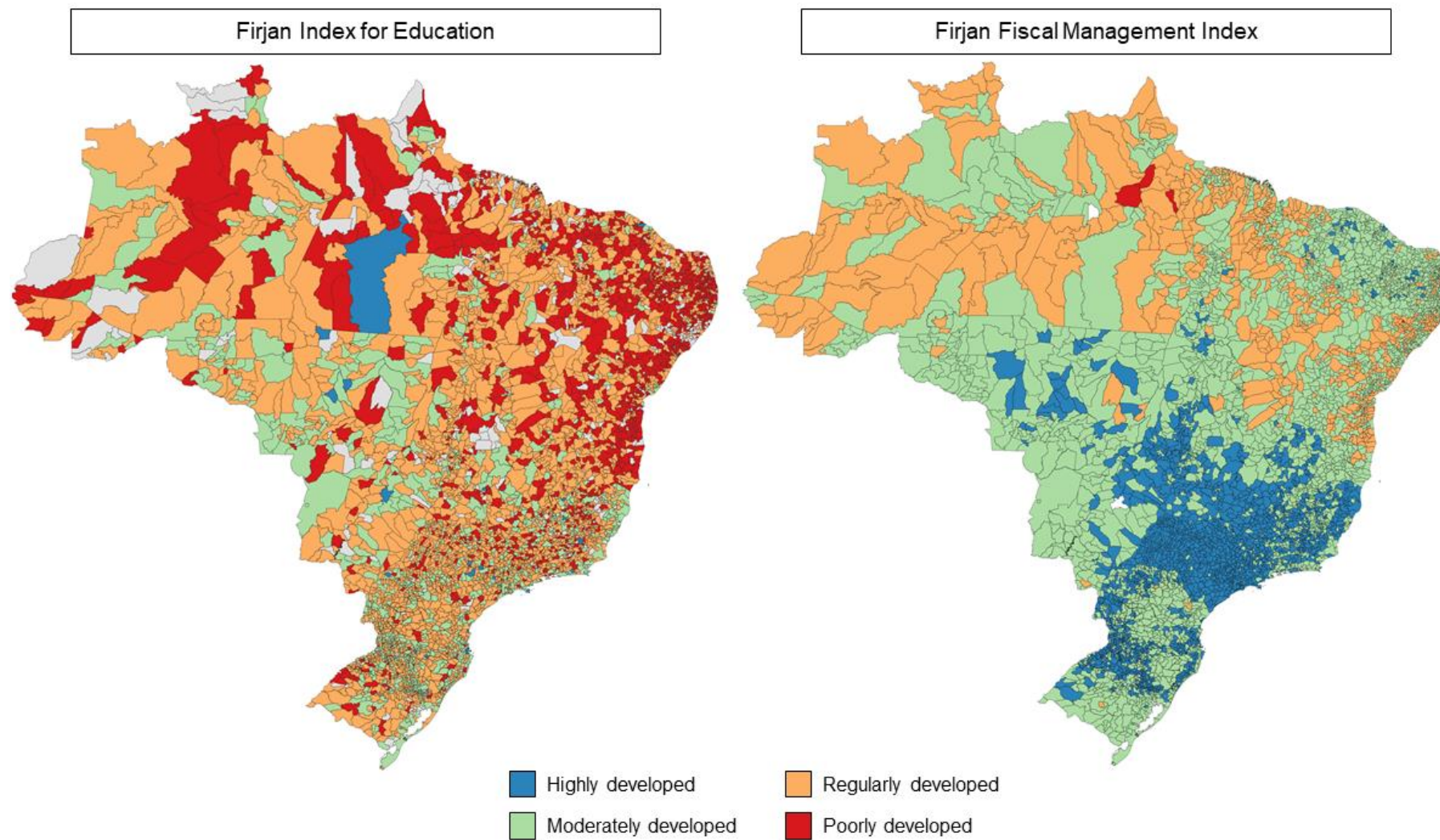


Figure 2 – Development status for Brazilian municipalities regarding their education (left) and governance (right) levels (2014 data)
Source: (FIRJAN)

Although an empirical study in Brazil would be relevant for discussion and policy-making, no research on this topic has been published yet. In general, Latin America has received limited attention (*e.g.* Cuervo-Cazurra & Dau, 2009; Fainshmidt, Judge, Aguilera, & Smith, 2018), *inter alia* due to the lack of available data.

Indeed, the literature argues on the problem of limited datasets available, which seems to be a worldwide problem (Lehnert *et al.*, 2017). A large portion of the institutional research comes from China due to the country's large data gathering (*e.g.* CHILD; MARINOVA, 2014; CUI; JIANG, 2012; DENG; ZHANG, 2018; QU; QU; WU, 2017). Even European countries have difficulties in gathering regional institutional data, especially from emerging economies (LESSMANN, 2013; NIELSEN; ASMUSSEN; WEATHERALL, 2017). Multiple studies were only possible due to hand-collected unique datasets built by the researchers, including studies focusing on China (*e.g.* CHEN; YU; ZHANG, 2019; LESSMANN, 2013).

Thus, the relevance and justification for this study can be summarized into three items:

- i) Empirical FDI studies accounting for home and host country institutions are still limited worldwide, and no Brazilian research has been published;
- ii) Brazil's inward FDI stock is increasing yearly, which justifies a more in-depth analysis of the outcomes of FDI in the country, especially if accounting for the MNCs' origins;
- iii) Brazil's subnational differences allow for an interesting study on the moderating effect of host country institutions in FDI-driven human development.

CHAPTER 2: FOREIGN DIRECT INVESTMENT, HOME COUNTRY INSTITUTIONS, AND LOCAL HUMAN DEVELOPMENT IN BRAZIL

2.1. INTRODUCTION

A large number of studies have analyzed the effects of Foreign Direct Investment (FDI) in emerging and developing countries. A significant part of the literature explores the effect of FDI on economic growth and firm-level productivity. Nonetheless, some studies have also explored the effects of FDI on the host country's human development indicators, such as education and poverty (KAULIHOWA; ADJASI, 2019; UCAL, 2014). The effects of FDI on human development, though, have delivered mixed results, and the reasons for these effects are far from being fully understood (CHEN; SAARENKETO; PUUMALAINEN, 2018). One significant shortcoming is the lack of research that considers both the institutions of the home countries as well as host regions into account (MINGO; JUNKUNC; MORALES, 2018). In particular, large emerging economies such as Brazil, India or China, show significant regional differences in terms of institutions and economic development that arguably condition the effects of inward FDI. Moreover, understanding the effects of home country institutions is important because emerging economies increasingly attract FDI from a variety of countries, such as the US, Germany, or China. This article contributes to this discussion by studying how the home country and host region's institutions condition the effects of FDI on human development in municipalities across Brazil.

Similarly to other BRICS countries, Brazil is a large emerging economy with significant subnational differences (COSTA; MACHADO; AMARAL, 2018; FERRAZ; MARIANO; REBELATTO; HARTMANN, 2019; MATTOS; POLITI; YAMAGUCHI, 2018). Figure 3 shows the differences in human development across municipalities in Brazil. The human development index (HDI) is a simple composite indicator of years of schooling, life expectancy and income per capita that ranges from 0 (= very low) to 1 (= very high levels of human development) (UNDP, 2020). Some municipalities, such as Brasília have a very high HDI of 0.824, while others, such as Santa Isabel do Rio Negro have a low HDI of 0.479. One dimension of these regional disparities is literacy. Comparatively, while roughly one-third of the population (ages 10-17) in Santa Isabel do Rio Negro is illiterate, only 1% in Brasilia is

illiterate (IBGE, 2010). Concurrently, Brazil's inward FDI stock has significantly increased from around 99.5 billion in 1998 to 684.2 billion in 2018, according to the United Nations Conference on Trade and Development (UNCTAD). However, not every municipality receives the same amount of FDI and from the same home countries (see Figure 3-B). For instance, there are 117 foreign companies, mainly from high HDI countries, located in São Bernardo do Campo (a city with approximately 830,000 inhabitants bordering Sao Paulo city). In contrast, only 10 foreign companies, mainly from low HDI countries, are located in Fortaleza (a state capital with approximately 2,600,000 inhabitants in Northeast Brazil). It must be noted that foreign investment in Brazil was dominated by companies from developed economies like the US and Germany until the late 90s. Then several companies from emerging economies, particularly from Asia, started investing in Brazil and represent now also a considerable source of FDI (BCB, 1998; 2018). Thus, the composition of investors has changed and the diversity of investors increased.

Arguably, each of these foreign companies to a certain extent carries the institutions and norms of their home countries to the regions in which they operate. In this regard, recent research in imprinting theory points to the role of home country institutions associated with MNCs. According to the imprinting theory, MNCs are shaped by experiences and knowledge developed at home at its founding time. The external environment of their home countries “gets stamped” onto the MNCs, and its influence persists even when the environment changes (SHIRODKAR; KONARA; MCGUIRE, 2017). Therefore, home country institutions—defined by NORTH (1990) as the “rules of the game” of a country such as formal (*e.g.* laws) and informal (*e.g.* culture) constraints—influence all business activities including MNCs' activities abroad (MINGO; JUNKUNC; MORALES, 2018; WU; CHEN, 2014). According to the imprinting theory, the MNCs can be considered an extension of the home country (KOGUT, 2005) and tend to positively influence the living standards of the investment recipient region. It can be argued that this positive effect occurs because most foreign companies have been from well-developed economies with high institutional standards (PENG; WANG; JIANG, 2008; SUN; PENG; LEE; TAN, 2015). Today, though, FDI from emerging economies is growing (LUO; XUE; HAN, 2010; STOIAN; MOHR, 2016), these countries usually present a weaker and more varied set of institutions (SUN; PENG; LEE; TAN, 2015) and also present their particular internationalization processes (WU; CHEN, 2014). While MNCs from well-developed economies come from an evolved regulatory environment (PENG; WANG; JIANG, 2008; SUN; PENG; LEE; TAN, 2015) and have extensive experience in investing abroad (LUO; XUE; HAN, 2010), FDI from emerging economies, which tend to be more institutionally

volatile (MINGO; JUNKUNC; MORALES, 2018) and less inexperienced in international FDI, might not bring the same level of benefits for the receiving regions (DEMIR, 2016). In consequence, the role of home countries' institutions and the origin of FDI are increasingly being discussed, but empirical evidence for developing and emerging economies on the regional level is still scarce. To our best knowledge, there exists no econometric study yet on the effects of home country institutions on regional human development in Brazil.

Human development is closely connected to the institutions of a region and country, as it describes the freedom of people to being able to choose the life they desire and be agents of development (HAQ, 1995; UNDP, 2020). While this requires a certain level of income as a measure of economic opportunities, it also involves health, knowledge, and other institutional factors that condition human capabilities and freedom (SEN, 1999). The extent to which countries (and their respective institutions and values systems) emphasize economic growth or other determinants of human development varies significantly (GRIFFIN; MCKINLEY, 1992). Arguably, the varying levels of human development, as an expression of the focus and ability of a country's institution to ensure human capabilities, influence the effects of MNCs on human development in the host regions. Thus, the following hypothesis can be formulated: "*H1: The home country institutions influence the effect of FDI on local human development*".

This leads to the question of whether FDI can be expected to have rather positive or negative effects, and what role institutions can play in the FDI to local human development link. Firstly, there are several reasons why MNCs may have a positive effect. In recent years, MNCs have increasingly invested in Corporate Social Responsibility (CSR) projects to gain legitimacy and access to local stakeholders (*i.e.* government; local markets) (FOOKS; GILMORE; SMITH; COLLIN *et al.*, 2011; SHIRODKAR; BEDDEWELA; RICHTER, 2018), as well as to prevent negative global publicity (JENKINS, 2005). This approach is often strategic and financially positive for the MNCs (WIIG; KOLSTAD, 2010), whilst also being positive for the host region. FDI, following strategies of CSR, can lead to more long-term and sustainable investments (ALEKSYNSKA; HAVRYLCHYK, 2013), higher salaries and a higher demand for skilled workers (KWOK; TADESSE, 2006; LEHNERT; BENMAMOUN; ZHAO, 2013). Seeking better opportunities, residents may invest in education and training (*i.e.* professionalization effect) (KWOK; TADESSE, 2006). Nevertheless, MNCs adopting CSR activities may improve their local reputation and credibility, and also increase their governance role in the host country (DOH; RODRIGUES; SAKA-HELMHOUT; MAKHIJA, 2017; FOOKS; GILMORE; SMITH; COLLIN *et al.*, 2011; SHIRODKAR; BEDDEWELA; RICHTER, 2018; WIIG; KOLSTAD, 2010), therefore gaining access to new internal markets.

This will force local companies to update their production and management styles due to competition. Thus, the presence of MNCs may promote the development of the local overall industry, as may even foster changes in public management (*i.e.* demonstration effect) (KWOK; TADESSE, 2006).

However, there are some critical voices among the literature on FDI that point to potential negative effects of such investments. Several studies acknowledge that FDI may create a limited amount of jobs for residents, and may only exploit natural resources and the local low-cost workforce (ALEKSYNSKA; HAVRYLCHYK, 2013; AMENDOLAGINE; PRESBITERO; RABELLOTTI; SANFILIPPO, 2019). Some studies also show that FDI is positively associated with inequality (ALI; NISHAT; ANWAR, 2009; CHOI, 2006) and that FDI may have a negative impact on the poorest quintile of the population of East Asia and Latin America (HUANG; TENG; TSAI, 2010). Finally, FDI might crowd-out local companies, receive unnecessarily large subsidies and tax exemptions, and undermine local endogenous capability (CANTWELL; DUNNING; LUNDAN, 2010; REITER; STEENSMA, 2010). As pointed by Figini and Görg (2011), FDI can be beneficial to the host economy, although it is not clear whether everyone will benefit from foreign investments or if some will lose.

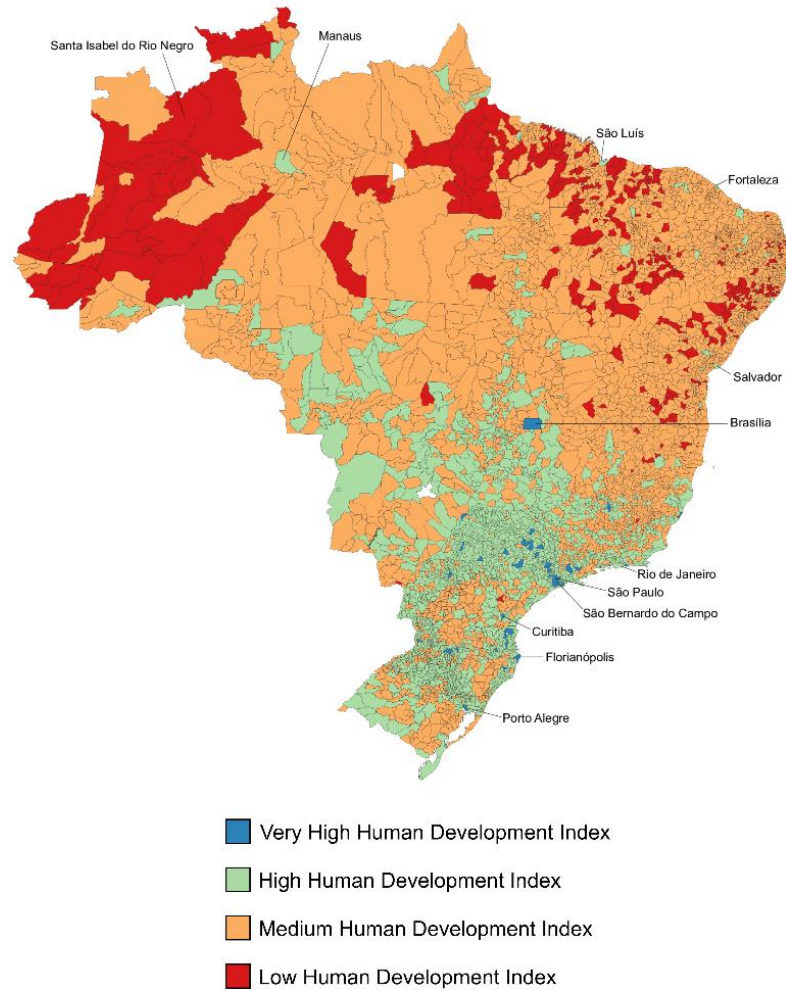
The effects of FDI also depend on local conditions. Several scholars have argued that governments should moderate MNCs' activities to ensure positive outcomes from inward FDI and reduce negative ones (WANG *et al.*, 2013). FDI may only be beneficial in some cases and may depend on the local economic and institutional conditions of the host region (CHEN; YU; ZHANG, 2019; MINGO; JUNKUNC; MORALES, 2018). For instance, Reiter and Steensma (2010) argue that FDI can be negative if MNCs are left alone to operate on their own agenda, which can lead to bribery and corruption (DOH; RODRIGUES; SAKA-HELMHOUT; MAKHIJA, 2017; STOIAN; MOHR, 2016). Thus, a weak institutional environment may prevent possible benefits from FDI (REITER; STEENSMA, 2010). From this perspective, it is the host's responsibility to shape the strategies of MNCs' activities. However, other scholars argue that FDI may particularly benefit weak regions. These regions may present "institutional voids" and inefficient institutions that may hinder business activities (*e.g.* due to underdeveloped capital markets; infrastructure; regulatory systems) (CANTWELL; DUNNING; LUNDAN, 2010; STOIAN; MOHR, 2016). In such cases, missing or malfunctioning institutions offer advantages to companies with skills and resources that address these issues. MNCs may be interested in forming ties with local governments and NGOs to reduce the effects of such "voids". This collaboration may help the region overcome challenges

in education, health, and infrastructure (DOH; RODRIGUES; SAKA-HELMHOUT; MAKHIJA, 2017).

Therefore, the impacts of MNCs can be expected to vary considerably according to the host region institutional standards. Threshold regression can help in this regard to distinguish the (non-linear) effect of FDI at different development levels of regions (GIRMA, 2005; KOHTAMÄKI; HEIMONEN; PARIDA, 2019). While the multiple positive and negative effects of FDI are still fiercely debated, it seems clear from a qualitative perspective that not only home country institutions of the MNCs, but also local institutions matter. Empirical proof from developing and emerging regions, though, is rare. Thus, we use threshold regressions and explore the following hypothesis 2 for the case of Brazil: “*H2: The human development effects of FDI depend on the host’s regional institutional level*”.

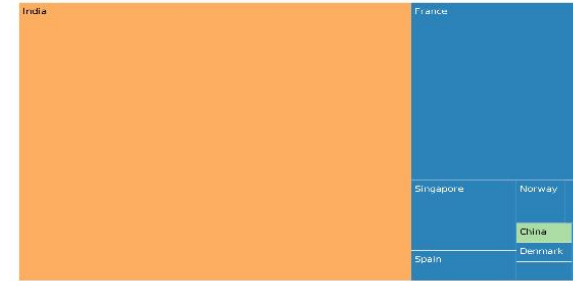
It is noteworthy that Latin America is a compelling research setting due to large institutional and economic differences across countries and regions (MINGO; JUNKUNC; MORALES, 2018). Yet, there is only limited empirical research on institutions in Latin America (*e.g.* FAINSHMIDT; JUDGE; AGUILERA; SMITH, 2018), mainly due to the lack of available data. Brazil, the largest country of Latin America, is an interesting case because it receives FDI from a varied set of countries and shows significant regional differences in terms of institutional quality and human development (COSTA; MACHADO; AMARAL, 2018; FIRJAN, 2017). The study at hand contributes to the literature in several ways. First, it contributes empirical evidence to the theoretical debate on how the home country and host regions’ institutions condition the effects of FDI. Research in this field is limited, especially from a human development perspective. Second, this study presents the first empirical evidence on the effects of FDI, home country and host region institutions on human development at the municipal level of Brazil. Third, as the necessary dataset on the regional level has not been available previously, we collected a unique dataset on 2,298 foreign exporting companies from 52 countries in a random sample of 92 municipalities across Brazil. Fourth, we introduce an index that measures the home country institutions of countries and that can be applied to other case studies as well. Fifth, we consider the non-linear effects of FDI at the regional level. Our results show that home country institutions do have a significant effect on human development, yet this effect depends on the regional institutions.

A. Differences in human development across municipalities in Brazil



B. Origin, export share, and home country HDI of exporting MNCs in host regions

B1. Fortaleza



B2. São Bernardo do Campo



B3. Porto Alegre

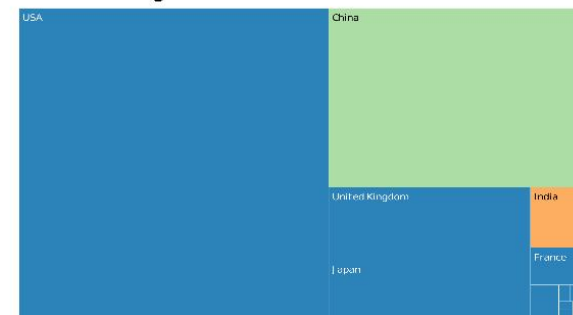


Figure 3 - Differences in human development across municipalities in Brazil (panel A; 2010) and across the foreign companies (panel B; 2010-14) exporting from the municipalities of Fortaleza (panel B1), Porto Alegre (panel B2) and São José dos Campos (panel B3)

Source: author.

2.2. DATA AND METHODS

2.2.1. Sample and data

As it is commonly known in the FDI literature (CHEN; YU; ZHANG, 2019), regional data on MNCs' location and origins are usually not readily available. As this also the case for Brazil, we manually collected a dataset covering 52 countries (see Appendix A) and 92 random municipalities across 18 federal states (see Appendixes B and C), with data ranging from 2010 to 2014. Information on foreign exporting companies was used as a proxy for FDI, and data on all exporting companies was taken from the Integrated System of Foreign Trade (SISCOMEX). This system provides a list including the names, location, and value of exports of companies. A research team visited each company's website to check the location of the respective company headquarter, which was considered as the MNC's home country, resulting in approximately 40,000 manual checks.

It must be noted that using foreign exporting companies as a proxy for FDI is not perfect, because it does not include MNCs that exclusively seek to address Brazil's internal market. Nonetheless, it is a comprehensive sample of the impact of foreign companies that export from the sample of municipalities and can be interpreted within this boundary. Moreover, it is arguably a reasonable proxy for the heterogeneous origins of local FDI activities in Brazil, considering that many foreign companies use Brazil as a start base to export also to neighboring countries. Finally, it is the first dataset covering the origin of foreign companies on the local level in Brazil.

It must be stressed that the export data of the respective municipalities is not a sample, but the total population of companies that exported, regardless of value. Thus, this study captured all exporting foreign companies of the analyzed municipalities. Moreover, every single Brazilian export will be accounted for by the SISCOMEX system, including micro exports to neighbor countries. This matters because a considerable share of foreign direct investment also uses Brazilian locations to export to other countries of MERCOSUL (*Mercado Comum do Sul*) (CASTILHO; ZIGNAGO, 2005). For instance, 22% of Paraguay's imports come from Brazil and include a wide variety of products from Brazil such as machinery, chemicals, cars, metals, plastics, paper goods, footwear, textiles, furniture, among others. Moreover, Brazil exports cars to Argentina, polymers to Ecuador, and petroleum to Uruguay and Chile. Foreign companies are involved in many of these products, such as cars, electronics or machinery. Thus, making use of available data on exporting companies is arguably able to

capture a significant part of local-level FDI in Brazil. Indeed, this measure might be employed in other developing economies, depending on the availability and quality of its export database.

This study considers multiple dependent, explanatory and control variables. Details about the data (*i.e.* description; sources) can be found in Appendix D. Briefly, an explanation of the chosen variables and models is given below.

2.2.2. Dependent variables

The Human Development Index (HDI) combines information on education, health, and income in one composite indicator (UNDP, 2020). Here, though, we study more precisely how FDI contributes to each of these dimensions. Thus, this study avoids the assumption that increases in human development may only be driven by increases in the average GDP of a region, and not by an increase in health and education (SEN, 1999).

Data on the municipalities' average income (*AVGINC*) comes from DataViva. Moreover, we use the Firjan Municipal Development Index for education ($IFDM^{EDU}$) and health ($IFDM^{HEALTH}$) as dependent variables. $IFDM^{EDU}$ comprises variables such as early childhood education, grade-age distortion in elementary school, teachers with higher education, average daily class hours in elementary school, and general quality exam outcomes. $IFDM^{HEALTH}$ covers the proportion of prenatal care, deaths by undetermined causes, infant deaths from preventable causes, and hospitalizations sensitive to primary care. The Firjan Foundation (Industry Federation of the State of Rio de Janeiro) is a private organization that publishes studies on Brazilian socioeconomic conditions. Both indexes are calculated using official government data (see Appendix E).

2.2.3. Explanatory variables

To analyze the effects of FDI and home country institutions on local human development, the institutional backgrounds from 52 countries were considered. For each municipality at a given time, the total amount of exports from foreign-owned exporting companies is calculated (eq. 01), as well as the export value of each country (eq. 02).

The dataset provides information on six 6 different export company sizes: companies exporting up to 1 million (Brazilian Real or BRL); between 1 to 5 million; 5 to 10 million; 10 to 50 million; 50 to 100 million; 100 to 320 million. We use the upper band value (1, 5, 10, 50,

100 or 320) to calculate the size and share of foreign exports. This measure is used by the Brazilian government to avoid disclosing firm-specific values.

Furthermore, to capture the effects of sending countries institutions, we calculate a Home Country Institutions Index (*HCII*). This index considers the level of human development of the home countries of the foreign companies and is weighted by the importance of respective companies in the municipality's total foreign exports. Thus, the total value of foreign exports, country-specific values, and the institutional index are calculated as follows:

$$TotalForeignExports_{i,t} = \sum_{L=1}^6 m_{i,t}^L \times ExpL^L \quad (01)$$

$$ForeignExports_{i,t}^C = \sum_{L=1}^6 m_{i,t}^{C,L} \times ExpL^L \quad (02)$$

$$HCII = \sum_{C=1}^N \left(\frac{ForeignExports_{i,t}^C}{TotalForeignExports_{i,t}} \times I_t^C \right) \quad (03)$$

Where i is the municipality, t is the year, m is the number of foreign-owned exporting companies, C represents a specific country, N is the number of countries in a region i , $ExpL$ is the exporting level, L is the exporting level values (1, 5, 10, 50, 100 or 320), and I is the home country institution.

It must be noted that the study employed the home countries' HDI as a proxy for the institutional environment. HDI is considered a crucial indicator to measure a society's development and human quality-of-life (HAQ, 1995). At first, other institutional variables were considered such as the Worldwide Governance Indicators (*e.g.* CHEN; YU; ZHANG, 2019; MINGO; JUNKUNC; MORALES, 2018). However, working with multiple institutional variables is problematic due to multicollinearity issues (CUI; HE, 2012). Moreover, as HDI and other institutional variables are correlated, this study focused on the HDI as a proxy for the country's institutional environment. Due to the lack of official HDI data, Bermuda and Taiwan were not included in the analyses.

Finally, 11 country-specific dummy variables were added to reveal the heterogeneous effects of the 11 largest investor countries whose companies were present in at least 20 municipalities between 2010 and 2014.

2.2.4. Control variables and regional level moderator

Several control variables were considered to account for the municipalities' characteristics. Per capita GDP (*PCGDP*) represents the municipalities' economic development. Moreover, the ratio of GDP value added from agriculture (*AGROGDP*) accounts for how industrialized or agriculture-based the region is. Both variables are commonly used in FDI studies. Furthermore, the total value of exports from Brazilian companies (*BREXPORTS*) and the ratio of foreign exports to the total exports value (*FOREIGNRATIO*) were added. The latter is used to account for the general size effect of FDI. Additionally, the population density (*POPENSITY*) was selected to account for the municipalities' demographic profile.

Regarding regional institutions, this study uses the Firjan Fiscal Management Index (*IFGF*) as a proxy for local governance. This index is calculated to identify the challenge many municipalities face in allocating their resources (for details, see Appendix E). By adding regional institutions, this study analyzes how the local institutional environment moderates the effects of FDI.

2.2.5. Model specification and estimation strategy

The main goal of this study is to analyze the effects of foreign companies on local human-development. For this purpose, this study examines different models for the three dependent variables. In addition to the municipalities' own characteristics, the institutional effect of FDI, which is represented by the *HCII* variable, is included in the models. Moreover, the interaction between *HCII* and *IFGF* (*i.e.* home country and host regions' institutions) is added to signal the possible existence of non-linearities. Country-specific dummy-variables are added to reveal the impact an MNC's origins may have on FDI-driven human development. Therefore, equation (04) is proposed.

It must be noted, though, that the possible non-linearity of the process can lead to misleading results. The institutional levels of the recipient region may affect the institutional effect of FDI on human development. For instance, Kurul (2017) reveals that institutional quality positively affects FDI only after this measure exceeds a certain threshold value. Hence, we employ Hansen (2000) threshold regression model to perform a high-low analysis as done by Child and Marinova (2014), and also consider the municipal level control context as Wu and Chen (2014), in the model equation (05):

$$W_{i,t} = \beta_0 + \beta_1'X_{i,t} + \beta_2'D_{i,t} + \beta_3\widehat{HCCI}_{i,t} + \beta_4\widehat{HCCI}_{i,t} \times IFGF_{i,t} + \alpha_i + \varepsilon_{i,t} \quad (04)$$

$$W_{i,t} = \beta_0 + \beta_1'X_{i,t} + \beta_2\widehat{HCCI}_{i,t} \times I(IFGF_{i,t} < \lambda) + \beta_3\widehat{HCCI}_{i,t} \times I(IFGF_{i,t} \geq \lambda) + \alpha_i + \varepsilon_{i,t} \quad (05)$$

Where $W_{i,t}$ represents the set of dependent variables, $X_{i,t}$ represents the set of regional control variables, $D_{i,t}$ represents the set of country-specific dummy variables, $\widehat{HCCI}_{i,t}$ is the Home Country Institutional Index, $IFGF_{i,t}$ is the regional institution, $I(\cdot)$ is an indicator function, α_i represents the municipality time-invariant characteristics, λ are the thresholds to be estimated, and $\varepsilon_{i,t}$ is the stochastic disturbance.

Initially, the models are estimated using Fixed-Effects Generalized Least Squares (FEGLS) to address panel individual heterogeneity and heteroskedasticity problems, as well as autocorrelation within panels (CROISSANT; MILLO, 2008; WOOLDRIDGE, 2010). Regarding the model formulation, endogeneity is a main concern. FDI may be attracted to hosts with certain characteristics (*e.g.* income level; productivity) (WANG *et al.*, 2013), thus leading to reverse causality. To mitigate the problem of endogeneity we use one-year lagged values of FDI following Wand *et al.* (2013) and Dang (2011), since their robust findings demonstrate that the procedure is capable of treating or at least significantly mitigating the problem. Alternative versions of equation (04) are estimated in the least-squares within estimator by Limited Information Maximum Likelihood Method (LIML), a method that tends to return better results with small samples (MARK, 2005). Endogeneity of FDI (*i.e.* foreign presence) was tested when *HCCI* and/or *FOREIGNRATIO* was employed. Moreover, following Kurul (2017), a fixed-effect panel threshold model is employed by applying the estimated values $\widehat{HCCI}_{i,t}$ as threshold variables to avoid inconsistency caused by endogeneity. However, although the two-stage procedure employed for the threshold regression return precise coefficients, the standard errors are incorrect, usually smaller than the correct ones. To address this issue, threshold model was estimated by bootstrapping standard-error for bias-corrected confidence intervals. This approach tends to perform well under both homoskedasticity and heteroskedasticity, even when the errors were fat-tailed (ZARKOS, 1999).

The fixed-effect panel threshold model follows a set of sample quantiles (1%; 1,25%; 1,50%; ... ; 98,75%; 99%) to estimate the threshold parameter (λ) (GIRMA, 2005). To verify the hypothesis of non-linearity, a triple-threshold regression model was employed, thus, allowing the model to capture the regional effects of FDI according to four regimes of local

institutional development: low, medium-low, medium-high, and high. The existence of distinct regimes was tested, *i.e.*, the null hypothesis ($H_0: \beta_2 = \beta_3$), is tested using likelihood ratio test statistics and their bootstrapped p-values.

2.3. RESULTS

The data shows that the United States and Europe are the main sources of FDI in Brazil (see Figure 4). Companies from the United States are present in 85.8% of the 92 sample municipalities (*i.e.* 79 municipalities), followed by Germany (57.6%), Switzerland (47.8%), and France (45.6%). The most frequent Asian investors are Japan (42.3%) and China (28.2%). Among the top receiving regions are municipalities such as Rio de Janeiro, with exporting companies from 28 different countries, Curitiba (24 countries), and São Bernardo do Campo (21 countries). Although the sample is not a full representation of the whole country, it does include municipalities from 18 different federal states of Brazil. The results also suggest that foreign investors are mainly interested in the southeast and southern regions. Descriptive statistics and a full pairwise correlation matrix can be found in the Appendixes F and G.

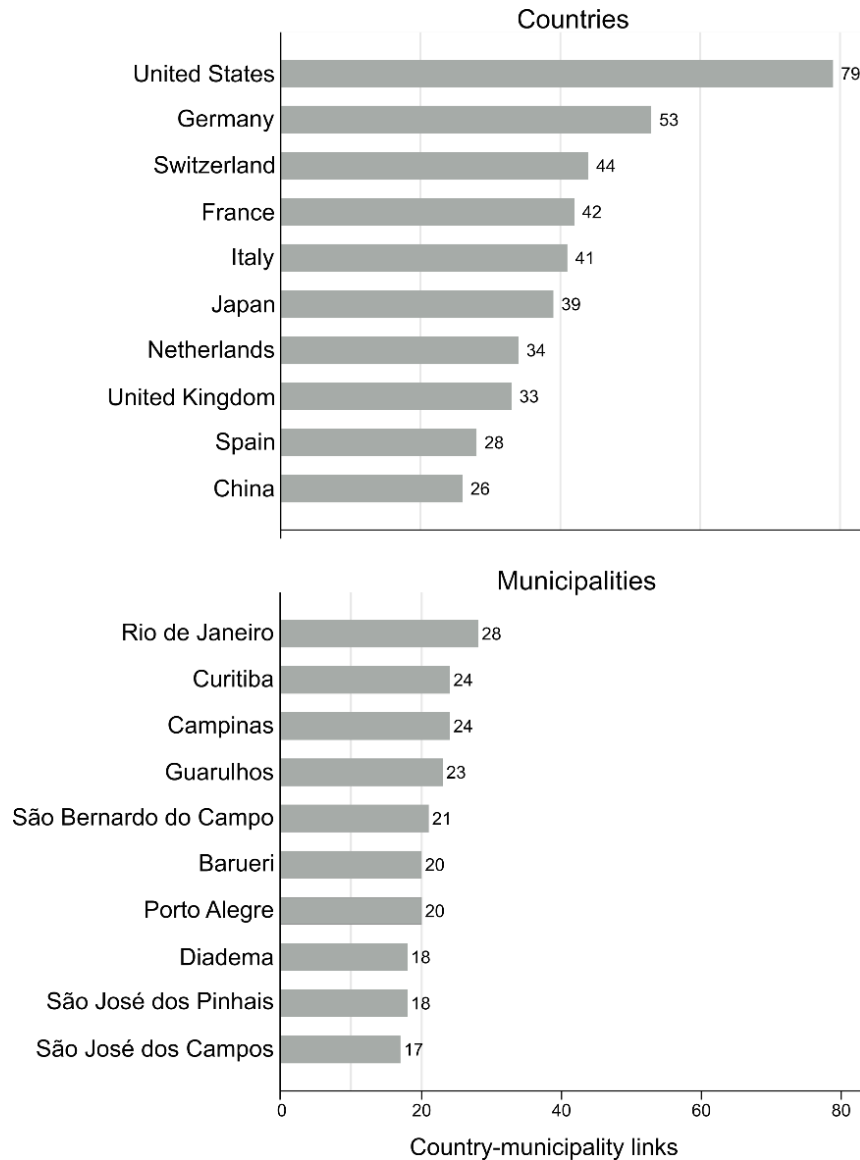


Figure 4 - Top 10 foreign exporters (countries) and receiving municipalities (2010-14)

Source: author.

2.3.1. Results from the linear analyses

Table 1 presents the results for the linear analyses, which were estimated using Fixed Effects Generalized Least Squares (FGLS) and panel data Limited Information Maximum Likelihood (LIML) methods. The latter was employed to deal with endogeneity problems. All regressions were performed using normalized values for all variables (*i.e.* min-max normalization). In addition to the FGLS, we also apply Random Effects (RE) models to evaluate the effects of 11 country-specific dummy variables that account for the top investor countries, since the within effects estimators of the fixed effects models tend to induce multicollinearity when adding a large number of binary covariates.

In summary, the results demonstrate that foreign investments are positively associated with local human development in Brazil, which can be observed in the positive and significant coefficients for *HCII* and *FOREIGNRATIO* in multiple models. A higher *FOREIGNRATIO* is positively associated with education (model 2), health (models 4, 5 and 6), and income (model 9). Moreover, a higher level of human development in the MNCs' home countries—*i.e.* a higher *HCII*—is positively associated with the regions' education (model 1) and income levels (model 7). Home country institutions seem to be significant factors in enhancing the region's human development level, at least in terms of their effects on education and economic opportunities. These results provide some support for the imprinting theory that the original institutional background of company is imprinted on the MNCs and conditions their effects in the host regions. No significant results, though, were found for health in the linear regressions. Although, as will be shown further below, this changes when considering regional-specific characteristics within threshold regressions. Thus, the results from the linear analysis partially support H1. It also is noteworthy that a reasonable number of controls variables were significant, and the F-statistic strongly rejects the null hypothesis.

Additionally, country-dummies in models 3, 6 and 9 provide insights into the impacts of MNCs from different countries. While the presence of companies from France, the UK, and Germany seem overall positive for the host regions in the data sample, the effects of Italy, Spain and China are mixed. Furthermore, companies from Argentina and Japan tend to have a negative effect on human development in the sample regions. These general effects vary even further across different dimensions of human development. For instance, while the presence of companies from the UK is associated with an improvement in the respective host regions' health levels, the presence of companies from France is significantly associated with the host's average income. These varying effects of countries are arguably associated with the institutions they carry to their host regions, but also other factors, such as the type of regions they invest and in which sector they invest. No data on the precise industries is available yet (and needs to be collected and explored in subsequent research), but the effect of different types of regions and their institutions can be explored in more detail within this study.

Table 1 - Linear effects of FDI and institutions

VARIABLES	(1) ^A	(2) ^A	(3) ^B	(4) ^C	(5) ^C	(6) ^C	(7) ^A	(8) ^C	(9) ^B
	EDUCATION			HEALTH			INCOME		
HCII	0.0822*** (0.0271)			0.101 (0.0781)			0.542*** (0.0574)		
HCII x IFGF		-0.0431*** (0.0165)			-0.0647 (0.0550)			-0.678*** (0.295)	
IFGF	-0.0219** (0.00889)		0.0291** (0.0120)	-0.0922* (0.0492)		-0.0754 (0.0532)	-0.112*** (0.0206)		-0.0988*** (0.0168)
FOREIGNRATIO	0.0160 (0.0123)	0.0318*** (0.0114)	0.000332 (0.0122)	0.728*** (0.365)	0.727*** (0.368)	0.740*** (0.403)	0.0405 (0.0433)	-0.0516 (0.0786)	0.0404** (0.0198)
PCGDP	1.126*** (0.0638)	1.165*** (0.0626)	0.532*** (0.0434)	-0.181 (0.158)	-0.142 (0.164)	-0.170 (0.163)	1.748*** (0.0668)	0.712 (0.438)	0.787*** (0.0518)
AGROGDP	0.0491 (0.0374)	0.0526 (0.0392)	0.00628 (0.0305)	0.0137 (0.141)	0.0109 (0.141)	0.0119 (0.144)	0.0894 (0.0669)	0.224* (0.123)	-0.0785** (0.0375)
POPDENSITY	0.389*** (0.0228)	0.383*** (0.0214)	-0.0669 (0.0416)	0.221 (0.874)	0.273 (0.865)	0.266 (0.812)	0.894*** (0.0362)	4.985*** (1.862)	0.0975** (0.0451)
BREXPORTS	0.0198 (0.0299)	0.0168 (0.0306)	-0.160*** (0.0525)	0.746 (0.497)	0.755 (0.516)	0.790 (0.578)	0.0478 (0.0486)	-0.134 (0.258)	0.316*** (0.0632)
Switzerland ^D			0.0150** (0.00603)			-0.00546 (0.0167)			-0.00693 (0.00913)
France ^D			0.0179*** (0.00655)			0.0471 (0.0428)			0.0451*** (0.0107)
Italy ^D			0.0221** (0.00865)			-0.0572* (0.0326)			-0.0273*** (0.00922)
United Kingdom ^D			0.0440*** (0.00906)			-0.0672 (0.0731)			0.0359*** (0.0123)
China ^D			-0.0254*** (0.00719)			0.0119 (0.0246)			0.0192** (0.00913)
Argentina ^D			-0.0204** (0.00995)			0.0162 (0.0342)			0.00495 (0.0106)
Netherlands ^D			0.00417 (0.00712)			-0.00408 (0.0243)			-0.000348 (0.00910)
Spain ^D			-0.0163** (0.00775)			-0.00175 (0.0235)			0.0209** (0.00887)
Germany ^D			0.0166** (0.00702)			0.0431* (0.0234)			-0.00701 (0.00884)
Japan ^D			-0.0155** (0.00771)			-0.0128 (0.0212)			0.00392 (0.0103)
United States ^D			-0.00118 (0.00689)			0.0243 (0.0613)			0.0237** (0.00993)
Constant	0.0590** (0.0238)	0.0895*** (0.0222)	0.552*** (0.0136)				-0.672*** (0.0516)		0.170*** (0.0159)
Endogenous	No	No	No	Yes	Yes	Yes	No	Yes	No
VIF	1.14	1.14	1.5	1.13	1.11	1.5	1.14	1.11	1.5
Observations	460	460	460	368	368	368	460	368	460

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

^A FGLS estimator (fixed-effects using within-subject demeaned values).

^B FGLS estimator (random-effects).

^C LIML estimator with instrumental variables.

^D Dummy.

^E Treated for endogeneity.

It must be noted that a significant moderating effect of regional institutions—measured by “*HCI* \times *IFGF*” can be observed in the models 2 and 8. Thus, the combination between the home country and regional institutions conditions the effects of FDI on human development. This result indicates the possibility that FDI-driven development follows a non-linear process. Therefore, this study analyses the effects of regional institutional quality further within threshold regressions (see Table 2).

2.3.2. Results from the non-linear analyses

Table 2 - Non-linear effects of FDI and institutions

VARIABLES	(1)	(2)	(3)
	EDUCATION	HEALTH	INCOME
HCII for very low IFGF ($\leq \lambda_1$)	0.0595	0.0992*	0.248*** ^E
	-0.0427	-0.052	-0.12
HCII for low IFGF ($> \lambda_1$ and $\leq \lambda_2$)	0.0328	0.0769	0.214*** ^E
	-0.0413	-0.0526	-0.118
HCII for intermediary IFGF ($> \lambda_2$ and $\leq \lambda_3$)	0.0769*	0.0457	0.179 ^E
	-0.041	-0.0475	-0.119
HCII for high IFGF ($> \lambda_3$)	0.0407	0.0261	0.130 ^E
	-0.0409	-0.0492	-0.117
PCGDP	0.384**	-0.03	0.833
	-0.172	-0.201	-0.657
AGROGDP	0.0194	-0.0982	0.308
	-0.0588	-0.126	-0.226
FOREIGNRATIO	0.00575	0.153*** ^E	-0.000918
	-0.0212	-0.0475	-0.0556
POPDENSITY	2.332***	0.783	7.362***
	-0.69	-0.63	-1.881
BREXPORTS	0.0773	-0.161	-0.335*
	-0.0685	-0.12	-0.187
Constant	0.296***	0.491***	-0.765***
	-0.0775	-0.0803	-0.192
Threshold 1 (λ_1)	0.324	0.370*	0.560*
Threshold 2 (λ_2)	0.526	0.492	0.65
Threshold 3 (λ_3)	0.531**	0.606	0.743
Observations	368	368	368

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

^E Treated for endogeneity.

Table 2 presents the results for our threshold analyses. It shows that both home country institutions (represented by *HCII*) and regional institutions (represented by *IFGF*) condition the effects of FDI on local human development. The applied triple-threshold model allows identifying four distinct regimes (NIEH; YAU; LIU, 2008) in which home country institutions *HCII* have different magnitudes of effects and levels of significance, according to the level of regional institutional quality in the municipalities. The results for education suggest home country institutions have a significant impact when the host region presents intermediary levels of governance quality (*i.e.* *IFGF* between 0.526 and 0.531). The institutional impact of FDI on regions with very high or very low levels of governance quality, instead, is not significant. The results for health show that institutional effect of FDI is positive when the municipalities are poorly developed (*i.e.* *IFGF* below 0.492). Instead, the results for higher levels of governance quality are insignificant. Finally, the results for income suggest a significant effect of home

country institutions on municipalities with lower levels of governance quality. Yet, the effect is stronger in regions with very low levels of *IFGF* (below 0.560).

The results presented in Table 2 differ from those shown in Table 1 in terms of the statistical significance of control variables. This often occurs in threshold models because the model splits the sample to estimate the threshold parameter, which leads to a low variability of the sample subset and in consequence insignificant control variables, especially for small samples. Nonetheless, the results of the linear model presented in Table 1 validate the set of control variables. In summary, these results show that FDI enhances local human development in a non-linear way. When MNCs from well-developed institutional backgrounds come to Brazil, their effects seem to be especially significant for institutionally weak regions in terms of income and health improvements. Therefore, the results support H2, and non-linearities in the effects of FDI on local human development are confirmed.

2.4. DISCUSSION AND FINAL REMARKS

The results suggest that FDI contributes to regional human development in Brazil. Foreign investments are capable of promoting their host regions' levels of education, health, and income. Moreover, the FDI-development nexus is conditioned by both the home country institutions, brought to the region by multinational companies, as well as the regional institutional environment, receiving such investments. The effects of FDI and its institutions on regional development is, therefore, a complex issue.

Regarding the effect of FDI on income, the results of this study are in line with previous research: the growing presence of foreign companies in a region tends to increase the average income. The literature indicates that, in general, MNCs offer better salaries and increase household welfare (LEHNERT; BENMAMOUN; ZHAO, 2013). Considering the institutional effect of FDI on the municipalities' income, our results suggest that MNCs from well-developed institutional backgrounds (*i.e.* high HDI) present a more human-centered management style, which may result in residents earning better salaries. Simultaneously, FDI is a meaningful instrument to increase education on a regional level. Arguably, an increase in income may result in increases in education. This may be the case of employees investing in their family's education. Also, MNCs can be perceived as valuable employment opportunities, and educated workers may be migrating to the MNCs' municipalities from other regions. Furthermore, our analysis suggests a positive effect of FDI on the host regions' health levels. Up to now, this relationship was barely explored by scholars (*e.g.* KAULIHOWA; ADJASI, 2018). We argue

that in comparison to domestic firms, MNCs offer better working conditions and a less harmful environment, while also offering health services. Simultaneously, MNCs offer better salaries, which arguably helps workers to invest more in health (USMAN; MA; WASIF ZAFAR; HASEEB *et al.*, 2019).

The results also provide support for the imprinting theory. This theory suggests that although the foreign companies are operating outside their home country institutional background, they will be influenced by their original institutional environment while operating abroad. In a way, the MNCs are an extension of the home country (KOGUT, 2005). Thus, FDI from well-developed economies with inclusive institutions (ACEMOGLU; ROBINSON, 2012) can be expected to generate more positive impacts than FDI from countries with exclusive institutions. Indeed, the Home Country Institutional Index resulted to be significant in multiple cases. This greater impact may be explained by CSR projects, which are now part of the MNCs' agenda, and are capable of enhancing local health and educational indexes (KHAN; LOCKHART; BATHURST, 2018; MONACHINO; MOREIRA, 2014), as well as positive professionalization and demonstration effects in the region. Institutionally-evolved MNCs may be more inclined to invest in CSR projects in education and health considering the institutions and culture imprinted onto them. These CSR activities are common in well-developed countries (*e.g.* UK; USA; Germany), especially when compared to emerging economies such as China (Y. Zhang, Shang, & Liu, 2018). Even though investments in CSR projects can be strategically beneficial for the company (*e.g.* publicity, branding), the host region may still experience positive outcomes, as shown by our results. Moreover, MNCs from well-developed economies are operating in a variety of industry-sectors, including numerous sophisticated activities. As shown by Appendix H, the majority of large MNCs in our sample of municipalities operate in very distinct sectors depending on their origins. While German MNCs operate in technology-intensive sectors (*e.g.* motor vehicles; electronic components; chemistry), MNCs from emerging economies are operating in less sophisticated sectors (*e.g.* agriculture; oil; mining). As companies from sophisticated and technology-related sectors pay better salaries and tend to demand a more educated and healthier workforce, their human development impact is larger than companies that are mainly seeking for low labor costs and natural resources (HARTMANN, 2014; HARTMANN; GUEVARA; CRISTIAN; ARISTARÁN *et al.*, 2017).

Amidst this discussion, our results suggest that the institutional effect of FDI, measured by *HCII*, is not the same across all municipalities. Our study, similarly to previous literature, demonstrates statistically significant and non-linear results. The threshold regressions demonstrate that, for all three human development dimensions included in this study, regional

institutions moderate the effect of FDI on human development. This is particularly important for the institutional effect of FDI on the municipalities' health levels. Linearly, the pool of institutions brought in by FDI appears to be insignificant for health. However, this institutional effect is positive and significant for institutionally weak regions (*i.e.* very low levels of governance quality). Similar results are found for income. For both cases, the results are in line with the argument that institutionally-weak regions present “voids” that can be exploited by companies with the capacity of addressing local issues by partially substituting the state. In contrast, the results for education demonstrate a significant effect for intermediate levels of governance quality. It can be argued that education in Brazil is very dependent on the government (MATTOS; POLITI; YAMAGUCHI, 2018) and MNCs may invest, in particular into more sophisticated sectors, when the educational level in a region reaches a minimum threshold. Furthermore, the impact of MNCs demand for more education may take some time to be effective, as investments in education (*e.g.* schools) will not impact the municipality's education index rapidly. Finally, municipalities with a very active and effective government may not experience the significant impact of MNCs on education, as these regions have already high levels of education.

In sum, FDI is positive for the host municipalities in Brazil. Moreover, MNCs from well-developed economies bring their institutions to the host region, and this pool of institutions is significant for the FDI-development nexus. It must be noted that this article presented the first econometric research on the effects of FDI on local human development in Brazil and Latin America, while considering both home country and host regions' institutions. Although institutions and country-specific origins need to be accounted for, our results suggest FDI contributes to local human development. Thus, our results contradict previous literature claiming FDI is harmful to the host (*e.g.* ALI; NISHAT; ANWAR, 2009; CHOI, 2006). Nonetheless, the FDI-development relationship is non-linear, and thus the heterogeneous effects of FDI on different types of regions should not be ignored. Moreover, subsequent research needs to explore the potential negative and positive effects on neighboring regions, as well as potential crowding-out effects of FDI.

The investigation approach employed by this research can be replicated by future studies. A few limitations should be noted, though. First, the sample employed by this study is limited and is not a full representation of Brazil. However, the data employed here is valuable as it represents the first attempt to build a local FDI dataset that allows for an analysis of the impacts of FDI across different regions in Brazil. Second, using multiple variables representing different facets of human development is a valuable research strategy, as FDI can have

heterogeneous effects on different dimensions of development. Subsequent research may also consider further indicators of (human) development as dependent variables, such as poverty levels, gender equality or higher education and vocational training enrollments. Third, using the location of a company's headquarters as the home country is not free of criticism, as the MNC's registered address for legal purposes can be different from where most of its shareholders live (CASSON, 2007). Fourth, the collection of further variables of regional institutions (at the moment not available) may provide further insights and provide further robustness. Future studies should take these limitations into account. In addition to greater precision, a larger regional-level sample may facilitate the use of spatial econometric models that scrutinize the effects among neighboring regions (*i.e.* spatial correlation). Finally, sector-specific data and effects should be collected and analyzed.

It must be noted that the results provided by this study have significant policy implications. The results suggest that FDI can be a valuable tool to boost local human development. Of course, FDI is only one agent of local development, among others, such as local companies, governments and education institutions, that need to ensure endogenous local development. Nonetheless, FDI may be strategically promoted to further develop regions with weak governance quality. Arguably, FDI from more developed economies is especially beneficial for less developed host regions, as they present a strong institutional background and may operate in more sophisticated sectors.

CHAPTER 3: CONCLUSION

This goal of this study was to verify if inward FDI is positive or negative for Brazil. Specifically, the intent was to empirically analyze the effects of MNCs on their host regions. This impact was measured from a human development perspective. However, the chosen dependent variables allowed this study to “escape” the narrow view some scholars have on human development (*e.g.* mistakenly using financial aspects only). Moreover, to perform such analyses, a unique dataset on regional FDI data was built, which took a whole research team and approximately 40.000 checks. The outcome was a unique dataset on FDI data including information on the MNCs’ origins. Furthermore, this study employed both linear and non-linear econometric analyses, and results suggest the FDI-driven development process occur non-linearly. Moreover, this study attended the five specific goals earlier defined.

In sum, FDI in Brazil is a significant booster of local human development, although this effect is not the same for all regions. Inward FDI, by carrying its home country institutions, positively impacts its host region by increasing the host’s education, health, and income levels. The municipalities’ income and health levels are particularly affected when local governance is weak. For education, a minimum threshold level is necessary for the significant impact of MNCs.

These results contribute to the theoretical debate on the FDI-development nexus. The findings of this study agree with part of the literature arguing in favor of FDI-driven development. However, results contradict another part of the literature arguing FDI is harmful to the host. In essence, the results here presented are the first attempt to study FDI on a local-level in Brazil. This sort of research is limited worldwide, and Latin America, although attractive to foreign investors, has been particularly neglected. The debate on the effects of FDI on the host country should continue on future studies.

In terms of policy implications, the results point in favor of policies aiming to attract foreign investments to boost local human development, especially in regions with weak institutions. Therefore, FDI can be used strategically by the Brazilian as a development tool. If possible, these policies should arguably aim to attract MNCs from countries with strong institutional environments (*i.e.* well-developed economies). Also, these policies should arguably encourage inward FDI in sophisticated sectors, although this topic needs further discussion.

As to the limitations of this study, future studies should consider employing a larger municipal-level dataset and compare future results with the findings presented here. A larger sample may include a higher share of MNCs from emerging economies, which could yield different results for the institutional effect of FDI, as these economies are institutionally unstable. Furthermore, a larger sample would allow for more robust results for the effects of FDI in different regions. After all, this study demonstrates the location of FDI is important for an analysis of its effects. FDI-related datasets in Latin-America should be built, as China is one of the few countries with a generous amount of FDI studies due to its data availability (LESSMANN, 2013). These new datasets should include sector-specific data, which is commented upon in the literature, although rarely included (BOGLIACCINI; EGAN, 2017; LEHNERT; BENMAMOUN; ZHAO, 2013; REITER; STEENSMA, 2010). Future research should explore new econometric methods, and arguably include non-linearities as a possibility.

Despite all limitations, this study demonstrates that Brazil experiences FDI-driven human development. The findings indicate that foreign investments can boost the host's welfare and that the MNCs' origins should not be ignored. Thus, scholars should continue the research on the FDI-development relationship, especially on countries lacking relevant empirical studies in spite of large inward FDI stocks, as is the case for Latin America.

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APPENDIX A

List of the 52 home countries included in the dataset

Developed Economies	Emerging Economies
Australia	Angola
Austria	Argentina
Belgium	Bahrain
Canada	Bangladesh
Cyprus	Chile
Czech Republic	China
Denmark	Colombia
Finland	Costa Rica
France	India
Germany	Malaysia
Hong Kong	Mexico
Iceland	Panama
Ireland	Paraguay
Israel	Peru
Italy	Poland
Japan	Saudi Arabia
Liechtenstein	South Africa
Luxembourg	Turkey
Netherlands	Ukraine
New Zealand	United Arab Emirates
Norway	Uruguay
Portugal	Venezuela
Singapore	Vietnam.
South Korea	
Spain	
Sweden	
Switzerland	
United Kingdom	
United States of America	

All countries were classified according to the International Monetary Fund (IMF), with the exception of Liechtenstein, which was classified according to the United Nations Conference on Trade and Development (UNCTAD).

APPENDIX B

List of the 92 Brazilian municipalities included in the dataset

Municipality	Municipality	Municipality	Municipality
Araras (SP)	Franca (SP)	Mogi Guaçu (SP)	Santa Cruz do Sul (RS)
Barueri (SP)	Goiania (GO)	Mogi Mirim (SP)	Santo André (SP)
Bauru (SP)	Gravataí (RS)	Montes Claros (MG)	São Bernardo do Campo (SP)
Belo Horizonte (MG)	Guarulhos (SP)	Niterói (RJ)	São Caetano do Sul (SP)
Blumenau (SC)	Igarassu (PE)	Nova Lima (MG)	São José do Rio Preto (SP)
Brusque (SC)	Indaiatuba (SP)	Nova Odessa (SP)	São José dos Campos (SP)
Camaçari (BA)	Itajaí (SC)	Osasco (SP)	São José dos Pinhais (PR)
Campinas (SP)	Itaquaquecetuba (SP)	Palmas (PR)	São Leopoldo (RS)
Campo Grande (MS)	Itatiba (SP)	Palmas (TO)	São Luís (MA)
Campo Largo (PR)	Itu (SP)	Paranaguá (PR)	São Sebastião do Caí (RS)
Canoas (RS)	Itupeva (SP)	Parnamirim (RN)	Serra (ES)
Cascavel (PR)	Jaraguá do Sul (SC)	Passo Fundo (RS)	Sertãozinho (SP)
Cataguases (MG)	João Pessoa (PB)	Ponta Grossa (PR)	Sinop (MT)
Contagem (MG)	Joinville (SC)	Porto Alegre (RS)	Sorocaba (SP)
Cravinhos (SP)	Juíz de Fora (MG)	Quatro Barras (PR)	Tijucas (SC)
Cruzeiro (SP)	Jundiaí (SP)	Recife (PE)	Timbó (SC)
Cuiabá (MT)	Limeira (SP)	Ribeirão Preto (SP)	Três Lagoas (MS)
Curitiba (PR)	Londrina (PR)	Rio de Janeiro (RJ)	Uberaba (MG)
Diadema (SP)	Manaus (MS)	Rio do Sul (SC)	Uberlândia (MG)
Divinópolis (MG)	Maracanaú (CE)	Rondonópolis (MT)	Valinhos (SP)
Duque de Caxias (RJ)	Maringá (PR)	Salto (SP)	Várzea Paulista (SP)
Eusébio (CE)	Matão (SP)	Salvador (BA)	Vinhedo (SP)
Fortaleza (CE)	Mogi das Cruzes (SP)	Santa Barbara D'Oeste (SP)	Vitória (ES)

State initials in parentheses.

APPENDIX C

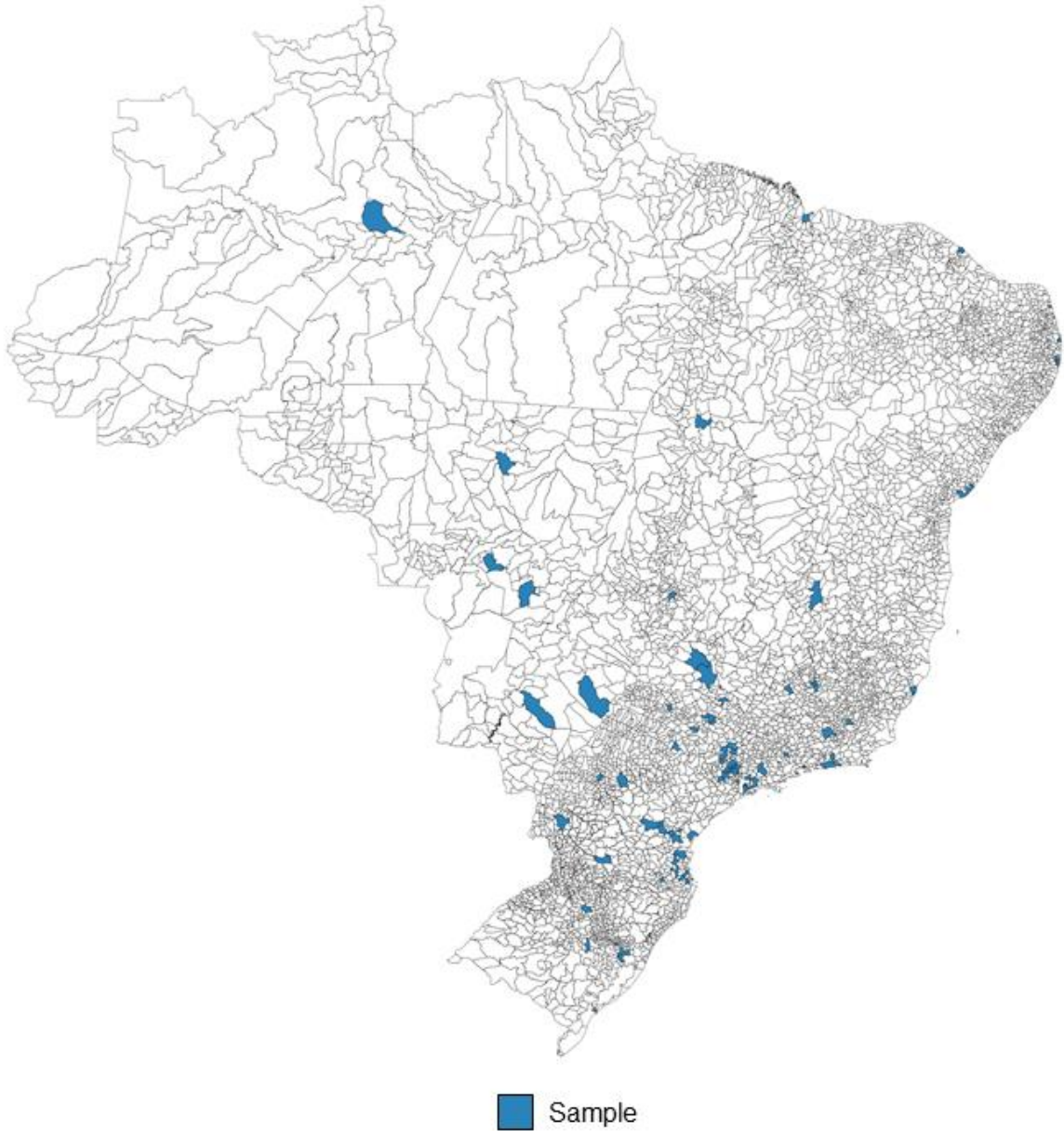


Figure – 92 Brazilian municipalities (sample)

Source: author.

APPENDIX D

Data summary

Data	Description	Level	Source
Firjan Index for Education ($IFDM^{EDU}$)	Ranges from 0 (low) to 1 (high).	Municipal	Firjan
Firjan Index for Health ($IFDM^{HEALTH}$)	Ranges from 0 (low) to 1 (high).	Municipal	Firjan
Average Income ($AVGINC$)	Given in thousands of BRL (Brazilian Real).	Municipal	DataViva
Home Country Institutional Index (HCI)	Index	Municipal	Unique dataset
Firjan Fiscal Management Index ($IFGF$)	Ranges from 0 (low) to 1 (high).	Municipal	Firjan
Foreign ratio ($FOREIGNRATIO$)	Ratio	Municipal	Unique dataset using data from Siscomex
Per capita Gross Domestic Product ($PCGDP$)	Given in thousands of BRL (Brazilian Real) in current prices.	Municipal	Brazilian Institute for Geography and Statistics
Value added from agriculture to total GDP ($AGROGDP$)	Ratio	Municipal	Brazilian Institute for Geography and Statistics
Population Density ($POPENSITY$)	Population per square kilometer	Municipal	Brazilian Institute for Geography and Statistics
Brazilian Exports ($BREXPORTS$)	Given in millions of BRL	Municipal	Unique dataset using data from Siscomex
Human Development Index (HDI)	Ranges from 0 (low) to 1 (high).	Country	United Nations Development Programme

APPENDIX E

Variables taken from Firjan

Index	Items	Source
Firjan Index for Health (IFDM ^{HEALTH})	Number of prenatal consultations; Deaths due to undefined causes; Child deaths due to avoidable causes; Sensitive Hospitalizations for Primary Care (ISAB).	Ministry of Health
Firjan Index for Education (IFDM ^{EDU})	Early childhood education attendance; Primary school dropout rate; Age-grade distortion rate; Primary education teachers with higher education; Mean hours in class per day; Result of the Primary Education Development Index (IDEB).	Ministry of Education
Firjan Fiscal Management Index (IFGF)	Capacity to obtain revenue Degree of rigidity of the budget Sufficient cash resources Capacity to make investments Cost of debt in the long term	National Treasury Secretariat

APPENDIX F

Descriptive Statistics

Variable	N	Min.	Max	Mean	S.D.	p.50
AVGINC	460	0	1	0.3979	0.1927	0.3843
IFDMedu	460	0	1	0.6841	0.1940	0.7233
IFDMHealth	460	0	1	0.6630	0.1876	0.6932
HCII	460	0	1	0.8708	0.1356	0.9144
IFGF	460	0	1	0.5670	0.2172	0.5799
HCII x IFGF	460	0	0.8799	0.4899	0.1992	0.5080
ForeignRatio	460	0	1	0.4128	0.2803	0.4301
PCGDP	460	0	1	0.1661	0.1340	0.1363
AGROGDP	460	0	1	0.0960	0.1662	0.0269
POPENSITY	460	0	1	0.1182	0.1840	0.0407
BRXEPORIS	460	0	1	0.0997	0.1140	0.0660
Switzerland ^D	460	0	1	0.3935	0.4891	0.0000
France ^D	460	0	1	0.4043	0.4913	0.0000
Italy ^D	460	0	1	0.4000	0.4904	0.0000
United Kingdom ^D	460	0	1	0.3065	0.4616	0.0000
China ^D	460	0	1	0.1913	0.3938	0.0000
Argentina ^D	460	0	1	0.1478	0.3553	0.0000
Netherlands ^D	460	0	1	0.3022	0.4597	0.0000
Spain ^D	460	0	1	0.2370	0.4257	0.0000
Germany ^D	460	0	1	0.4957	0.5005	0.0000
Japan ^D	460	0	1	0.3630	0.4814	0.0000
United States ^D	460	0	1	0.8109	0.3920	1.0000

Normalized data

APPENDIX G

Pairwise correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
(1) AVGINC	1																						
(2) IFDMEdu	0.23	1																					
(3) IFDMHealth	0.24	0.50	1																				
(4) HCII	-0.07	0.16	0.02	1																			
(5) IFGF	0.08	0.22	0.28	-0.13	1																		
(6) HCII x IFGF	0.06	0.28	0.28	0.28	0.91	1																	
(7) ForeignRatio	0.24	0.11	0.14	0.10	-0.08	-0.03	1																
(8) PCGDP	0.52	0.37	0.37	-0.11	0.21	0.16	0.18	1															
(9) AGROGDP	-0.31	-0.08	0.01	0.08	-0.02	0.02	0.02	-0.17	1														
(10) POPDENSITY	0.28	-0.01	0.00	-0.03	0.04	0.02	0.05	0.16	-0.32	1													
(11) BRXEXPORTS	0.35	-0.10	0.04	-0.18	0.27	0.18	-0.09	0.18	-0.20	0.15	1												
(12) Switzerland ^D	0.23	0.14	0.19	0.00	0.03	0.04	0.32	0.26	-0.15	0.13	0.25	1											
(13) France ^D	0.40	0.11	0.16	0.05	0.13	0.15	0.39	0.34	-0.20	0.32	0.18	0.27	1										
(14) Italy ^D	0.26	0.22	0.24	-0.03	0.14	0.13	0.34	0.38	-0.17	0.11	0.21	0.41	0.43	1									
(15) United Kingdom ^D	0.38	0.30	0.24	0.07	0.08	0.10	0.31	0.29	-0.17	0.26	0.16	0.43	0.37	0.34	1								
(16) China ^D	0.19	-0.07	0.11	-0.26	0.15	0.04	0.16	0.06	-0.13	0.09	0.38	0.30	0.14	0.11	0.17	1							
(17) Argentina ^D	0.14	-0.06	0.13	-0.08	-0.02	-0.05	0.15	0.06	-0.11	0.06	0.18	0.27	0.23	0.35	0.19	0.17	1						
(18) Netherlands ^D	0.26	0.03	0.02	0.04	0.14	0.16	0.08	0.21	-0.11	0.19	0.35	0.37	0.21	0.21	0.30	0.15	0.18	1					
(19) Spain ^D	0.26	-0.09	0.06	-0.07	0.13	0.10	0.27	0.11	-0.11	0.16	0.19	0.24	0.46	0.41	0.23	0.05	0.23	0.31	1				
(20) Germany ^D	0.25	0.15	0.02	0.17	0.02	0.08	0.21	0.22	-0.21	0.21	0.15	0.20	0.41	0.39	0.42	0.03	0.18	0.19	0.26	1			
(21) Japan ^D	0.29	0.12	-0.02	0.05	0.21	0.23	0.26	0.23	-0.26	0.19	0.32	0.35	0.47	0.28	0.37	0.17	0.20	0.39	0.27	0.33	1		
(22) United States ^D	0.35	0.09	0.32	0.07	0.26	0.28	0.32	0.30	-0.11	0.04	0.22	0.20	0.28	0.18	0.14	0.19	0.11	0.11	0.11	0.07	0.23	1	

Normalized data

APPENDIX H

Classification of German MNCs and MNCs from emerging economies with exporting value above 100 million BRL

Germany			China, South Africa and Uruguay		
Classification	Observations	%	Classification	Observations	%
Wholesale and retail trade; repair of motor vehicles and motorcycles	27	18,62	Manufacture of grain mill products	18	26,09
Manufacture of motor vehicles, trailers and semi-trailers	25	17,24	Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	9	13,04
Manufacture of electrical and electronic equipment for motor vehicles	17	11,72	Growing of cereals (except rice), leguminous crops and oil seeds	8	11,59
Manufacture of other parts and accessories for motor vehicles	13	8,97	Growing of vegetables and melons, roots and tubers	8	11,59
Manufacture of bearings, gears, gearing and driving element	6	4,14	Manufacture of other chemical products	7	10,14
Manufacture of electronic components	5	3,45	Mining of non-ferrous metal ores	6	8,70
Manufacture of chemicals and chemical products	5	3,45	Production of electricity	6	8,70
Production of electricity	5	3,45	Extraction of crude petroleum and natural gas	4	5,80
Manufacture of computer, electronic and optical products	5	3,45	Support activities for petroleum and natural gas extraction	3	4,35
Transmission of electricity	5	3,45	Total	69	100
Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	5	3,45			
Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	5	3,45			
Manufacture of power-driven hand tools	5	3,45			
Manufacture of lifting and handling equipment	5	3,45			
Manufacture of rubber tires and tubes; retreading and rebuilding of rubber tires	4	2,76			
Wholesale of computers, computer peripheral equipment and software	3	2,07			
Wholesale of information and communication equipment	3	2,07			
Manufacture of machinery and equipment	2	1,38			
Total	145	100			

Classifications taken from the Statistical Classification of Economic Activities in the European Community, also known as NACE. A single company may allocate multiple classifications. The observations represent the five years time span of our dataset. Thus, the same company can count up to five times (2010-2014).