8-2023

A STUDY OF THE RELATIONSHIP BETWEEN FDI INFLOWS AND ENTREPRENEURIAL ACTIVITY AT THE COUNTRY LEVEL

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A STUDY OF THE RELATIONSHIP BETWEEN FDI INFLOWS AND ENTREPRENEURIAL ACTIVITY AT THE COUNTRY LEVEL

by

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A Dissertation
Submitted to the Graduate School,
the College of Arts and Sciences
and the School of Social Science and Global Studies
at The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

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August 2023

Published by the Graduate School

ABSTRACT

This dissertation focuses on the relationship between FDI inflows and entrepreneurial activity at the country level in a 3-essay format. Building on the competing theories of knowledge spillover theory of entrepreneurship (KTSE) and the occupational choice model (OCM), this research seeks to determine if FDI inflows and entrepreneurship are complimentary or competing phenomenon.

Essay 1 analyzes the existing comparative entrepreneurship measures available through a correlation matrix using panel study data from 172 countries and territories from 2006 to 2019. This essay finds that the available measures of comparative entrepreneurship are not as highly correlated as anticipated and that there are major challenges with missing data within the available options of variables for country level entrepreneurial activity.

Essay 2 seeks to determine if FDI inflows influence entrepreneurship at the country level. Using panel data from 154 countries during the years of 2006 through 2019, this study tests the relationship of FDI inflows on new venture creation. The study also controls for other explanatory variables influencing entrepreneurship including GDP level, population, corruption level, trade policy, education level, and government effectiveness. This essay did not find a significant direct relationship between FDI inflows and entrepreneurial activity. However, a significant direct relationship between education level and entrepreneurial activity was found.

In Essay 3 the model was expanded to analyze key interaction variables which may moderate the relationship between FDI and entrepreneurship and to test for the possibility of a curvilinear relationship between FDI inflows and country-level

entrepreneurship. A curvilinear relationship was found between the two variables of interest, while the interaction variables were not found to direct significant influence on the relationship. This research makes a theoretical contribution to both the FDI spillover and comparative entrepreneurship literature.

ACKNOWLEDGMENTS

This dissertation could not have been completed with the assistance, encouragement, and support of many people. First, I am profoundly grateful for the guidance I received from my dissertation chair, Dr. Edward Sayre. Dr. Sayre was incredibly supportive and provided wonderful insights throughout the process. I would also like to thank the three members of my committee Dr. St. Marie, Dr. Pauly, and Dr. Lansford. Each of these professors added to the quality of my educational experience, and I appreciate all their support and guidance through the process. Annette Copeland has been helpful at every step throughout this program and has been a pleasure to get to work with her throughout the process.

I also appreciate the interactions with all my classmates in the IDV program. I especially appreciate Michelle Watts, Jennifer Kuklenski, and Timea Varga. Their friendship and collegiality helped to make this program more enjoyable. On a bittersweet note, I started this program with my good friend and colleague Scott Carrlee, who tragically lost his life to cancer, but I want to acknowledge the important role he played in supporting my experience during the early years of course work and our good times as roommates traveling in Costa Rica.

Finally, I want to thank my wife Jan for her support throughout my time in the program. My children, Kylie and Cameron also have been very supportive in this experience. My parents and other extended family members have also each played a part in this process, and I wish to thank them as well. I couldn’t have completed this dissertation without the support of my family.

DEDICATION

This dissertation is dedicated to my parents, Steve and Barbara Cohu who have supported and encouraged me in all my endeavors throughout my life.

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CHAPTER I - INTRODUCTION

This dissertation is focused on the relationship between foreign direct investment (FDI) inflows and entrepreneurship at the country-level and is comprised of three essays. The first essay explores the challenges of choosing a measure of country-level entrepreneurship for use in comparative research. Chapter 2 achieves this goal by producing and analyzing a time-series panel regression correlation matrix of the leading comparative entrepreneurship measures. Chapter 3 directly investigates the relationship between FDI inflows and entrepreneurial activity at the country-level through a times-series panel regression model of the relationship between the two variables. Finally, chapter 4 investigates potential specific moderators of the relationship between FDI inflows and country-level entrepreneurial activity by expanding the existing model through the introduction and testing of the influence of two potential interactive moderator variables on the regression equation. Chapter 5 concludes and summarizes the overlapping themes of the three individual studies, explaining the limitations of each study, and making recommendations for future research is also included in this dissertation.

FDI Inflows and Spillovers

Foreign direct investment (FDI) is defined as a substantial and lasting investment in a foreign enterprise, and the trend has grown rapidly in magnitude within the international economy since the end of World War II (Denisia 2010). Over the past 30 years FDI activity, including both flow and stock, has grown rapidly, outpacing the rate of world trade or output (UNTCAD 2020). The United States has been the largest recipient of, and source of, FDI capital, followed closely by China (UNTCAD 2020).

While Organization for Economic Cooperation and Development (OECD) countries account for most of the FDI activity, developing and transitional economies have dramatically increased their share of FDI inflows since 1995 (UNTCAD 2020). Although FDI dipped during the global pandemic, the long-term trend of increased FDI activity does not seem to be slowing.

Generally, FDI is believed to have a positive effect on a country's economic growth and development as generators of new employment, higher productivity, increased national competitiveness, and technology and process spillovers (Caves 1996; Borensztein, DeGregoria, and Lee 1998). Some of the positive FDI spillovers identified in literature include: increased exports, demonstration effect, increased human capital, increased competition, and the creation of backward and forward linkages (Crespo and Fontoura 2007).

Probably the most important FDI spillover is the demonstration effect where multinational enterprises bring new technology and best practices into a country leading to increases in human capital capacity through training and observation by domestic employees (Crespo and Fontoura 2007; Ahmed, 2012). The demonstration effect has been documented as significant to economic development particularly in selected industries such as manufacturing, information technology, energy, and biotech (Blomstrom and Kokko 1998; Ayyagari and Kosova 2010; Ali, Canter, and Roy 2016).

FDI spillovers can occur through increased competition within the domestic market. Crespo and Fontoura (2007) state that "competition in the domestic economy between MNEs and domestic firms is… an incentive for the latter to make more efficient use of resources" (412). Of course, there is also the possibility that domestic firms will

not survive this competition. Still, the need to increase productivity and achieve new competitive efficiencies has been empirically demonstrated by several researchers (Aitken and Harrison 1999; Havranek and Irsova 2011).

The creation of backward and forward linkages is also a channel of FDI spillovers. This phenomenon occurs when domestic firms become suppliers (backward linkage) to, or customers (forward linkages) of, the newly present MNEs (Crespo and Fontoura 2007; Gorodnichenko, Svejnar, and Terrell 2014). The backward linkages lead to increased economies of scale for domestic producers who now have increased demand due to the presence of the MNEs, and the forward linkages occur as domestic firms are able to acquire higher quality products at lower prices (Crespo and Fontoura 2007; Gorodnichenko, Svejnar, and Terrell 2014). Several researchers have found the presence of both forward and backward linkages as FDI spillovers (Fujimori and Sato 2015; Gorodnichenko, Svejnar, and Terrell 2014; Iwasaki et al 2012; Markusen and Venables 1999; Rodriguez-Claire 1996).

The existing FDI spillover literature has suggested that there are many moderating factors that influence the impact of these spillovers. Crespo and Fontoura (2007) state "that the existence, sign, and magnitude of FDI spillovers to domestic firms depend on a multiplicity of factors related to the characteristics of the MNEs and of foreign investment, as well as on the characteristics of host countries, sectors, and firms" (412). They also identify five categories of determinant factors of FDI spillovers including, "absorptive capacity and technological gap, regional effect, domestic firm characteristics, and other factors" (Crespo and Fontoura 2007, 412). Many of these variables help to explain the mixed results of FDI spillover impact in the existing research literature.

Narula and Marin (2003) define absorptive capacity as "the ability to internalize knowledge created by others and modifying it to fit their own specific applications, processes, and routines" (23). Crespo and Fontoura (2007) state that "the determinate of FDI spillovers that have been most widely investigated are the absorptive capacity (both at the firm and country level) and the influence of the technology gap" and suggest that a "technology catch-up hypothesis" has produced mixed results due to the moderating influence of both national and firm readiness (416). Scholars have argued that a moderate technology gap is most conducive to achieving major spillover effects as too small a gap will be negligible, and too wide a gap will be limited in absorptive capacity (Kinoshita 2001; Kokko Zejan, and Tansini 2001; Narula and Martin 2003; Hamida and Gugler 2009; Crespo and Fontorua 2007; Fujimori and Sato 2015).

Another moderating variable is the impact of a "regional effect" which suggests that gains from technical diffusion are reinforced at the regional level (Crespo and Fontoura 2007). Several scholars have identified a moderating regional effect in FDI spillover studies (Audretsch and Feldman 1996; Lychagin et al 2016; Ubeda and Perez-Hernandez 2017). Crespo and Fontoura (2007) state that "labor turnover and demonstration effect are limited in space; vertical linkages are mainly regionally confined, due to transport costs; finally, the competition effect is stimulated at a more circumscribed scale, both in its positive and negative dimensions" (413).

There are many other potential moderating factors to FDI spillover presented in the literature. For instance, several researchers have identified domestic firm characteristics, such as export capacity, firm size, tax policy, and private versus state ownership, as moderating variables impacting the magnitude of FDI spillover effects

(Gentry and Hubbard 2000; Hajkova et al 2006; Crespo and Fontoura 2007). Firm characteristics require using firm level data to analyze the spillover effects, which has often limited the scope of a study to a single country or industry sector (Iwasaki et al 2012). In addition, the characteristics of the type of FDI have also been found to be moderating factors in FDI spillovers including national origin of MNEs, transportation costs, entry mode, mergers and acquisition, and degree of foreign ownership (Blomstrom and Kokko 1998; Takii 2011; Zhang, Guo, and Wang 2014; Liu et al 2016). Finally, other factors seem to influence the magnitude of FDI spillovers, including trade policy of the host country, intellectual property right protection, labor mobility, inter-sectoral spillovers, and length of time of FDI investment (Crespo and Fontoura 2007; Kokko, Zejan, and Tansini 2001; Saggi 2002; Havranek and Isrova 2011; Isrova and Havranek 2013; Ha and Giroud 2015; Yunus, Said, and Azman-Saini 2015; Baudino 2016; Zhang 2016; Contractor et al 2020).

Overall, FDI spillovers are generally presumed to be positive to economic development, with a few exceptions, and with many moderating variables that influence the magnitude of the spillover impact. There are numerous measurement challenges which make studying FDI spillovers difficult due to the interconnected and interactive nature of the variables and the choice of research design matters a lot in the results in this field (Irsova and Havranek 2013; Hanousek, Kocenda, and Maurel 2011; Iwasaki et al 2012). Crespo and Fontoura (2007) have suggested that to effectively study this topic more robust models should be utilized and that the careful consideration of the appropriate units of analysis should be evaluated. Both essays two and three in this dissertation should add to the body of FDI spillover literature.

Entrepreneurship

Encouraging entrepreneurship has become a major focus for economic development among policy makers in both developed and emerging economies, which has subsequently led to increased research activity into this topic (Lanstrom, Harirchi, and Astrom 2012). However, the field of entrepreneurship is still considered to be an emergent research discipline characterized by limited theoretical frameworks, mostly imported from mainstream disciplines such as management and economics, and several definitional deficiencies (Shane and Venkataman 2000; Lanstrom Harirchi, and Astrom 2012; Lanstrom, Astrom, and Harirchi 2015;). In an effort to address these problems, Shane and Venkataraman (2000) have defined "the field of entrepreneurship as the scholarly examination of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated and exploited" (218). They add, "Consequently, the field involves the study of sources of opportunities; the process of discovery, evaluation, and exploitation of opportunities, and the set of individuals who discover, evaluate and exploit them" (218). The individuals who initiate this process of opportunity exploitation are called entrepreneurs. Bollingtoft and Ulhoi (2005) have defined entrepreneurs as "individuals who recognize and exploit opportunities made possible by recombinations of existing production factors and/or recognized needs in the market and/or new technology" (266). These definitions help to legitimize the domain of entrepreneurship research. The following section will discuss the evolution of the entrepreneurship research field, including the concept of entrepreneurial ecosystems.

While the academic field of entrepreneurship is considered to be 30-40 years old, some of the basic foundations are rooted in older economic and psychology disciplines

(Landstrom, Harirchi, and Astrom 2012). The early psychology research was focused on the characteristics of entrepreneurs and was a major focus of large-scale behavioral studies which dominated the field of entrepreneurship studies for many years (Lanstrom, Harirchi, and Astrom 2012). Much of the research on entrepreneurs has historically focused on personality traits, motivations, and leadership styles (Lounsbury and Glynn 2001). These early entrepreneurship models are based on an equilibrium concept that assumes "entrepreneurial opportunities either do not exist or are randomly distributed across the population" and that it is individual attributes such as risk-taking that lead to successful entrepreneurial activity (218, Shane and Venkataraman 2000). Over time, entrepreneurship studies expanded to view entrepreneurship as a situational process, often rooted in disequilibrium, which involves the need for economic and evolutionary models to fully explain the phenomenon (Baumol 1993; Shane and Venkataraman 2000; Lanstrom, Harirchi, and Astrom 2012; Simon-Moya, Revuelto-Taboada, and Guerrero 2014). This need has led to a reconsideration of economic theories as foundations of entrepreneurship.

Joseph Schumpeter (1934) is considered a key economist to explore the foundations of entrepreneurship, and his seminal works create a foundational school of thought regarding the field (Avendalen and Boschma 2017; Baumol 1993: Lanstrom, Harirchi, and Astrom 2012). Schumpter's (1934) early work identified innovation as an endogenous process and the entrepreneur as the catalyst for innovation who moves the market to a higher equilibrium point. Schumpeter's (1942) later work argued that increased rationality within the institutional structure of a society stagnates a capitalist economy and serves as barrier to entrepreneurship. Landstrom, Harirchi, and Astrom

(2012) performed bibliographic analysis of the field of entrepreneurship and found Schumpeter's (1934; 1942) classic works among the most influential theories in the field of entrepreneurship.

There are several other economic schools of thought which serve as foundational theory for entrepreneurship studies. Kirzner (1973) argued that entrepreneurs serve a valuable market function by remaining alert to profit-making opportunities which exist due to imbalances and asymmetric information within the marketplace. His work is critical to defining the entrepreneurial function in the Austrian economic tradition (Douhan, Eliasson, and Henrekson 2007). Another economic foundation is found in the work of Knight (1921) who differentiated between insurable risk and non-insurable uncertainty, arguing that entrepreneurs only find opportunities in the unpredictable uncertainty category. Knight's (1921) work serves as a basis for many entrepreneurial decision-making models (Amit, Muller, and Cockburn 1995). Finally, Casson (1982) has contributed to the economic theory foundation of entrepreneurship by emphasizing the role of entrepreneurs as "market-makers" who rely on individual differences in tastes and access to information to pursue new ventures. All of these economic theories have provided a theoretical foundation for the emergent field of entrepreneurship.

In recent years several empirical categories of inquiry have emerged in the field of entrepreneurship including: startup rates, survival rates, stages of growth, networks, social capital, funding opportunities, institutional support, and many other entrepreneurial process and context subfields (Amit, Muller, and Cockburn 1995; Shane and Venkataraman 2000; Battilana, Leca, and Boxenbaum 2009; Tanas and Audretsch 2011; Landstrom, Harirchi, and Astrom 2012; Acs, Autio, and Szerb 2014; Landstrom, Astrom,

and Hirirchi 2015; Tian, Lo and Song 2016). However, Shane and Venkataraman (2000) assert that all research questions regarding entrepreneurship fall into one of three categories. The first category is "why, when, and how opportunities for the creation of goods and services come into existence," which really is a focus on market opportunities which exist due to disequilibrium conditions. The second research question category is how these market opportunities are discovered, and the third question is how they are exploited. While this three-category model catches most of the domain of literature considered to be in the entrepreneurial space, it does not address the creation of new firms which Shane and Venkataraman (2000) consider to be a related, but not necessarily essential, category of entrepreneurship. However, there are substantial amounts of literature on new firm creation including creation rates, survival rates, and exit strategies (Casson 1982; Aldrich and Wiedenmeyer 1993; Aldrich 1990).

There is also some debate as to whether entrepreneurship and innovation are one or two separate fields of research (Landrstom, Astrom, Harirchi 2015). Finally, Alvedalen and Boschma (2017) state that "some entrepreneurship research has treated entrepreneurial opportunities as exogenous, not considering the creation of opportunities as part of the entrepreneurial process" but rather a systemic view where "agents act upon new opportunities they perceive and mobilize resources from their environment to exploit" (891). Overall, the field of entrepreneurship is evolving quickly but still has some legitimizing to complete (Acz, Autio, and Szerb 2014; Lanstrom, Harirchi, and Astrom 2012; Frank and Landstrom 2016; Shane and Venkataman 2000).

One rapidly developing subfield within domain of entrepreneurship is the concept of entrepreneurial ecosystems (EE) which has grown in popularity and is rooted in the

shift in focus from entrepreneurial traits to entrepreneurial process and context (Aldrich 1990; Aldrich and Wiedenmayer 1993; Isenberg 2010; 2011). Cohen (2006) defined EE as "an interconnected group of actors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures" (3). Alvedalen and Boschma (2017) state that "many EE scholars criticize the lack of a holistic approach to entrepreneurship that focuses on interrelated aspects of entrepreneurship" and that there is a "need to understand entrepreneurship in broader contexts" (890). However, many scholars suggest the EE literature is suffering from the same deficiencies as the larger domain of entrepreneurship, including the lack of clear analytical framework, definitional weaknesses, and minimal empirical evidence to support causal relationships (Alvedalen and Boschma 2017). Despite these weaknesses, there has been some literature exploring the role of networks in facilitating entrepreneurial activity which could be used to begin the process of defining the EE domain (Afandi, Kermani, and Mammadov 2017; Birley 1986; Dubini and Aldrich 1991; Li, Zebielqui, and O'Connor 2015; Owen-Smith and Powell 2004).

The popularity of the EE concept is undeniable in policy circles and in the volume of literature on the topic, although it is hard to distinguish EE literature from entrepreneurial systems (ES) literature, except that the former implies some ecological approach to the topic (Alvedalen and Boschma 2017). The ecological group of EE scholars have often used an 'economic gardening' approach to development and do often rely on ecological concepts of mutually dependent components, diversity, resilience, and adaptability (Davis 2012; Jenna, Rigby, and Allum 2016; Mack and Meyer 2016; Mason and Brown 2014; Neck et al 2004).

Although the literature stream in EE has many deficiencies, it has identified many potential variables believed to be important to entrepreneurial success (Davis 2012; Isenberg 2010; 2011; Malecki 2011). Isenberg (2010; 2011) has offered what he describes as an "entrepreneurship ecosystem strategy for economic development," which he states, "either replaces, or at least is a necessary complement, and possibly even a pre-condition to cluster strategies, innovation systems, knowledge-based economies, and national competitiveness policies" (1). His descriptive model of an entrepreneurial ecosystem is displayed in Appendix A, and also includes prescriptive policy advice for developing a strong local EE focused predominately on leadership priority and institutional support. Isenberg (2011) also concedes that this model lacks causal paths and warns that influences probably flow in multiple directions. Some scholars have used this EE model to survey the perceptions of EE stakeholders or to analyze a local EE (Jenna, Rigby, and Allum 2016).

As noted earlier, there are not enough empirical research studies on EE, and much of the existing EE literature relies on a descriptive analysis of local communities or regions as a case study for understanding the domain. For instance, Cohen (2006) uses network and culture literature to analyze the EE of Victoria, British Columbia. Motoyama and Knowlton (2016) use St. Louis, Missouri as a case study to explore key domains of EE through network analysis methodology. Ksherti (2014) uses a comparative case study of South Korea and Estonia to explore EE similarities and differences while concluding that multiple paths to entrepreneurship exist. Sheriff and Muffatto (2015) use a comparative case study method to analyze differences in EE among several African countries. They conclude that while entrepreneurs are omnipresent in all of the sample

countries, the difference in EE produces dramatically different levels of entrepreneurial activity and success (Sheriff and Muffatto 2015). Napier and Hansen (2011) performed a regional comparative study of entrepreneurial ecosystems and find that the quality of the ecosystem ultimately is contingent on the quality and commitment of key actors with the system. Mack and Meyer (2016) use Phoenix, Arizona as the contextual case study for their proposed evolutionary framework designed to demonstrate how history, culture, and institutions interact to create and sustain the local entrepreneurial ecosystem. Each of these studies adds to the body of EE theory-building literature but are also illustrative of the need for more empirical research on the topic.

The role of entrepreneurial ecosystems in accelerating entrepreneurial activity is a growing topic in theoretical literature on location specific entrepreneurial activity, including at the country level (Cohen 2006; Alvedalen and Boschma 2017). It is also argued that FDI spillovers might be an important facilitator in the process of building such an ecosystem, although at that moment there is little empirical evidence to support this theory (Gorg and Strobl 2002; Afandi, Kermani, and Mammadov 2017). FDI spillover theory contains much of the same language and framing as that of the emerging EE literature and may be a related phenomenon in the process of creating a country-level entrepreneurial ecosystem.

Overview of the Study and Findings

This dissertation is composed of three related studies addressing the topic of the relationship between FDI inflows and entrepreneurship at the country level. Each of the three studies build sequentially on the previous work. The following is a summary of each of the three studies and the related findings.

Chapter 2 Overview and Findings

To explore the relationship between FDI inflows and country-level entrepreneurship it is necessary to have a proxy measure of entrepreneurial activity which can serve as the dependent variable in a regression analysis. Chapter 2 begins with a study focused on exploring the available options for measuring entrepreneurship at the country level. Measuring country-level entrepreneurship is a serious challenge within the field of comparative entrepreneurship. Several groups have developed sets of measures that serve as proxies for different types of entrepreneurial activity, including the World Bank Group data set, Global Entrepreneurship Monitor Consortium, Global Entrepreneurship Index, and others (Marcotte 2013). Some of the measures developed focus on entrepreneurship in new firms, while others focus on business ownership, growth, and innovation within incumbent firms (Marcotte 2013).

Chapter 2 reviewed the available sources of comparative entrepreneurship measures, including the entrepreneurial focus of each option, and then tested to see if similarly defined measures are comparable through the application of correlation matrix. Specifically, this study compared six existing measures frequently used in comparative entrepreneurship studies and proposed 5 hypotheses predicting either a high ($r > .6$) or moderate level ($r > .3$) of correlation would exist between key pairs of variables.

The study used times series, panel data from the date range of 2006 to 2019 collected from 172 countries or territories. One of the major challenges of the study was the amount of missing data within the dataset, as not all countries had measures for each of the years in the study sample. The six measures used in this study had missing data of 9.4%, 68.3%, 51.3%, 13.7%, 73.3% and 68.8% respectively, resulting in a heavily

unbalanced panel dataset. As a result of the high levels of missing data, some countries had to be excluded from the analysis and full information maximum likelihood estimation was utilized to produce the estimate in the correlation matrix. Overall, the amount of missing data was a key observational discovery of this study as it demonstrated how difficult it is to find proxy measures for comparative entrepreneurship analysis.

Unfortunately, the findings of this study did not yield the anticipated results as none of the five hypothesized relationships were significant at a level predicted. The results of this study illustrate the challenges of conducting comparative entrepreneurship research on two fronts. First, the availability of data is a major challenge for empirical research using statistical analysis. Researchers may have to choose the most available measure over the best theoretically aligned option for a dependent variable in comparative entrepreneurship research. More importantly, this study finds that similarly defined measures are not that similar statistically. Both outcomes provide insights for future research and likely explain the existence of mixed results in many studies in this field.

Chapter 3 Overview and Findings

Chapter 3 is designed to study the direct effect of FDI in flows on entrepreneurial activity at the country level. There are two competing theories concerning how inward FDI affects domestic entrepreneurship. The first theory is the knowledge spillover theory of entrepreneurship (KSTE) which holds that FDI inflows increase entrepreneurial activity through positive spillovers from the foreign multinational corporation's entrance into the local economy (Acs, Audretsch, and Lehman 2013). The second theory concerning the impact of FDI inflows on entrepreneurial activity is the occupational

choice model (OCM) which predicts that inward FDI will produce a "crowding out" effect on domestic entrepreneurship as potential entrepreneurs choose wage employment over entrepreneurship (De Backer and Sluewaegen 2003). The existing research on this topic has produced mixed results and has mostly featured single-country studies with small sample sizes (Kim and Li 2014). This study is designed to be a large-scale, time-series, panel data study to test this relationship more comprehensively with a large diverse sample size of countries.

This study utilized the World Bank Group's (2021b) measure of the number of new businesses created as the dependent proxy variable for country-level entrepreneurial activity and FDI inflows (net) as reported by United Nations Conference on Trade and Development (UNCTAD) as the independent variable. The study also included several control variables including GDP level, population, control of corruption, trade openness, education level, and government effectiveness. Control of corruption, trade openness, education level, and government effectiveness were also tested as predictor variables for entrepreneurial activity. The sample date range was from 2006 to 2019 and included 154 countries in the dataset. Five hypotheses were produced predicting a direct significant linear relationship between inward FDI and country-level entrepreneurship and predicting a direct linear relationship between four of the control variables previously mentioned. A linear regression model was run using listwise exclusion to account for missing data.

The results of this study did not find a direct significant linear relationship between FDI inflows and country-level entrepreneurial activity. Nor did the study find a direct significant linear relationship between corruption level, trade openness, and government effectiveness despite each of these variables being discussed in literature as

important for supporting entrepreneurial behavior (Freytag and Thurick 2007). The study did find a significant direct linear relationship between education level and new venture creation.

The results of the study should be considered as inconclusive regarding the debate between KSTE and the OCM theory. As previous smaller studies have demonstrated, there is evidence of both phenomena occurring at the individual level (Avci and Akin 2020). The study does confirm the importance of education in the entrepreneurial development sphere. The failure to find a significant direct influence between the two variables of interest is better explained by the results found in the expanded regression model in chapter 4.

Chapter 4 Overview and Findings

The final study found in chapter 4 expands upon the previous research model to examine potential moderating and interaction variables upon the relationship between FDI inflows and country-level entrepreneurial activity. Building on existing literature that suggests that the relationship between inward FDI and country-level entrepreneurship varies depending on the economic development level of the country, this study adds the World Bank (2021e) four economic development levels (low income, low middle income, upper middle income, and high income) as categorical "dummy" variables to examine if the predicted differences exist across these categories (Sun, Lee, and Hong 2017). Four hypotheses were developed to test the relationship between inward FDI and entrepreneurial activity at the country level. It was anticipated that a direct linear relationship would be found in the lower middle and upper middle, but the opposite to be true in the low income and high-income categories. The logic in these predictions is

based on the idea that the lower and higher levels of economic development are more likely to experience the crowding out effect, while the countries in the middle were more likely to experience the KSTE effect and produce more entrepreneurship (Meyer and Sinani 2009). However, these significant direct linear relationships were not found in this study. Therefore, the first four hypotheses were rejected.

Closely related to the theory that economic development level would produce variation in the impact of FDI inflows on entrepreneurial activity is the idea discussed in literature that this relationship is curvilinear with entrepreneurial activity rising faster in the middle levels of the curve and declining on each end of the curve to produce an inverted U-shape relationship (Meyer and Sinani 2009). In other words, the relationship between FDI inflows and country-level entrepreneurship is not linear at all. Two potential interactions discussed in the literature believed to influence this curvilinear relationship are the interaction between FDI inflows and education level, and FDI inflows and government effectiveness (Stenholm, Acs, and Wuebker 2013; Berrill, O'Hagan-Luff, and van Stel 2018). As a result, both interaction variables were added to the regression model and tested for both a direct linear influence and to test for a direct significant curvilinear relationship. Two hypotheses predicting a significant direct influence producing a curvilinear effect were developed based on existing literature.

The testing for a curvilinear relationship did not produce the expected result. A significant direct cube root S-shaped curvilinear relationship was found as opposed to the anticipated quadratic inverted U-shaped curve. In addition, neither of the two interaction variables were found to have a significant direct linear influence or curvilinear influence

on the relationship of FDI inflows and country-level entrepreneurial activity. Therefore, hypotheses 5 and 6 were rejected.

The major finding in this study is that a significant direct cube root curvilinear relationship was found to exist between FDI inflows and country-level entrepreneurial activity. This finding is not totally inconsistent with previous literature which predicted a curvilinear relationship with moderate levels of FDI producing higher levels of entrepreneurial activity, although the shape of the curve does not support declining levels of entrepreneurial activity at the lower and higher levels of inward FDI, only diminishing returns. Therefore, the unanticipated cube root curvilinear relationship is a major finding in the study and should serve as a catalyst for further research on the relationship between FDI inflows and country-level entrepreneurial activity.

Conclusions

In conclusion, this 3-essay dissertation analyzed the relationship between FDI inflows and entrepreneurial activity at the country level. While both FDI inflows and entrepreneurship are considered to be important to the economic growth and development of a country, there is very little research investigating the relationship between the two phenomena, and both fields of study are still considered to be emerging (Jones, Coviello, and Tang 2011; Herrera-Echeverri, Haar, and Estevez-Breton 2014). Despite the unanticipated results, this study adds to the early body of knowledge examining that potential relationship and contributes to both the FDI spillover and comparative entrepreneurship streams of literature.

CHAPTER II - MEASURES OF ENTREPRENEURSHIP IN COMPARATIVE STUDIES

Introduction and Purpose

The field of comparative entrepreneurship has grown substantially over the past few years and has become one of three research domains within the field of international entrepreneurship (Coviello, McDougall, and Oviatt 2011; Glodowska, 2019). However, the comparative entrepreneurship stream is the smallest and least developed domain within the field of international entrepreneurship and remains in an "infancy" stage of development (Terjesen et al 2013). Comparative entrepreneurship is focused on addressing research problems related to cross-country differences in entrepreneurial activity based on institutional and cultural conditionings (Jones, Coviello, and Tang 2011; Glodowska 2019). While the need for new research and the importance of the field of comparative entrepreneurship is widely recognized, it is also understood that a major challenge within this research domain is domestic entrepreneurship measurement (Glodowska 2019). Early attempts to study comparative entrepreneurship relied exclusively on measures that were mere aggregates of individual entrepreneurship data. For example, some researchers compiled results of individual survey research within a country and compared those results with a similar survey from a different country (Baker, Gedajlovic, and Lubatkin 2005).While these early efforts provided theoretical insights that lacked a comprehensive framework for country-level measurement needs (Acs, Autio, and Szerb 2014) Marcotte (2013) claims that the multifaceted nature of entrepreneurship called for integrated approaches and common definitions of measurement at the country-level. To address this challenge several new conceptually

grounded measures of national entrepreneurship have been developed over the past 25 years.

The emergence of comparative entrepreneurship measures is still a relatively new phenomenon with several measures developed in parallel by different researchers and institutions over the past several years (Marcoutte 2013). The measurement and definition of entrepreneurial activity within the field of comparative entrepreneurship has always been a considerable challenge, including determining the appropriate unit of measure, which has been studied at the individual, firm, regional, and national level (Reynolds, et al. 2005; Van Stel, Carree, and Thurik, 2005; Freytag and Thurik, 2007; Marcoutte, 2013; Acs, Autio, and Szerb 2014; Fayolle et al. 2016; Frank and Landstrom, 2016). Mattingly (2015) states that the difficulty in defining dependent variables in entrepreneurship studies is a result of the newness of the topic, the phenomenon-driven nature of the topic, and the assumption of homogeneity within the field. This difficulty in selecting the appropriate dependent variable has been specifically challenging regarding national measures of entrepreneurship.

Finally, a key challenge in conceptualizing and measuring national entrepreneurial activity is the overlap between entrepreneurship and innovation. While scholars and policymakers agree that both entrepreneurship and innovation are intertwined and important ingredients in creating economic growth, there is considerable disagreement regarding whether the two constructs are essentially synonymous or two distinct fields (Romer 1986; Romer 1990; Landstrom, Astrom, and Harirchi 2015). Those who believe that the two constructs are distinct fields point to different theoretical roots and different units of measure (Landstrom, Astrom, and Harirchi 2015). However, at the

national level many of the existing measures of entrepreneurial activity include data capturing innovation created within existing firms as opposed to new market entrants (Marcoutte 2013).

The purpose of this study is to provide empirical analysis regarding the degree of similarity or variation among the existing comparative entrepreneurship measures. This study is designed to aid comparative entrepreneurship researchers in understanding the differences and commonalities between the available options of country level measures for entrepreneurship to assist in choosing the appropriate dependent variable. Specifically, this study is designed to address the following research question:

R1: How well do the existing comparative entrepreneurship measures correlate to each other?

Researchers attempting comparative entrepreneurship studies need to know how similar the existing measures of national level entrepreneurship are when choosing a dependent variable for use in new studies. This study provides empirical evidence of the similarities and differences between the existing comparative entrepreneurship measures.

Summary of Comparative Entrepreneurship Measures

Numerous sources for comparative entrepreneurship measures have been created in recent years by several different research groups. The following literature review outlines the major sources and measurements available to comparative entrepreneurship researchers.

The Global Entrepreneurship Monitor (GEM) was initiated in 1998 and is one of the major sources of country-level entrepreneurship data (Reynolds et al. 2005). The GEM data set was built to consider the conceptual variations in entrepreneurial activity

between countries. The major data collection activities utilized with the GEM model include adult population surveys, unstructured interviews and self-administered questionnaires with national experts, and relevant standardized measures from existing-cross national datasets (Reynolds et al. 2005). The GEM data set includes several measures of entrepreneurial activity including total early-stage entrepreneurship (TEA) index and related subsets such as necessity or innovation-based TEA. The TEA index measures the percentage of adults involved in starting a nascent business. The necessity-based entrepreneurship measure (TEA-necessity) reports those involved in entrepreneurial activity due to a lack of other alternatives, while the innovation-based TEA is focused on entrepreneurs engaged in start-up activities that exhibit market innovation potential (Reynolds et al. 2005). The GEM data set also reports measures related to the start-up process, market expansion, investment activities, and entrepreneurial perceptions. Overall, the TEA index is the most widely used measure of the GEM data set (Reynolds et al. 2005).

Since 2000, the World Bank Group Entrepreneurship Survey (WBGES) has collected data from over 170 countries on entrepreneurial activity. The primary measures reported by the WBGES include total number of new firms, business density rate, and firms closed. The data collected by the WBGES comes predominantly from government sources and likely understates entrepreneurial activity within informal economy of some developing countries (World Bank. 2021b). However, both new firm creation and business density are frequently used as dependent variables in comparative entrepreneurship studies (Marcotte 2013). The major advantage of the WGGES data set

is the abundance of data relative to the other potential sources of comparative entrepreneurship measures.

The Global Entrepreneurship and Development Index (GEDI) was developed to provide a more dynamic and qualitative measure of national entrepreneurial activity (Acs, Autio, and Szerb 2014). Specifically, the GEDI was designed based on the theoretical supposition that national systems of entrepreneurship are driven by individual entrepreneurial activity through creating new enterprises which are moderated by country specific institutional characteristics (Acs, Autio, and Szerb 2014). Under the GEDI framework comparative entrepreneurship is a phenomenon led by individual actions and contextualized by country-level institutional frameworks.

The GEDI framework produces 3 unique sub-indices consisting of attitudes, ability, and aspirations based on 15 individual pillars of interactions which drive entrepreneurial activity within a given country (Acs and Szerb 2009). The developers of the GEDI framework contend that the sequence of the 3 sub-indexes each are significant to different stages of the entrepreneurial process (Marcotte 2013). For example, the attitudes sub-index is an essential prerequisite for both activity and aspirations and is most critical in factor-driven economies. The activity sub-index would be the most important focus with efficiency-driven economies, and the aspiration sub-index would be a critical focus for innovation-driven economies (Acs et al. 2010). Table 1 displays the 15 pillars of the GEDI framework. The GEDI measures utilized within the existing literature include the aggregate score and each of the 3 sub-indices.

Table 2.1. 15 Pillars of GEDI Framework

Pillar 1: Opportunity Perception
Pillar 2: Startup Skills
Pillar 3: Risk Acceptance
Pillar 4: Networking
Pillar 5: Cultural Support
Pillar 6: Opportunity Startup
Pillar 7: Technology Sector
Pillar 8: Gender
Pillar 9: Quality of Human Resources
Pillar 10: Competition
Pillar 11: Product Innovation
Pillar 12: Process Innovation
Pillar 13: High Growth
Pillar 14: Internationalization
Pillar 15: Risk Capital

Finally, the OECD-Eurostat Entrepreneurship Indicators program and the EIM COMPENDIA data set is another source of comparative entrepreneurship data used in many studies. The OECD-Eurostat Entrepreneurship Indicator program was developed in the mid-2000s to produce a set of internationally comparative entrepreneurship indicators. Some of the key indicators in this data set include both new market entrants and innovation by existing firms (Davis 2008). The EIM COMPENDIA data set harmonizes business ownership data across 23 OECD countries to be used in comparative entrepreneurship research. This data set is considered very robust, but it is also limited in sample size to the 23 OECD countries and the comparative entrepreneurship estimates were only produced from the date range of 1972 to 2004 (Van Stel, Carree, and Thurik 2005). Unfortunately, the data set was discontinued in 2005, and it is not clear if any future researchers will produce new estimates for the dates following the original data set.

Based on the preceding narrative the available options for dependent variables in a comparative entrepreneurship study are numerous and each have advantages and disadvantages depending on the focus of the study (Baker, Gedajlovic, and Lubatkin 2005; Acs and Szerb 2009; Marcoutte 2013). The available sources of comparative entrepreneurship data include: Global Entrepreneurship Monitor, EIM COMPENDIA, World Bank Group Entrepreneurship Survey, Global Entrepreneurship and Development Index, and the OECD-Eurostat Entrepreneurship Indicators Program (Marcoutte 2013). Most of these data sources have multiple measures for entrepreneurship at the country level with fundamentally different definitions including new firm creation, entrepreneurship in existing firms, innovation, growth in entrepreneurial activity, and a comprehensive, multidimensional model designed to measure the entrepreneurial climate known as the GEINDEX (Acs and Szerb 2009). In Table 2, Marcoutte (2013) categorizes the most utilized existing measures of entrepreneurship at the country level.

Table 2.2. Classification of Country-Level Entrepreneurship Measures

Entrepreneurship in New Firms (New Venture Creation)
GEM—TEA (Total Early-Stage Entrepreneurship)
World Bank—New Business Density
World Bank—New Business Starts
Entrepreneurship in Incumbent Firms
EIM COMPENDIA—Business Ownership Rate
GEM—Established Business Ownership Rate
World Bank—Business Density
Innovation
GEM—TEA Opportunity (Small Firm Innovation)
OECD—BERD/GDP (Large Firm Innovation)
Growth:
GEM—TEA High Growth
GEM—Established Business High Growth
GEINDEX-Attitudes, Activity, and Aspiration

The greatest challenge facing a researcher attempting to perform comparative entrepreneurship research is the lack of available data from many of the previously discussed measures. Each of the data sets has a large amount of missing data within any country and date range. For this reason, the choice of a dependent variable in many comparative entrepreneurship studies will likely come down to a choice between a preferred measure with less data, and subsequently smaller sample sizes, or a less desirable measure with more observations. This study will illustrate that trade-off very specifically.

Methodology

This study utilizes correlation coefficient regressions matching six selected existing measures of entrepreneurial activity at the country level from a time-series, panel data sets collected from the years 2006 to 2019. The resulting correlation matrix is presented and analyzed in the following section to explain the differences in the measures and the appropriateness of usage in future studies. Each of the existing measures were correlated against the other measures in the date set to analyze the strength of the relationships, and the results are analyzed using the existing literature concerning the composition of these measures. Conclusions, recommendations, and implications for use in future studies are also discussed. The sample size of the countries and territories present in the time series panel regression is 172. The countries and territories in this study are displayed in Appendix B.

The variables used in this study differ dramatically in availability of observations resulting in a heavily imbalanced panel data set. EIM COMPENDIA was not used as the

data was not available for the date range of the study. The six variables used in the correlation matrix are described in Table 2.3 below.

Table 2.3. Measures of Country-Level Entrepreneurship Used in this Study.

Variables	Variable Tag	Source
# Of New Business Starts	*#NB*	World Bank Group Entrepreneurship Survey
Total Early-Stage Entrepreneurship	*TEA*	Global Entrepreneurship Monitor Report
Global Entrepreneurship Index	*GEI*	Global Entrepreneurship Index Report
GEM Business Ownership Rate	*GEMOwn*	Global Entrepreneurship Monitor Report
World Bank Business Density Rate	*WBDen*	World Bank Group Entrepreneurship Survey
Total Early-Stage Entrepreneurship-Opportunity	*TEAOpp*	Global Entrepreneurship Monitor Report

The study utilized the following hypotheses to test the level of correlation between key measures within this study:

$H_{0:}$ (*#NB*) The # of new business starts will not correlate at >.6 with (*TEA*) Total Early-stage Entrepreneurship.
$H_{1:}$ (*#NB*) The # of new business starts will correlate at >.6 with (*TEA*) Total Early-stage Entrepreneurship.

H_0: (*#NB*) The # of new business starts will not correlate at >.6 with the (GEI) Global Entrepreneurship Index.
$H_{2:}$ (*#NB*) The # of new business starts will correlate at >.6 with the (GEI) Global Entrepreneurship Index.
H_0: (*TEA*) Total Early-stage Entrepreneurship will not correlate at >.6 with the (GEI) Global Entrepreneurship Index.
$H_{3:}$ (*TEA*) Total Early-stage Entrepreneurship will correlate at >.6 with the (GEI) Global Entrepreneurship Index.
H_0: (*GEMOwn)* Business ownership rate will not correlate at >.6 with the (*WBDen*) World Bank Business Density Rate.
$H_{4:}$ (*GEMOwn*) of new businesses will correlate at >.6 with the (*WBDen*) World Bank Business Density Rate.

H_0: (*GEI*) The Global Entrepreneurship Index will not correlate at >.3 with TEA-Opportunity (*TEAOpp*).
H_5: (GEI) The Global Entrepreneurship Index will correlate at >.3 with TEA Innovation (*TEAOpp*).

It was expected that the # of new business starts (*#NB*), total early-stage entrepreneurship (*TEA*), and the global entrepreneurship index (*GEI*) would all have a high positive correlation as these measures are each focused on new venture creation. For this reason, H_1-H_3 predicted an r score above >.6 between the 3 variables respectively. In the same manner, H_4 predicted an r score above >.6 between the two measures of entrepreneurship in incumbent firms. Finally, when comparing the Global Entrepreneurship Index (*GEI*) to the GEM new firm opportunity rate (*TEAOpp*) it was expected that the correlation would be moderate with an r score above .3 which is reflected in H_5. The use of .6 to designate two variables as highly correlated and .3 to designate a relationship as moderately correlated is based on literature in other studies which use a similar threshold (Sawilosky 2009). In these prior studies researchers compared scores from different instruments purporting to measure similar domains which were compared to threshold levels set using "rule of thumb" guidelines from statistical literature discussing correlation effect thresholds (Cohen 1988; Sawilosky 2009).

Results of the Study

This essay examined the relationship of some of the available measures of comparative entrepreneurship to determine how correlated these measures are. Data was obtained and analyzed to answer the research question.

Data

The data consisted of the six variables (#NB, TEA, GEI, WBDen, TEAOpp, and GEMOwn) measured for each country at multiple time points. The time points consisted of years spanning 2006 to 2019, meaning that each country could have as many as 14 measurements for each variable. In order to perform the data analysis, the data were compiled in long format, meaning that each observation (row) in the dataset contained the measurements for one country for one year. Rows that did not contain any data for the six variables of interest were removed from the dataset. The final dataset contained 2056 observations.

Table 2.4 displays descriptive statistics for each of the variables. The average value of #NB was 30131.75 (*SD* = 69990.07), and the percentage of observations missing data for this variable was 9.4%. The average value of TEA was 11.94 (*SD* = 7.87), and the percentage of observations missing data for this variable was 68.3%. The average value of GEI was 39.06 (*SD* = 19.67), and the percentage of observations missing data for this variable was 51.3%. The average value of WBDen was 3.37 (*SD* = 4.61), and the percentage of observations missing data for this variable was 13.7%. The average value of TEAOpp was 48.31 (*SD* = 13.26), and the percentage of observations missing data for this variable was 73.3%. Finally, the average value of GEMOwn was 8.40 (*SD* = 5.94), and the percentage of observations missing data for this variable was 68.8%.

Table 2.4. Descriptive Statistics for Study Variables.

Variable	*n*	Minimum	Maximum	Mean	Std. Deviation
#NB	1863	2.00	684874.00	30131.75	69990.07
TEA	651	2.10	52.11	11.94	7.87
GEI	1001	8.77	90.23	39.06	19.67
WBDen	1775	0.01	39.04	3.37	4.61
TEAOpp	549	9.82	81.50	48.31	13.26
GEMOwn	642	0.42	41.32	8.40	5.94

Source: Stata software output.

Correlation Matrix

To answer the research question, a correlation model including all six variables was computed using Stata software. To account for the non-independence in the data (i.e., the nesting of observations within countries), each variable was group mean-centered by country. Group mean-centering was conducted by first computing the mean value of each variable for each country, and then subtracting the corresponding country mean from each value in the dataset. A model was then computed with correlations between all pairs of group mean-centered variables as the parameters to be estimated. The model used full information maximum likelihood estimation to account for missing data.

The estimated correlation coefficients are presented in Table 2. #NB was significantly positively correlated with TEA ($r = .06$, $p = .029$), GEI ($r = .12$, $p < .001$), and WBDen ($r = .37$, $p < .001$). TEA was significantly positively correlated with GEI ($r = .09$, $p = .024$), WBDen ($r = .18$, $p = .006$), and GEMOwn ($r = .36$, $p < .001$). GEI was significantly positively correlated with TEAOpp ($r = .20$, $p < .001$). No other correlations were significant at an alpha level of .05.

Table 2.5. Correlation Matrix for Study.

Variable	#NB	TEA	GEI	WBDen	TEAOpp
#NB	-				
TEA	.064*	-			
GEI	.116**	.086*	-		
WBDen	.368**	.180**	.047	-	
TEAOpp	.027	-.005	.198**	-.022	-
GEMOwn	-.049	.364**	-.026	-.025	.080

Source: Stata software output.

Notes: *$p < .05$. **$p < .01$.

Analysis of Results

The results of the correlations matrix led to the rejection of all 5 hypotheses in this study. The unanticipated results require further analysis. To begin this analysis, it is important to consider the construct of each variable. The following section will analyze the outcomes of the study.

The number of new business starts (#NB) did not correlate as highly as expected with total early-stage entrepreneurial activity (TEA) or the Global Entrepreneurship Index (GEI). Although both were significantly positively correlated to #NB, the relationship was at the low levels of .06 and .12 respectively leading to the rejection of hypotheses 1 and 2. There are some likely reasons for this result.

First, it is possible that a difference in the World Bank new business starts from other measures of early-stage entrepreneurship starts is due to the lack of data on the informal economy, particularly in lower income countries. New business starts are collected by the World Bank from legally registered business data at the government level (Acs, Desai, and Klapper 2008; Marcotte 2013). The informal economy is a major part of most developing economies; therefore, it is likely that the WBGES data set understates entrepreneurship in those countries with higher levels of informal economy

(Baker, Gedajlovic, and Lubatkin 2005). The informal economy has been estimated to be approximately 15-20 percent in developed economies and 40-60 of developing economies (Schneider 2002; Webb et al 2009; Dell'Anno 2022). Both the GEM data set which produces the TEA measures, and the GEI dataset each use a multi-source data collection approach which is more robust and inclusive of the informal economy and focuses on capturing entrepreneurial intent (Baker, Gedajlovic, and Lubatkin 2005; Marcotte 2013). A previous study examining data from 2007 found that the WBGES data reported higher levels of early-stage entrepreneurship in developed countries and lower levels in developing countries than the GEM data from the same time period (Acs, Desai, and Klapper 2008). It is likely the same is true for the relationship between the WBGES data and the GEI data set.

It is also possible that the straightforward institutional approach of the World Bank to collecting data is creating different outcomes than the more robust approaches of both GEM and GEI. Ironically, the # of new businesses (#NB) correlated at the highest and most significant level with the World Bank density (WBDen) measure which is looking at entrepreneurship within existing businesses rather than new venture creation. Therefore, the highest correlation for #NB is with a different measure from the same research group. This result illustrates that the process by which the data is collected is likely very different between the various groups producing comparative entrepreneurship measures. While it is believed that each group is internally consistent in the operational definitions of what they are measuring, it seems that the differences in those methods are quite substantial.

For instance, the operational definition of the WBGES #NB measure is a newly registered legal business unit which is capable of incurring liabilities and engaging in in economic transactions with other parties (Acs, Desai, and Klapper 2008; Marcotte 2013). The operational definition of the TEA measure is the percentage of the population ages 18-64 who are currently engaged in creating or working in a nascent business or in the past 42 months (Levie and Autio 2008; Stenholm, Acs, Wuebker 2013). This means that the TEA number could potentially count the same individual 4-5 times (years) as being engaged in a startup enterprise, while the WBGES would only capture the legal formation of such a business once. The TEA measure is heavily reliant on both expert and survey data, while the WBGES data is totally reliant on government institutions for their data. When the GEI is thrown into the comparison, the operational focus becomes the weighted average of multiple sub-variables to capture a number that is mostly focused on entrepreneurial culture, intentions, and aspirations (Acs and Szerb 2009; Marcotte 2013; Acs, Autio, and Szerb 2014). The differences in the construction and collection of data for these comparative entrepreneurship measures are clearly substantial and could explain the reason there is so much variation in results among the existing research in this field.

TEA and GEI were significantly positively related but again not at the levels predicted by hypothesis 3. Again, despite claiming to measure the same phenomenon, the two measures have very different construct and operational definitions. It is likely that there is overlap in many country measures, but those countries with nuanced differences in entrepreneurial culture will score differently on these two measures.

GEM Ownership (GEMOwn) and the World Bank Density (WBDen) were negatively correlated, although not at a significant level. This finding suggests that these

two approaches to measuring existing business entrepreneurship are not at all similar. One possible explanation for this variation could be related to differences among countries in capturing business closure data (Acs, Desai, and Klapper 2008). Many countries do not have mechanisms to enforce businesses to report closures which would inflate the WBDen measure as it is reported by government registry versus the survey approach used to report the GEMOwn measure (Levie and Autio 2008; Marcotte 2013). Even with these possible differences between the two approaches to measurement, it is surprising that a negative correlation would be found.

Finally, the Global Entrepreneurship Index (GEI) and total early-stage opportunity (TEAOpp) measure were positively and significantly correlated but not at a high enough level to support hypothesis 5. The expectation was for a correlation at the .3 level and the results were at the .2 level. Therefore hypothesis 5 was also rejected. The TEAOpp measure is designed to distinguish between necessity-based entrepreneurship and entrepreneurial activity that is designed to exploit an opportunity in the marketplace. Necessity-based entrepreneurship is focused on entrepreneurial activity that is pursued to survive, while opportunity-based entrepreneurship focuses on a more proactive motivation (Levie and Autio, 2008; Marcotte 2013). While the GEI measure is broader in definition, it was believed that it would correlate moderately with the TEAOpp measurement as both contain a high emphasis on entrepreneurial intent and aspiration (Marcotte 2013). Unfortunately, the statistical results did not yield the expected outcome to support hypothesis 5. However, the underlying rational of a moderate correlation could still be theoretically sound.

Conclusions and Recommendations

Summary of Study Results

In conclusion, correlations were computed between the variables *#NB*, *TEA*, *GEI*, *WBDen*, *TEAOpp*, and *GEMOwn* measured across years spanning 2006 to 2019. The results showed that *#NB* was weakly but significantly correlated with *TEA* and *GEI*. *#NB* was moderately correlated with *WBDen*. *TEA* was weakly but significantly correlated with GEI and *WBDen*, and *TEA* was moderately correlated with *GEMOwn*. Finally, *GEI* was weakly but significantly correlated with *TEAOpp*.

The results of this essay lead to several conclusions regarding the challenges of conducting comparative entrepreneurship studies. First, the scant availability of data for many of these measures is a major challenge for researchers. With 172 countries and territories in the study database, there was a potential for 14,448 total observations in the data set if all six variables were present for each of the 14 years. However, due to the high level of missing data previously discussed, the usable observations for this correlation matrix were limited to only 2,056. This low number demonstrates the challenge of performing large sample time-series, comparative entrepreneurship studies due to the low availability of data. It is possible that smaller studies focused on specific regions or other criteria within shorter time ranges might find combinations of countries with more observations to improve the statistical comparisons, although it is unlikely that those studies would include countries from the emerging markets segment which is one of areas needing the most empirical research (Bruton, Ahlstrom, and Obloj, 2008). Most researchers will be forced to choose their dependent variable on the basis of availability over other theoretical preferences.

In addition, as the results clearly indicate, although these variables are each used as proxy measures of country-level entrepreneurship, they clearly do not measure the same phenomena and are not interchangeable. Depending on the independent variable being studied some of the dependent variable choices may be more appropriate measures than others in future research studies. While the variables are related, they are not interchangeable and will likely produce different statistical results in regression models. Some researchers may choose to run multiple regression models using multiple dependent variable options to evaluate the differences in results. However, these competing regression models will also be limited in comparison opportunities due to the missing data challenge previously discussed. For these reasons, it is recommended that future researchers carefully consider the choice of the dependent variable used in comparative entrepreneurship studies.

Recommendations for Future Research

Finally, further research is needed to determine if there are better methods to measure country-level entrepreneurial activity more thoroughly and consistently. Multiple research teams have worked to create comparative entrepreneurship measures, but these efforts have not produced a consistent and reliable method to capture country-level entrepreneurial activity. With the exception of the World Bank measures, it seems that the existing comparative entrepreneurship measures are all highly dependent on specific research teams and have proven to not be sustainable as evidenced by the EIM COMPENDIA discontinuance. It is highly recommended that some larger academic or quasi-governmental institutions with multiple research teams develop a new measure for country-level entrepreneurial activity. If possible, it would be good if the new measure

could be computed retroactively and more broadly to capture more countries. Then a commitment by these institutions to continue the data collection and production of an annual data set that is not contingent upon any specific individual's involvement would be beneficial. Without better measurement options for dependent variables, the field of comparative entrepreneurship will remain in the infancy stage lacking empirical research and applications.

It is possible that some previous studies would have found different results using a different proxy variable for country-level entrepreneurship. However, due to the scarcity of the data it would be very difficult to test for different outcomes with different measures. It is likely that many researchers used the most available dataset to accomplish their objectives rather than using a measure that might have been conceptually a better fit for the research model design. It is also likely that the difficulty in finding good comparative entrepreneurship measures is partially responsible for the mixed results in many topic areas. For instance, several researchers have found entrepreneurship to have a positive, negative, or insignificant impact on economic growth (Van Stel, Carree, and Thurick 2005; Wong, Ho, and Autio 2005; Naude 2009). Marcotte has suggested that some of the differences in empirical entrepreneurial research is likely due to differences in what the data is actually capturing. This study provides further evidence that standardization and greater accessibility of comparative entrepreneurship measures is needed to further advance this subfield.

Conclusion

In conclusion, this study examined six leading measures of comparative entrepreneurship in a large panel dataset over a 14-year period from 2005 to 2019

collected from 172 countries. The study ultimately found that found that a large percentage of the potential observations were not available dure to missing data. In addition, the correlation matrix indicated that several of these measures are not significantly correlated at a high level as was anticipated based on the stated definition of the measures. Overall, this study demonstrates the need for better and more data in the field of comparative entrepreneurship.

CHAPTER III - A STUDY OF THE IMPACT OF FDI INFLOWS ON COUNTRY-LEVEL ENTREPRENEURSHIP

Introduction and Purpose

FDI Inflows are considered by most policy makers to be a valuable tool for economic growth and development leading many countries to pursue economic policy strategies designed to increase incoming FDI (Crespo and Fontoura 2007; Doytch and Epperson 2007). Increased entrepreneurship is also considered an important tool for economic growth and development and is usually touted by economic policy makers as an important strategic goal within most countries (Isenberg 2010; Kshetri 2014). However, there are competing theories regarding the relationship between FDI inflows and entrepreneurship and the limited amount of existing research on the relationship between the two desired economic outcomes have produced mixed results. The purpose of this study is to explore the relationship between foreign direct investment (FDI) inflows and entrepreneurship at the country level. The results of this study will contribute to the literature on both FDI spillovers and comparative entrepreneurship.

FDI inflows produce positive spillover effects through the transfer of firm-specific advantages possessed by multinational enterprises to domestic producers (Crespo and Fontoura 2007; Daude and Stein 2007). FDI inflows improve a country's economic performance through spillover effects such as demonstration effect, improved human capital, increased exports, increased competition, and forward and backward integration (Rodriguez-Clare 1996; Markusen and Venables 1999; Crespo and Fontoura 2007; Duade and Stein 2007; Hanousek, Kocenda, and Maurel 2011; Havrenek and Isrova 2011; Irsova and Havranek 2013). Each of these spillover channels supports increased levels of

new venture creation. In some cases, FDI inflows can also "crowd-out" entrepreneurial activity as some individuals choose to work for foreign firms rather than pursue entrepreneurial opportunities (De Backer and Sleuwaegan 2003; Kher Streeter, and Just 2012).

Entrepreneurship is defined by two distinct types of activity. Many researchers claim entrepreneurs are catalysts for creative destruction needed for economic growth and development through increased innovation, evolution of industry, job creation, knowledge spillovers, productivity, and competition (Schumpeter, 1934, 1942; Van Stel, Carree, and Thurik, 2005; Landsrum, Harirchi, and Astrom, 2012; Acs, Erkko, and Szerb, 2014). This form of entrepreneurship is referred to as 'Schumpeterian' and is focused on new, disruptive innovation. A second form of entrepreneurship known as 'Kirznerian' is focused on opportunity exploitation and is predominately a function of entrepreneurs being alert to, and acting upon, new profit-taking opportunities in the market (Kirzner 1973). Both forms of entrepreneurship, innovation-based and opportunity exploiting, are considered important and can be directly impacted by FDI inflow investments through either knowledge spillovers acquired from new foreign entities, or from new opportunities arising to create backward and forward integration with these new companies. This implies that both Schumpeterian entrepreneurship and Kirznerian entrepreneurship would be directly influenced by FDI inflows.

Despite the importance of both FDI spillovers and entrepreneurship on economic policy, the literature fails to adequately address the relationship between the two topics. This failure is due to several factors, including the emerging nature of both fields of study and numerous measurement shortcomings. The scarcity of literature on the relationship

has produced differing views with some arguing FDI spillover effects have a direct impact on entrepreneurship based on the KSTE (Gorg and Strobl 2000; Acs et al. 2009; Kim and Li 2014), while others suggest that the effect is inverse based on the OCM theory (Caves, 1974; Lucas 1978; Jovanovic 1994; De Backer and Sleuwaegen 2003; Kher, Streeter, and Just 2012). Since both increased FDI inflows and increased entrepreneurship are considered positive economic goals among policy makers (Avci and Akin 2020); it would be useful to know if these are complementary or competing goals. The purpose of this study is to address that question and add to the empirical evidence concerning the relationship between FDI inflows and domestic entrepreneurship.

Literature Review

The existing literature examining the impact of FDI spillover effects on entrepreneurship has found both direct and inverse results consistent with two competing economic theories which predict different outcomes (Burk, Gorg, and Hanley 2008; Meyer and Sinani 2009; Berrill, O'Hagan-Luff, and Van Stel 2018). The knowledge spillover theory of entrepreneurship (KSTE) predicts that FDI spillovers are causally related to entrepreneurial activity and created by exploiting knowledge spillovers (Gorg and Strobl, 2002; Acs et al. 2009; Ghio et al. 2015). An alternative theory based on occupational choice models (OCM) suggests that FDI inflows crowd out domestic entrepreneurship by increasing the opportunity costs of leaving the established workforce to begin a new venture (Lucas 1978; Grossman 1984; Jovanovic 1994; De Backer and Sleuwaegen 2003; Kher, Streeter, and Just 2012). The following sections will discuss both theories and summarize the existing empirical studies on the topic.

Knowledge Spillover Theory of Entrepreneurship (KSTE)

KSTE predicts that in contexts in which high knowledge spillovers frequently occur there will be a higher level of entrepreneurial activity (Markusen and Venables 1996; Acs et al. 2009; Qian and Acs 2013; Acs, Audretsch, and Lehman 2013; Hayter 2013). Therefore, FDI inflows should have a positive effect on entrepreneurship through the commercialization of new ideas and knowledge acquired from the FDI inflows. Acs, Audretsch, and Lehman (2013, 758) argue that "knowledge created by incumbent firms and research organizations, which is underexploited and not fully commercialized for purposes of economic gain, then spills over to other economic agents—entrepreneurs, as identified as the primary factor in resource allocation." The entrepreneurs in this context can exploit knowledge without incurring the cost of developing the knowledge, so the theory argues that these knowledge spillovers create new entrepreneurial opportunities that did not exist without the introduction of the FDI (Acs, Audretsch, and Lehmann 2013). De Maeseneire and Claeys (2012) have extended the knowledge spillover beyond new innovation-based knowledge to include exploiting opportunities to collaborate as a sub-contractor for key activities.

Occupational Choice Model (OCM)

Occupational choice models (OCM) have been used to predict the likelihood of new venture creation by expressing the possibility of entrepreneurial activity as a direct function of managerial ability and an indirect function of an individual's risk tolerance (Amit, Muller, and Cockburn 1995; De Backer and Sluewaegen 2003). Specifically, under OCM a potential entrepreneur weighs the benefit of a new business launch against the benefit of wage employment. When the addition of the FDI variable is applied to

OCM theory, it is argued the result of this new investment is a crowding out effect on entrepreneurship (Jovanovic 1994; De Backer and Sleuwaegen 2003; Kher, Streeter, and Just 2012; Avci and Akin 2020).

The FDI crowding-out effect under OCM occurs in two ways. First, Jovanovic (1994) predicts that when new FDI-related wage differentials are included in the decision process, the best potential entrepreneurs will choose to be wage workers rather than entrepreneurs as the opportunity cost of forgoing wage employment will increase. Secondly, Grossman (1984) claims that FDI reduces entrepreneurship by forcing lower prices in the product markets which in turn lowers the potential income from a new business launch. In summary, OCM predicts that the crowding out of entrepreneurship occurs in both the product and labor markets by producing products more efficiently at lower prices, and by increasing demand in the domestic labor markets leading to higher wages (De Backer and Sluewaegen 2003). Therefore, OCM theory predicts FDI inflows crowd out new entrepreneurial activity by increasing the benefits of choosing wage labor and decreasing the benefits of pursuing entrepreneurial activity.

Empirical Studies of FDI Inflows and Entrepreneurship

The existing empirical evidence for either the KSTE or OCM theories regarding FDI inflows and entrepreneurship is scant and limited by context. Several studies have found a direct relationship between FDI inflows and entrepreneurship supporting the KSTE (Gorg and Strobl 2002; Javorcik 2004; Burke, Gorg, and Hanley 2008; Ayyagari and Kosova 2010; Herra-Echeverri, Harr, and Estevez-Breton 2014; Kim and Li 2014; Ali, Canter, and Roy 2016; Sun, Lee, and Hong 2017; Iftikhar, Ahmad, and Audretsch 2020). Other studies have supported an inverse relationship between FDI inflows and

entrepreneurship consistent with the occupational choice model prediction (De Backer and Sleuwaegen 2003; Barbosa and Eiriz 2009; Berrill, O'Hagan-Luff, and Van Stel 2018; Avci and Akin 2020). Most of these studies are focused on a single country or industry and have used a variety of dependent variables as a proxy for entrepreneurial activity limiting the comparability of the results (Aikin and Harrison 1999; Barrios and Strobl 2002; Amhed, 2012; Duran and Ryna 2014; Yunas, Said, and Azman-Saini 2015; Fujimora and Sato 2015; Baudino 2016; Zhang 2016; Ubeda and Perez-Hernandez 2017). The need for further empirical study of the relationship between FDI inflows and entrepreneurial activity has been discussed in the literature (Gorg and Strobl 2002; Javorvik 2004; Kim and Li 2014; Ghio et al. 2015; Sun, Lee, and Hong 2017; Avci and Akin 2020; Iftikhar, Ahmad, and Audretsch 2020). This study addresses that need.

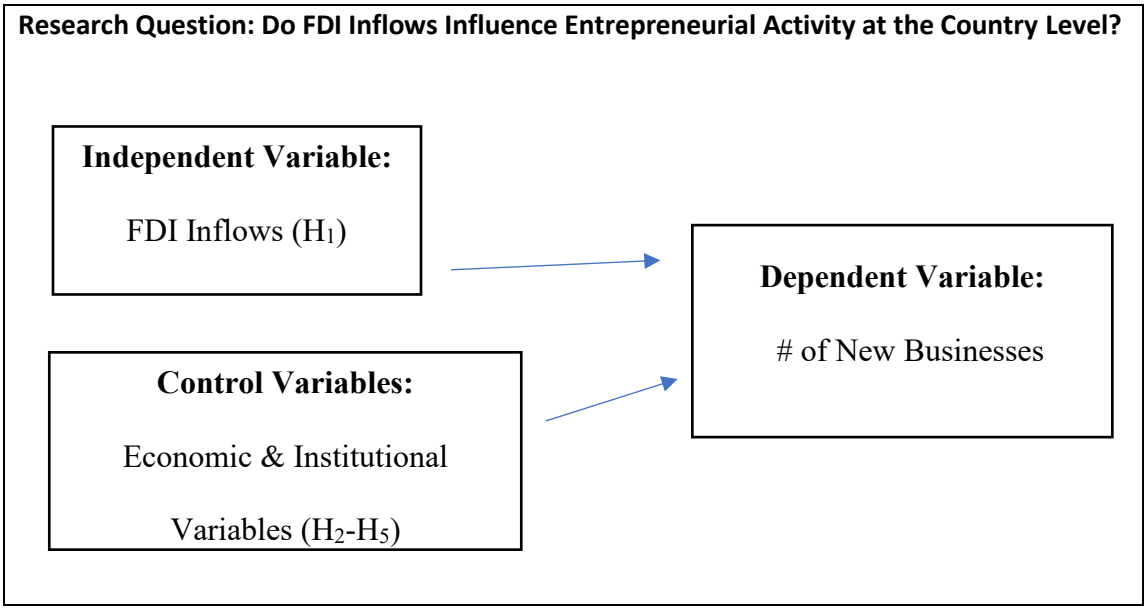
Methodology

Based on the proceeding literature review this study utilizes panel data, multiple regression statistical analysis to examine the following research question:

R2: Do FDI inflows influence entrepreneurial activity at the country level?

This study examined this research question using the World Bank Group Entrepreneurship Survey (2021b) measure of new businesses created (#NB) as a proxy for entrepreneurship at the country level. The sample size in this study included 154 countries displayed in Appendix C. Some countries were excluded from this analysis due to missing data related to some of the variables within the regression model which is discussed more fully in the data section. The date range for this study was 2005 to 2019 and Figure 3.1 shows the research design for this study.

Figure 3.1. Research Design of the Study.



Operational Definitions of Variables

As previously noted, the dependent variable in this study is the number of new businesses created (*#NB*) as measured by the World Bank Group Entrepreneurship Survey database (World Bank 2021b). The World Bank Group Entrepreneurship Survey is published annually and as previously noted, the new business entry rate is a measure of the number of new business startups per year.

The independent variable in this study is FDI inflows (*FDIInf*) as reported by the United Nations Conference on Trade and Development (UNCTAD 2020). FDI inflows (*FDIInf*) are defined as "an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor" (245, UNCTAD 2020). Because there is an assumption that a time lag

exists between the inflow of FDI capital and its' effect on entrepreneurship, this variable will be lagged 1 year in the regression model.

GDP level (*GDPLvl*) was taken from the World Bank Annual Economic Report (World Bank 2021c). This measure will control for the aggregate size of each country's economy which could influence both entrepreneurship and FDI inflows. This measure is reported annually. As with each of the other independent and control variables, GDP level will be lagged by one year to account for the time required for the transmission of the effects which would not be immediate (Berrill, O'Hagan-Luff, and Van Stel, 2018).

It was also necessary to use population (*Pop*) as a control variable in this study. Population differences were needed to reflect per capita differences in country size as the #NB are not measured in per capita terms. Population data was taken from the World Bank Population Report (2022) and was lagged by one year in the regression model.

A variable for government effectiveness (*GovEff*) was included in the regression model as a control variable. Government effectiveness has been found to be an important variable in FDI decisions by multinational corporations (MNE) and poor government effectiveness has also been found to be barriers to entrepreneurial activity (Kaufman and Kraay 2003; Buchanan, Le, and Rishi 2012; Moya, Revuelto-Taboada, and Guerrero 2014; Slesman, Abubakar, and Mitra 2021). The government effectiveness measure was taken from the World Bank Government Effectiveness Index (World Bank 2022a). This government effectiveness index measures the "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the

government's commitment to such policies" with scores ranging from -2.5 (worst) to 2.5 (best) using standard normal distribution (World Bank 2022a, 3).

A variable for the corruption level (*CorLvl*) of each country in the sample was measured using the World Bank Control of Corruption Index (World Bank 2021a). The Control of Corruption Index ranges from -2.5 (worst) to 2.5 (best) reflecting perceptions of the extent to which public power is exercised for private advantage and personal gains (World Bank 2021a). The index is published annually and captures both petty and grand forms of corruption as well as control or 'capture' of the state by elites and private interests (World Bank 2021a). While there are other possible measures to use for corruption, the control of corruption index is believed to be the most encompassing among the many heterogeneous options (Berrill, O'Hagan-Luff, and Van Stel 2018). This variable will be lagged 1 year in the regression model.

The Trade Policy (*TradePol*) variable will be measured using the World Bank Trade Openness Index (World Bank 2020d). The variable is calculated by dividing the sum of a country's imports and exports by the country's GDP (World Bank 2020d). The trade openness index is reported annually, and this variable will be lagged by 1 year in the regression model.

The education level (*EducLvl*) variable in this study used the United Nations Human Development Index report (2021) measure of the mean years of schooling. This variable is reported annually and ranges in potential score from 0 to 15. The variable was lagged by 1 year in the regression model. All variables used in this study are listed with the appropriate source and operational variable tag in Table 3.1 below.

Excluded Variable

It was originally intended that this study would utilize a property rights (*PropRts*) variable from the International Property Rights Index (*IRPI*) measure which estimates the level of both physical and intellectual property rights (GTIPA 2020). The index is produced by the Global Trade and Innovation Policy Alliance annually and uses a scale of 1-7 with the higher score indicating superior property rights protection (GTIPA 2020). Unfortunately, due to high levels of missing data for this specific variable, the IPRI was dropped from the analysis. Retaining the IRPI in the regression would have resulted in a loss of 31.5% of the observations in the data set. Fortunately, several studies have found a high correlation between the *IRPI* variable and the *GovEff* variable used in this study (Estrin, Korosteleva, and Mickiewicz 2009; Redford 2020). Therefore, it is believed that this variable is not necessary as a control variable to achieve the purpose of this analysis.

Table 3.1. Variables & Data Sources for Essay #2.

Dependent Variables	**Variable Tag**	**Source**
Number of New Businesses Created	*#NB*	World Bank Group Entrepreneurship Survey
Independent Variable		
FDI Inflows	*FDIInflows*	UNCTAD FDI Inflows (US $)
Control Variables		
GDP Level	*GDPLvl*	World Bank Annual Economic Report
Population	*Pop*	United Nations Population Division. World Population Prospects: 2019 Revision
Government Effectiveness	*GovEff*	World Bank Government Effectiveness Index, World Governance Indicators
Corruption Level	*CorLvl*	World Bank Control of Corruption Index, World Governance Indicators
Trade Policy	*TradePol*	World Bank Trade Openness Index
Education Level	*EducLvl*	Human Development Index, United Nations Report, Mean Years of Schooling

Linear Regression Model

Using the variables described above, the regression model used in this study is the following:

$$\#NB = \beta o + \beta_1 FDIInf^{(t-1)} + \beta_2 GDPLvl^{(t-1)} + \beta_3 \text{Pop}^{(t-1)} + \beta_4 \text{G}ovEff^{(t-1)} + \beta_5 CorLvl^{(t-1)} + \beta_6 TradePol^{(t-1)} + \beta_7 EducLvl^{(t-1)} + u$$

Hypotheses

Using the model above, and focusing on the main effect variable of interest in this study (FDI inflows), the following null and alternative hypotheses will be tested:

> H_0: FDI inflows (*FDIInflows*) will not affect the number of (*#NB*) of new businesses created.
> H_1: FDI inflows (*FDIInflows*) will directly affect the number of (*#NB*) of new businesses created.

This study will also test the influence of some of the control variables on entrepreneurship using the following hypotheses.

> H_0: Government Effectiveness (*GovEff*) will not affect the number of (*#NB*) new businesses created.
> H_2: Government Effectiveness (*GovEff*) will directly affect the number of (*#NB*) new businesses created.

> H_0: Corruption level (CorLvl) will not affect the number of (*#NB*) new businesses created.
> H_3: Corruption level (CorLvl) will directly affect the number of (*#NB*) new businesses created.

> H_0: Trade Policy (*TradePol*) will not affect the number of (*#NB*) new businesses created.
> H_4: Trade Policy (*TradePol*) will directly affect the number of (*#NB*) of new businesses created.

> H_0: Education Level (*EducLvl*) will not affect the number of (*#NB*) new businesses created.
> H_5: Education Level (*EducLvl*) will directly affect the number of (*#NB*) of new businesses created.

Each of these hypotheses (H1-H5) were also tested in conjunction with the four categorical dummy variables indicating each country's income level to observe if any differences in results occurred across the different country groups. Therefore, the results of these hypotheses will provide further insights into the relationship between FDI inflows and entrepreneurship by economic development level.

Results of Study

This study examined the relationship of FDI inflows (*FDIInflow*) and the creation of new businesses (#NB) using a linear regression model. Data were collected and analyzed to answer the previously described research question.

Data

The data in this study consisted of eight variables (*#NB, FDIInflow, GDPLvl, Pop, GovEff, CorLvl, TradeOpen, EducLvl*) measured for each country at multiple time points. The time points consisted of years spanning 2006 to 2019, meaning that each country could have as many as 14 measurements for each variable. In order to perform the data analysis, the data were compiled in long format, meaning that each observation (row) in the dataset contained the measurements for one country for one year. The initial dataset consisted of 2580 observations. The data were examined for missing values. Listwise exclusion of all observations with missing data for any variable would have resulted in 1131 valid observations. It was found that many countries did not have any data for IPRI, so this variable was dropped from the analysis. After listwise exclusion of all observations with missing data for the remaining variables, a total of 1652 observations from 154 countries remained and were included in the analysis.

Table 3.2 displays descriptive statistics for each of the continuous variables. The average value of NB was 30563.20 (*SD* = 70206.11). The average value of *FDIInflow* was 14442.97 million (*SD* = 46285.50 million). The average value of *GDPLvl* was 330848.34 million (*SD* = 941910.72 million). The average value of Pop was 41.30 million (*SD* = 152.67 million). The average value of *CorLvl* was 0.15 (*SD* = 1.00). The average value of *TradeOpen* was 95.84 (*SD* = 58.59). The average value of *EducLvl* was 8.95 (*SD* = 3.04). The average value of *GovEff* was 0.18 (*SD* = 0.95). The most common *DevLevl* was 4 which comprised 36.6% of the observations (*n* = 605), followed by *DevLevl* 3 (*n* = 523, 31.7%), *DevLevl* 2 (*n* = 360, 21.8%), and *DevLevl* 1 (*n* = 164, 9.9%). Development level 1 was low income, and levels 2, 3, and 4 were lower middle, upper middle, and higher income respectively.

Table 3.2. Descriptive Statistics for Continuous Study Variables.

Variable	Minimum	Maximum	Mean	Std. Deviation
#NB	2.00	664974.00	30563.20	70206.11
FDIInflow (millions)	-239337.01	733826.50	14442.97	46285.50
GDPLvl (millions)	-850.72	13608151.86	330848.34	941910.72
Pop (millions)	0.07	1392.73	41.30	152.67
CorLvl	-1.70	2.46	0.15	1.00
TradeOpen	0.17	442.62	95.84	58.59
EducLvl	1.43	14.13	8.95	3.04
GovEff	-2.14	2.43	0.18	0.95

Source: Stata software output.

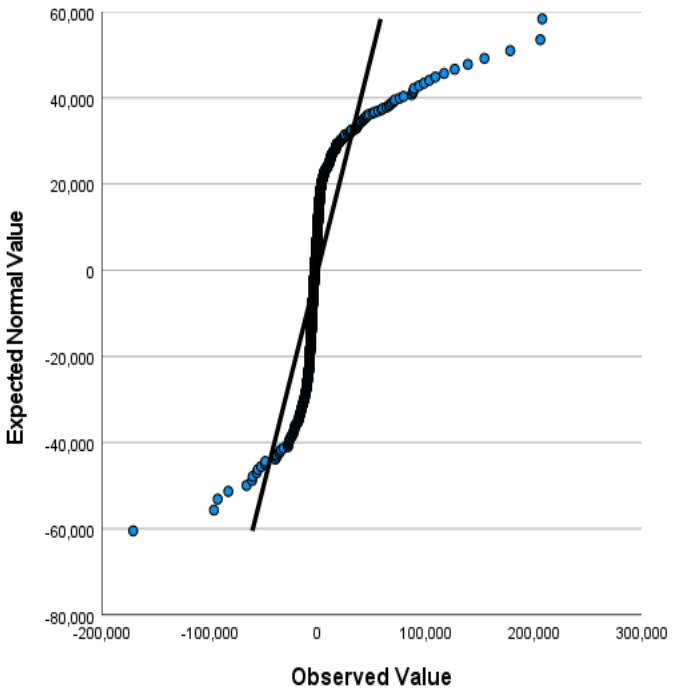
Linear Regression Model

To answer the research question, a linear model was computed. In this analysis, the dependent variable was NB. The predictor (independent) variables were *FDIInflow, GDPLvl, Pop, CorLvl, TradeOpen, EducLvl, DevLevl,* and *GovEff*. To account for the repeated observations within countries, a random intercept for country was included in the model as a variance component, and the covariance among repeated measurements

(years) was modeled as first order auto regressive (AR1). To aid in interpretation, all continuous predictor variables were standardized prior to the analysis. Development level (*DevLevl*) was dummy coded with a value of 1 serving as the reference category.

Statistical conclusion validity was ensured by testing the assumptions of normality, homoscedasticity, and absence of multicollinearity, and by checking for model convergence. Normality was tested by graphing the model residuals in a normal Q-Q plot (Figure 1). There was marked deviation of the residuals from the normal (diagonal) line. This was due to the dependent variable (#NB) being highly skewed. To alleviate the skewness, a natural log transformation was applied to the variable.

Figure 3.2. Q-Q Plot of Linear Mixed Model Residuals.

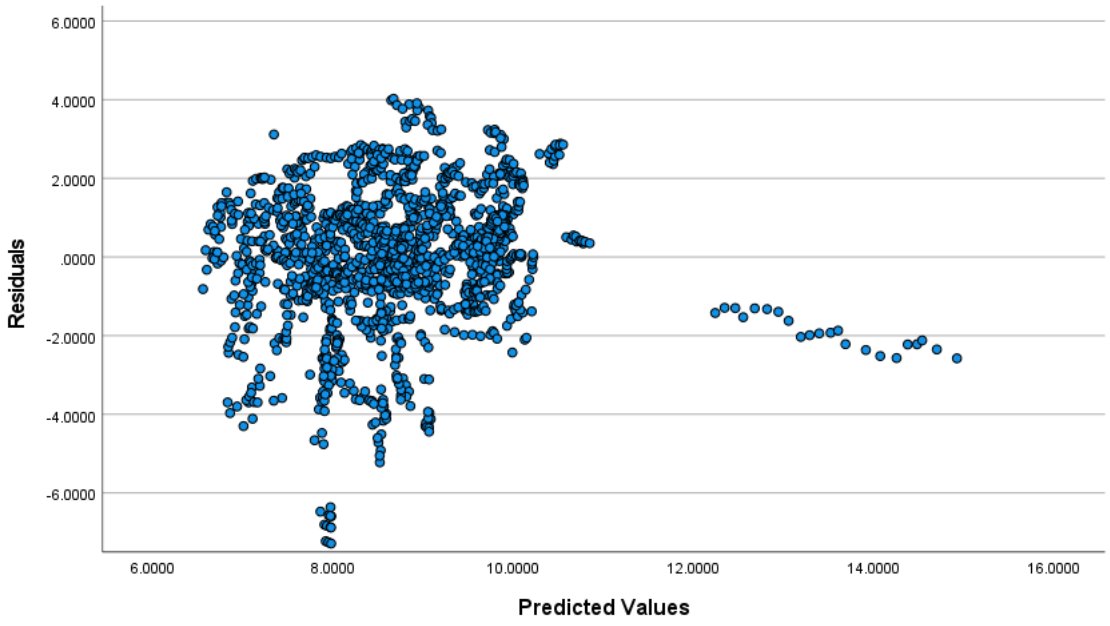


Source: Stata software output.

Homoscedasticity was tested by graphing the model residuals against its predicted values (Figure 3.3). The majority of the data followed a desired random pattern, with the

exception of several observations with high predicted values which appeared to be outliers. Examination of the data showed that these were observations from a single country: India. The observations were retained in the analysis as they were found to have no impact on the results of the regression model. The scatterplot in Figure 3.3 provides a visual presentation of predicted values in relationship to the residuals. It was determined that the homoscedasticity assumption was valid with this model.

Figure 3.3. Scatterplot of Linear Mixed Model Residuals Versus Predicted Values.



Source: Stata software output.

The presence of multicollinearity was tested by calculating variance inflation factors. All variance inflation factors were below 10 (maximum = 7.39), indicating that no severe multicollinearity was present among the predictors. Finally, the linear mixed model was computed and checked for convergence. The model did not achieve convergence, suggesting that the calculated model estimates may not be valid. To achieve convergence, the model was run as a generalized estimating equation with robust

estimators, which also alleviates the influence of model assumption violations (i.e., heteroscedasticity).

Table 2 displays the parameter estimates for the generalized estimating equation. *FDIInflow* was not significantly linearly related to the natural log of NB ($B = 0.01$, $p = .282$). *CorLvl* was not significantly linearly related to the natural log of NB ($B = 0.08$, $p = .205$). *TradeOpen* was not significantly linearly related to the natural log of NB ($B = 0.08$, $p = .094$). *EducLvl* was significantly linearly related to the natural log of NB ($B = 0.66$, $p < .001$), indicating that a one standard deviation increase in *EducLvl* results in a 0.66 increase in the natural log of NB.

Table 3.3. Parameter Estimates for Linear Model Predicting Natural Log of NB.

			95% CI		
Parameter	*B*	Std. Error	Lower	Upper	Sig.
(Intercept)	8.39	0.36	7.68	9.10	< .001
FDIInflow	0.01	0.01	-0.01	0.02	.282
GDPLvl	0.11	0.06	0.00	0.22	.048
Pop	0.61	0.16	0.30	0.93	< .001
CorLvl	0.08	0.07	-0.05	0.21	.205
TradeOpen	0.08	0.04	-0.01	0.16	.094
EducLvl	0.66	0.10	0.46	0.85	< .001
DevLevl 4 [ref: 1]	0.64	0.49	-0.32	1.60	.192
DevLevl 3 [ref: 1]	0.05	0.45	-0.83	0.94	.907
DevLevl 2 [ref: 1]	0.32	0.45	-0.56	1.21	.477
GovEff	-0.05	0.06	-0.18	0.07	.428

Source: SPSS software output.

Summary of Findings

In summary, a generalized estimating equation was computed with *FDIInflow, GDPLvl, Pop, CorLvl, TradeOpen, EducLvl, DevLevl,* and *GovEff* as predictors of *#NB* and showed that *FDIInflow* was not significantly linearly related to *#NB*, therefore H1 was not supported. *GovEff*, *CorLvl* and *TradeOpen* were also not significantly linearly related to #NB, so H2-H4 were not supported. Finally, *EducLvl* was significantly linearly

related to NB, therefore H5 was supported indicating that education level did directly influence the creation of new business at a statistically significant level. Although not the focus of this this study it was also determined that none of the various economic development levels impacted the relationship between *FDIInflow* and *#NB* which will be further discussed in the results of the expanded regression model in Chapter 4. In summary hypotheses 1-4 were rejected, and hypothesis 5 was accepted.

Analysis of Results

Analysis of FDI Inflows and Country-Level Entrepreneurial Activity Relationship

The results of this study were not as anticipated for the relationship between FDI inflows and entrepreneurial activity at the country level. It was hypothesized that a significant direct relationship between FDI inflows and entrepreneurial activity would be found to support the knowledge spillover theory of entrepreneurship (KSTE). It should be noted from the literature review that the results of previous studies of the relationship between FDI inflows and country-level entrepreneurship have consistently produced conflicting and often inconclusive results (Backer and Sleuwaegen 2003; Ayyagari and Kosova 2010; Kim and Li 2014; Ali, Cantner and Roy 2016; Sun, Lee and Hong 2017). This study seems to have followed that pattern.

There are many potential reasons for the results in this study. First, this is the only study of this size, scope, and magnitude to attempt to statistically examine this relationship. This study involved 154 countries and a 14-year panel data set time frame. Many previous studies on this topic have been based on single country data (Gorg and Strobl 2002; Backer and Sleuwaegen 2003; Burk, Gorg, Hanley 2008; Barbosa and Eiriz 2009; Ayyagari and Kosova 2010). Other studies have used smaller sample sizes and

much shorter date ranges (Ali, Canter and Roy 2016; Sun, Lee and Hong 2017; Avci and Akin 2020). The large size and complexity of this study could be a reason for inconclusive results.

Measurement challenges are significant in this field. As noted in the chapter 2 study, there is a lot of missing data in the comparative entrepreneurship measures, and this was also true for some of the control variables. This reality forced the use of listwise exclusions of data from the regression analysis. While the statistical results are still valid for the available data, this does raise a question concerning the impact the missing data could have produced on the regression equation results. In addition, other measurement issues such as the operation definition of country level entrepreneurial activity. As noted in chapter 2, the difference between formal and informal economy is a major issue in defining comparative entrepreneurship activity (Webb et al. 2009; Gunther and Launov 2012; Philip, Samson, and Ogwa, 2013; Nazier and Ramadan 2015; Canelas 2019). In the same manner the difference between needs-based entrepreneurship and opportunity-based entrepreneurship likely produces different entrepreneurial reactions to FDI inflows with needs-based entrepreneurs possibly choosing to exit self-employment to take FDI initiated job opportunities while the latter might see FDI inflows as an opportunity to exploit a market need through a business launch (Gunther and Launov 2012; Philip, Samson, and Ogwa 2013). It is also possible that the influence of FDI inflows on new business creation is a slower process than modeled in this study. For instance, if the demonstration effect requires employment with a multinational employer before developing the competencies to launch a new business, it could be years between the FDI inflow and the actual resulting entrepreneurial activity.

Certainly, the use of aggregate country-level data could possibly mask several nuanced FDI spillover preconditions such as specific industry, vertical vs horizontal spillovers, country of origin, institutional quality, absorptive capacity, ownership structure, or cultural factors which could help explain the lack of direct influence of FDI inflows influencing activity. In addition to differences in spillover conditions, several studies have found significant differences in the type of entrepreneurial activity outcomes even among homogenous country groups (Moya, Revuelto-Taboada, and Guerrero 2014; Ghio et al 2015). This indicates the complexity of the two key focal variables of this study (FDI inflows and entrepreneurial activity) may be too difficult to capture with a linear regression model.

Finally, while every effort was made in this study to account for multicollinearity, the relationship between the variables in this study is challenging. Many scholars would argue that the multidirectional nature of most of the variables within this study make statistical inference difficult to achieve (Iacobucci et al 2016). In fact, the emerging field of entrepreneurial ecosystems is theoretically anchored on the assumption that the entire field of entrepreneurship possesses deep multicollinearity issues which are impossible to mitigate (Cohen 2006, Isenberg 2011; Alvedalen and Boschma 2017). In other words, there are too many inseparable influences coexisting that influence outcomes in multiple directions. Certainly, the research on determinants of FDI inflows and entrepreneurial activity often have similar variables listed as predictors (Crespo and Fountouro 2007; Freytag and Thurick 2007; Acs et al. 2008; Bruton, Ahlstram, and Obloj 2008; Acs et al. 2014) Several scholars have suggested that multicollinearity is inherent in international business research and is an unfortunate cost of working in that field (Havranek and Isrova

2011; Marcoutte 2013; Li et al. 2021). It is possible that some of these challenges have influenced the result of this study.

It would be irresponsible to contend that the result of this study is evidence that the KSTE is not valid and that the crowding effect of the occupational choice model is valid. A more responsible assessment of these results would conclude that the study is inconclusive concerning the relationship between FDI inflows and entrepreneurial activity. Some occupational choice theorists will concede that the crowding effect may be an initial short-term response to FDI inflows and that the longer trend does lead to spillover entrepreneurial activity (De Backer and Sleuwaegen 2002; Avci and Akin 2020). Certainly, both sides of the theoretical debate agree that both responses to FDI inflows do occur at the individual level (Meyer and Sinani 2009; Kim and Li 2014; Sun, Lee, and Hong 2017; Avci and Akin 2020). It was the assertation of this study that the KSTE would be the overriding macro level finding of a large sample panel study, and that expectation has turned out to be either invalid or inconclusive.

Analysis of Control Variables and Country-Level Entrepreneurial Activity

In addition to the relationship of FDI inflows to country level entrepreneurial activity, three of the four control variables believed to influence entrepreneurship were also found not to be significant in this study. The three variables found not to influence entrepreneurial activity include government effectiveness, control of corruption, and trade openness. This finding was not consistent with existing literature concerning the importance of these variables.

Government effectiveness and control of corruption have been found to be highly correlated in previous studies (Busenitz, Gomez, and Spencer 2000; Estrin, Korosteleva,

and Mickiewicz 2009; Redford 2020). This could explain the lack of a finding of significant influence. In addition, both variables have been theorized to be positive determinants of both FDI inflows and entrepreneurial activity, especially entrepreneurship in the formal sector (Busenitz, Gomez, and Spencer 2000; Crespo and Fontouro 2007; Berrill, O'Hagan-Luff, and van Stel 2018). This is the reason both variables were used as control variables in this study. However, there is considerable debate about whether corruption helps or hinders FDI inflows and entrepreneurship (Mauro 1995; Cuervo-Cazurra 2006; Aidt 2009; Dusha 2015) Many scholars believe corruption only limits FDI inflows between countries with a higher corruption gap and that between countries with a similar tolerance for corruption FDI inflows actually increase (Cuervo-Cazurra 2006; Karhunen and Ledyaena 2012; Ledyaena, Karhunen, and Kosonen 2013). In a study with as diverse a sample selection as found in this model it is possible the influence of corruption level is less important than previous small sample studies that focused exclusively on higher income countries. The same argument can be made for the relationship of these variables to entrepreneurial activity as there is some evidence that entrepreneurship can successfully be pursued in corrupt countries with weak government effectiveness (Buchanan, Le, and Rishi 2012; Stenholm, Acs, and Wuebker 2013). As these variables were used primarily as control variables in this study, the absence of a significant direct influence on entrepreneurial activity should not be construed as evidence that the variables are not worthy of further consideration in future studies as determinates of country level entrepreneurial activity.

Trade openness has also been identified in previous studies as a potential driver of entrepreneurial activity, although the empirical results are typically limited by certain

prerequisite conditions such as capital access, institutional quality, education, and other country specific capabilities (Busenitz, Gomez, and Spencer 2000; Ali, Canter, and Roy 2016). Therefore, the lack of a finding of significance in this study is not inconsistent with some previous research. It should also be noted that the trade openness measure does not distinguish between the import and export focus of a country. Some countries are far more open to one side of the trade equation than the other. However, despite the lack of a direct relationship to entrepreneurship, the trade openness measure is still very useful as a control variable in the relationship between FDI inflows and entrepreneurial activity.

Finally, the importance of education level on new business creation was found to be a significant predictor. This result is consistent with many other studies of the FDI inflows and entrepreneurship relationship (Smarzynska 2004; Berrill, O'Hagan-Luff, and van Stel 2018). This study used mean years of schooling (MYS) from the human development index as its proxy for country education level. While there are other measures of education which could have been used in this study, MYS was considered the most comprehensive measure to be able to capture both primary and tertiary education achievement (Busenitz, Gomez, and Spencer 2000; Sanchez 2011). This comprehensiveness meant that the educational level measure would apply to all types of spillover opportunities (vertical and horizontal) requiring different educational skill levels. This study demonstrates that higher education levels clearly lead to more entrepreneurial activity, and it is likely based on previous literature to be also attractive for many types of FDI inflows (Crespo and Fountouro 2007; Meyer and Sinani 2009; Ali, Canter, and Roy 2016).

Limitations of the Study

This study has many limitations including some of the measurement issues previously discussed. As demonstrated in chapter 2, available measurement options for large scale comparative entrepreneurship studies are challenging. This study used the most available measure to mitigate missing data. However, this does not mean that the measure used in this study was the best proxy option for country level entrepreneurial activity, only that it was the most available. It is impossible to know whether a measure such as total entrepreneurial activity (TEA) or the global entrepreneurship index (GEI) would have produced different results. The only certainty with utilizing either of these alternative measures would have been a very small sample size of countries which would have defeated the objective of the study, which was to use a large diverse sample of countries.

Recommendations for Future Studies

This study illustrates the need for future research on this topic. First, as noted in chapter 2, better measures of comparative entrepreneurial activity need to be developed, and the existing measures need to have better collection methods to ensure the availability of data. Without consistent measurement of entrepreneurial activity, comparative entrepreneurship research will be difficult to conduct. The same is true for other critical variables related to institutional quality, property rights, trade policy, and cultural aspects related to entrepreneurship. Without new measures and better collection of existing measures, empirical data on this topic will be limited. Future studies should attempt to analyze the relationship between FDI inflows and entrepreneurial activity using multiple measures for the dependent variable which might illuminate the nuanced

or subtle differences previously discussed. Currently, the data does not exist to effectively perform this type of analysis in times-series, panel data set.

The question of the country level entrepreneurial response to FDI inflows is still a relevant research topic in need of further exploration. Future research on this topic might be best conducted at the individual level to identify specific behavioral choices made in response to FDI inflows. For instance, if large amounts of individual survey data on these entrepreneurial behaviors were to be consistently collected in several countries, nonparametric analysis could be performed to find statistical inference on entrepreneurial action in response to FDI inflows. It is also possible that future researchers could increase the time frame between the FDI inflow and the entrepreneurial activity to see if there is a slower developing pattern of FDI spillovers influencing new business creation.

Finally, future studies might consider taking an entrepreneurial ecosystem (EE) approach to exploring the relationship between FDI inflows and country level entrepreneurial activity. As noted earlier, each of the control variables used in this study has been found to be influential in previous studies of entrepreneurial activity. Using a social structure network approach found in many EE studies might identify some of the nuanced micro level patterns within the FDI inflow and entrepreneurial activity relationship that may be difficult to isolate in a linear regression model (Mitchell 2011; Carlson et al. 2013). Cluster analysis could also be applied to this relationship and is also a methodological tool frequently used in EE research (Neck et al. 2004; Davis 2012; Mason and Brown 2014). The complexity of this topic invites new ways of analyzing the relationship between FDI inflows and country level entrepreneurial activity.

Conclusions

This study reinforces the complexity and challenges of studying the relationship between FDI inflows and entrepreneurial activity. While there was not a significant relationship between FDI inflows and entrepreneurial activity at the country level, the study did demonstrate the importance of education as a driver for entrepreneurship. The study also illustrates the measurement challenges of comparative entrepreneurship studies. Further research is needed to continue to address the competing theories of KSTE and the occupational choice crowding out effect of FDI inflows on country level entrepreneurial activity as it is an important topic to economic policy makers. Unfortunately, the results of this study are inconclusive on that issue

CHAPTER IV – A STUDY OF MODERATING VARIABLES INFLUENCING THE RELATIONSHIP OF FDI INFLOWS TO COUNTRY-LEVEL ENTREPRENEURSHIP

Introduction and Purpose

The third study in this dissertation focuses on variables which are believed to have a moderating impact on the relationship between FDI inflows and country-level entrepreneurship. Building on the previous research model found in Chapter 3, this study will analyze the level of moderation influence of a country's economic development level, FDI inflows and government effectiveness interaction, and FDI inflows and education interaction level on the FDI inflows and entrepreneurship relationship. Building on existing theory and literature, this study will create extensions to the previous regression model and will analyze and interpret the results.

The impact of FDI inflows on entrepreneurship can be moderated by specific characteristics of the country investigated (Burk, Gorg, and Hanley, 2008; Meyer and Sirani, 2009; Sadayuki, 2011; Doytch and Epperson 2012; Zhang, Guo, and Wang, 2014; Berrill, O'Hagan-Luff, and Van Stel. 2018). Some country specific factors believed to influence the relationship between inward FDI, and entrepreneurship include absorptive capacity, level of economic development, government trade policies, institutional quality, and the country's education level (Bloomstrom and Kokko, 1998; Chen and Chen, 1998; Hamida and Gugler 2009; Gorodnichenko, Svejnar, and Terell, 2014; Simon-Moya, Revuelto-Taboada, and Guerrero 2014; Ha and Giroud, 2015;). Each of the specific factors has the potential to affect the level and intensity of the relationship between FDI inflows and entrepreneurship. The existence of so many potential moderating variables is

believed to be the explanation for previous mixed results of studies within this field (Meyer and Sirani, 2009; Berrill, O'Hagan-Luff, and Van Stel. 2018).

Two factors that have been theorized to have a specific interactive effect with FDI inflows and the impact on entrepreneurial activity at the country level are education level and government effectiveness (Meyer and Sinani 2009; Buchanan, Le, and Rishi 2012; Stenholm, Acs, and Wuebker 2013; Kim and Li 2014; Ali, Cantner, and Roy 2016; Berrill, O'Hagan-Luff, and Van Stel 2018). In addition, there is also some literature suggesting that the level of a country's economic development may also have a moderating effect on the relationship between FDI inflows and country-level entrepreneurial activity (Busenitz, Gomez, and Spencer 2000; Meyer and Sinani 2009; Stenholm, Acs, and Wuebker 2013). The purpose of this study is to test the moderating influence of a country's level of economic development, education level, and quality of government effectiveness on the relationship between inward FDI and entrepreneurship. This study will expand the basic regression model in Chapter 3 to test potential conditions which are believed to accelerate or decrease the impact of FDI inflows on entrepreneurship at the country level.

Literature Review

As previously noted, the possibility that some moderating variables exist within the FDI inflow and entrepreneurship relationship have been theorized and discussed in the existing literature. Certainly, there are several variables that are believed to support both FDI inflows and entrepreneurial activity (Meyer and Sinani 2009; Stenholm, Acs, Wuebker 2013; Kim and Li 2014). Some of these variables would include education

level, institutional quality, government effectiveness, government trade policies, control of corruption, and many others (Ali, Cantnor, and Roy 2016).

The economic development level of a country has been theorized to have an impact on the level of influence that FDI inflows have on entrepreneurship at the country level (Gorg and Stobl 2001; Chen, Su, and Tsai 2007; Meyer and Sinani 2009). Several scholars believe that the occupational choice model (OCM) applies most directly to lower income countries (*LI*) and higher income (*HI*) countries, while the KSTE applies more directly to countries in lower (*LMI*) and upper middle income (*UMI*) countries (Meyer and Sinani 2009). Therefore, the FDI inflows and entrepreneurial activity relationship is crowded out by individuals choosing wage employment over new venture creation in the top and bottom levels, while more people in the middle-income countries leverage FDI spillovers into new venture creation.

The argument for FDI crowding out entrepreneurship in lower income (*LI*) countries is that in these countries, many individuals are leaving necessity-based entrepreneurship to pursue the stability of steady wage employment (De Backer and Sluewaegen 2003; Avci and Akin 2020). Because these lower income countries often attract FDI inflows that are frequently motivated to exploit lower wage rates, there are fewer demonstration effects to spillover than would be present in countries with higher absorptive capacity (Doytch and Epperson 2012; Duran and Ryan 2014). In addition, absorptive capacity is typically suppressed in these countries due to lower educational achievement levels and limited access to capital (Avci and Akin 2020). Finally, the lower income countries typically have higher corruption levels and lower levels of government

effectiveness and property rights which each serve as barriers to new business creation (Foyolle et al. 2016).

In the high income (*HI*) countries it is argued that the types of FDI entering these countries is such that it produces high wage jobs that increase the opportunity cost of being an entrepreneur to a level much higher than in the lower and middle-income countries (De Backer and Sluewaegen 2003; Avci and Akin 2020). Higher income countries typically have higher education levels making high wage employment an attractive, lower risk alternative to entrepreneurship (Crespo and Fontoura 2007; Estrin, Korosteleva, and Mickiewicz 2009; Doytch and Epperson 2012). In addition, higher income countries also already possess increased levels of technology and management practices reducing the demonstration effect gap impact which would be more prevalent in lower categories of economic development (Sun, Lee, and Hong 2017).

For those scholars who believe that a country's income level moderates the FDI inflow and entrepreneurial activity relationship, it is assumed that the middle-income countries receive the most benefit from FDI spillovers (Javorik 2004; Chen, Su, and Tsai 2007; Sun, Lee, and Hong 2017). It is believed that because middle income countries have a combination of high technology gaps and higher absorptive capacity that these countries receive more FDI spillover impact than higher and lower income countries (Crespo and Fontoura 2007; Sun, Lee, and Hong 2017). In addition, the middle-income countries are often working to improve government effectiveness, property rights, and institutional quality which should support both FDI inflows and entrepreneurship (Javorick 2004; Estrin, Korosteleva, and Mickiewicz 2009). Finally, the middle-income countries are usually seen as better investment opportunities for higher quality FDI

investments which usually produce more spillovers, while these countries also typically have better education systems and greater access to capital than the lower income countries (Ayyagari and Kosova, 2010; Iwaski et al. 2012; Ali, Cantnor, and Roy 2016). Overall, the differences in economic development level between countries is believed to be a moderator of the FDI inflow and country-level entrepreneurial activity relationship.

Some scholars have theorized that the relationship between FDI inflows and country-level entrepreneurship could be a curvilinear relationship where lower levels of FDI inflows produce a lower entrepreneurial spillover effect, while higher levels of investment begin to experience either a decline or a diminishing return producing an inverted U-shaped function (traditional quadratic function) of the relationship between FDI inflows and entrepreneurship at the country level (Meyer and Sinani 2009). The arguments for this particular shape of the nonlinear function include the influence of the economic development level previously discussed as lower income countries are usually on the low end of FDI inflows and higher income countries are usually on the higher end. Typically, as FDI inflows within a country increase they are accompanied by improved institutional quality, human capital, and domestic market technology infrastructure (Meyer and Sinani, 2009). Each of these factors are believed to facilitate conditions for FDI spillover opportunities which would lead to higher levels of new venture creation in countries receiving moderate levels of inward FDI.

Chen (1996) asserts that dynamics in competition within a country are a function of awareness, motivation, and capability which leads to a nonlinear relationship in FDI spillover effects. This nonlinear relationship is created by the inability to absorb spillovers in countries receiving lower levels of FDI inflows due to levels of technology

gaps which are too large to absorb, less open trade policies, lack of domestic capital availability, human capital constraints, and institutional disincentives to create new enterprises (Chen 1996; Ayyagari and Kosova, 2010; Avci and Akin 2020). On the other end, those countries which have very high amounts of FDI inflows likely possess small technology gaps and highly developed national systems of innovation leading to a diminished return on spillover effects (Borenstein, De Gregorio, and Lee 1998; Barbosa and Eiriz 2009). However, as FDI inflows increase from lower levels to higher levels the spillover effects on entrepreneurship are believed to increase as the conditions for spillover benefits become more favorable until they begin to reach either a declining or diminishing return which produces the curvilinear function (Estrin Korosteleva, and Mickiewicz 2009; Avci and Akin 2020).

One potential moderating variable believed to directly influence a curvilinear relationship between FDI inflows and entrepreneurial activity is the interaction effect between government effectiveness and FDI inflows (Freytag and Landstrom 2007; Batillana, Bernard, and Boxenbaum 2009; Estrin, Korosteleva, and Mickiewicz 2009; Davis 2012). Stenholm, Acs, and Wuebker (2013) assert that each country's entrepreneurial environment is built on differences in institutional arrangements which produce significant variance in the rate and type of entrepreneurial activity created. The effectiveness of the government is one of the key areas that has been identified as an important difference within institutional arrangements. For moderately increasing impact and innovation types of business creation, government effectiveness is considered an important influence and is believed to interact with FDI inflows to create a moderating influence producing a curvilinear relationship on the FDI inflow and country level

entrepreneurial activity relationship (Duade and Stein 2007; Fujimori and Sato 2015; Avci and Akin 2020). Government effectiveness and institutional quality are not as significant on the lower technology and lower impact vertical spillover end of the spectrum within a country, meaning that lower levels of FDI inflows also contribute to the curvilinear outcome. Finally, very high impact and high technology-based startups are not nearly as influenced by government effectiveness as the moderate level enterprises (Aitkin and Harrison 1999; Baudino 2016). This is another factor which also supports a curvilinear relationship. The interaction effect between FDI inflows and government effectiveness is also believed to directly influence or accelerate the growth of entrepreneurial activity at the country level if that relationship is linear, as believed by many KTSE theorists (Caves 1974; Burke, Gorg and Hanley 2008; Herrera-Echeverri, Haar, and Estevez-Breton 2014).

Another moderating variable identified in literature as a potential direct influence and believed to produce a curvilinear relationship between FDI inflows and entrepreneurial activity is the interaction of FDI inflows and education level (Doytch and Epperson 2012; Ali, Cantner and Roy 2016; Berrill, O'Hagan-Luff, and van Stel 2018). It is argued that in countries with lower education levels FDI spillovers serve to create many low skill jobs with consistent pay which crowds out low technology, necessity driven entrepreneurship producing a decline in new business starts. However, as the country's education level increases there is an effect of creating quality-adjusted human capital that is more capable of absorbing demonstration effects and exploiting this knowledge to create new domestic ventures (Crespo and Fontouro 2007; Davis 2012; Ali, Cantner and Roy 2016; Avci and Akin 2020). Finally, in countries with high FDI inflows

and high education levels, the interactive effect is to reduce entrepreneurship through the occupation choice crowding out effect for high wage jobs. The crowding out effect is also a function of increased foreign competition and market saturation (De Backer and Sluewaegen 2003; Avci and Akin 2020).

In summary, there is a considerable amount of literature suggesting that the mixed results reported in studies of the relationship of FDI inflows and entrepreneurial activity relationship is a result of either different economic development levels of the countries in question or the existence of a curvilinear relationship between the two variables in which lower and higher levels of FDI inflows produce declining or diminishing returns on new business starts (Crespo and Fontouro 2007; Berrill, O'Hagan-Luff, and van Stel 2018; Avci and Akin 2020). This study will test those theories to see if these factors moderate that relationship.

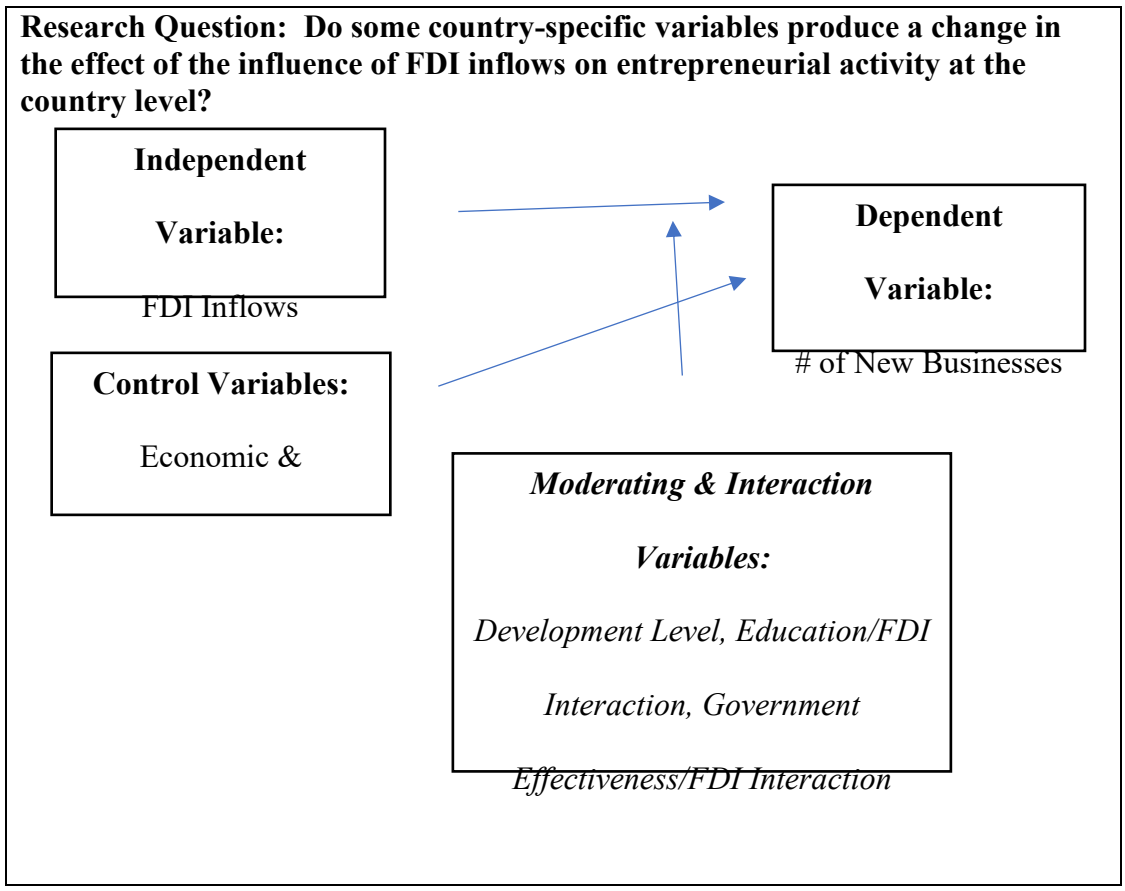
Methodology

The third study in this dissertation will build upon the research model in Chapter 3 and previously discussed literature review by analyzing the moderating effect of potential interactive variables on the relationship between FDI inflows and entrepreneurial activity at the country level. Specifically, this study will address the following research question:

R3: Do some country-specific variables produce a change in the effect of the influence of FDI inflows on entrepreneurial activity at the country level?

The expanded version of the research model for Chapter 4 is displayed in Figure 4.1 below with the modifications highlighted in italics.

Figure 4.1. Enhanced Research Design of the Chapter 4 Study.



This third study specifically analyzes the effect of the country's development level, an FDI and education level interactive variable, and an FDI and government effectiveness interactive variable on the relationship between FDI inflows and country-level entrepreneurial activity. In addition, based on the literature review, this study will examine if a curvilinear relationship exists between FDI Inflows and entrepreneurial activity and if that relationship is modified by these two interaction variables. Each of the variables used in this expanded regression model are listed in Table 4.1 below.

Table 4.1. Variables & Data Sources for Chapter 4 Study.

Dependent Variables	Variable Tag	Source
Number of New Businesses Created	*#NB*	World Bank Group Entrepreneurship Survey
Independent Variable		
FDI Inflows	*FDIInflows*	UNCTAD FDI Inflows (US $)
Control Variables		
GDP Level	*GDPLvl*	World Bank Annual Economic Report
Population	*Pop*	United Nations Population Division. World Population Prospects: 2019 Revision
Government Effectiveness	*GovEff*	World Bank Government Effectiveness Index, World Governance Indicators
Corruption Level	*CorLvl*	World Bank Control of Corruption Index, World Governance Indicators
Trade Policy	*TradePol*	World Bank Trade Openness Index
Education Level	*EducLvl*	Human Development Index, United Nations, Mean Years of Schooling
Moderating & Interaction Variables		
Level of Development	*DevLev*	Work Bank Annual Economic Report Classification 4-Tiers (LI, LMI, UMI, HI)
FDI and Education Level Interactive Variable	*FDIxEducLvl*	FDI Inflow variable times the Education Level variable
FDI and Institutional Quality Interaction Variable	*FDIxGovEff*	FDI Inflow variable times the Government Effectiveness Variable

Regression Model

Using the variables described above, the regression model from Chapter 3 is modified for use in this study to the following form:

$$\#NB = \beta o + \beta_1 FDIInf^{(t-1)} + \beta_2 GDPLvl^{(t-1)} + \beta_3 Pop^{(t-1)} + \beta_4 GovEff^{(t-1)} + \beta_5 CorLvl^{(t-1)} + \beta_6 TradePol^{(t-1)} + \beta_7 EducLvl^{(t-1)} + \beta_8 DelLev1_{(1,2,3,4)} + \beta_9 FDIxEducLvl + \beta_{10} FDIxInstQ + u$$

Hypotheses

Using the model above, and focusing on the main independent variable of interest in this study (FDI inflows), the following null and alternative hypotheses will be tested:

H_0: FDI inflows (*FDIInflows*) will directly affect the number of (*#NB*) of new businesses created in lower income (*LI*) countries.
H_1: FDI inflows (*FDIInflows*) will not directly affect the number of (*#NB*) of new businesses created in lower income (*LI*) countries.

H_0: FDI inflows (*FDIInflows*) will not directly affect the number of (*#NB*) of new businesses created in lower middle income (*LMI*) countries.
H_2: FDI inflows (*FDIInflows*) will directly affect the number of (*#NB*) of new businesses created in lower middle income (*LMI*) countries.

H_0: FDI inflows (*FDIInflows*) will not directly affect the number of (*#NB*) of new businesses created in upper middle income (*UMI*) countries.
H_3: FDI inflows (*FDIInflows*) will directly affect the number of (*#NB*) of new businesses created in upper middle income (*UMI*) countries.

H_0: FDI inflows (*FDIInflows*) will directly affect the number of (*#NB*) of new businesses created in higher income (*HI*) countries.
H_4: FDI inflows (*FDIInflows*) will not directly affect the number of (*#NB*) of new businesses created in higher income (*HI*) countries.

H_0: The interactive effect of FDI and Education level (*FDIxEducLvl)* will not produce a curvilinear relationship between (FDI inflows (*FDIInflows*) and the number of (*#NB*) of new businesses created.
H_5: The interactive effect of FDI and Education level (*FDIxEducLvl)* will produce a curvilinear relationship between (FDI inflows (*FDIInflows*) and the number of (*#NB*) new businesses created.

H_0: The interactive effect of FDI and Government Effectiveness (*FDIxInstQ)* will not produce a curvilinear relationship between (FDI inflows (*FDIInflows*) and the number of (*#NB*) new businesses created.
H_6: The interactive effect of FDI and Government Effectiveness (*FDIxInstQ)* will produce a curvilinear relationship between (FDI inflows (*FDIInflows*) and the number of (*#NB*) new businesses created.

Hypotheses 1-4 use the categorical variable of a country's development level to test differences in the FDI and entrepreneurship relationship by a country's level of income. Based on the literature previously discussed it is expected the impact of FDI on entrepreneurship will not be directly significant at the lower and higher income categories of development level supporting occupational choice model (OCM) of inward FDI crowding out new business starts. Conversely, it is expected that the impact of FDI inflows will directly and significantly impact the number of new businesses started in lower and upper middle-income countries supporting the KSTE. Finally, Hypotheses 5-6 will test the interactive effect of FDI inflows with both education level and government effectiveness on the inward FDI and entrepreneurship relationship. Based on theory found in literature it is expected that both interactive variables will significantly influence a curvilinear relationship between FDI and country level entrepreneurial activity.

Data

This essay examined country-specific variables which may produce a change in the effect of the influence of FDI inflows (*FDIInflow*) on entrepreneurial activity (i.e., #NB). Data were collected and analyzed to answer the previously stated research question and hypotheses. The data collected and analyzed for this study were the same as in Chapter 3 with the addition of two interactive variables: FDI inflows and education level (*FDIInflowxEducLvl*) and FDI inflows and government effectiveness (*FDIInflowxGovEff*). A total of 1652 observations from 154 countries were included in the regression analysis. The list of countries included in the study sample is found in Appendix C.

Results of the Study

To answer the research question, further analysis was performed on the data and model from Chapter 3. In this analysis, the dependent variable was the natural log of #NB. The predictor (independent) variables were *FDIInflow, GDPLvl, Pop, CorLvl, TradeOpen, EducLvl, DevLevl, and GovEff*. Interaction terms were included for FDIInflow x EducLvl and FDIInflow x GovEff. To account for the repeated observations within countries, a random intercept for country was included in the model as a variance component, and the covariance among repeated measurements (years) was modeled as first order auto regressive (AR1). To aid in interpretation, all continuous predictor variables were standardized prior to the analysis. *DevLevl* was dummy coded with a value of 1 serving as the reference category. To achieve model convergence and alleviate violations of model assumptions, the model was computed as a generalized estimating equation.

Table 4.2 displays the parameter estimates for the generalized estimating equation with the interaction terms included. The interaction between *FDIInflow* and *EducLvl* was not significantly linearly related to the natural log of *#NB* ($B = 0.02$, $p = .490$). The interaction between *FDIInflow* and *GovEff* was not significantly linearly related to the natural log of NB ($B = -0.04$, $p = .253$).

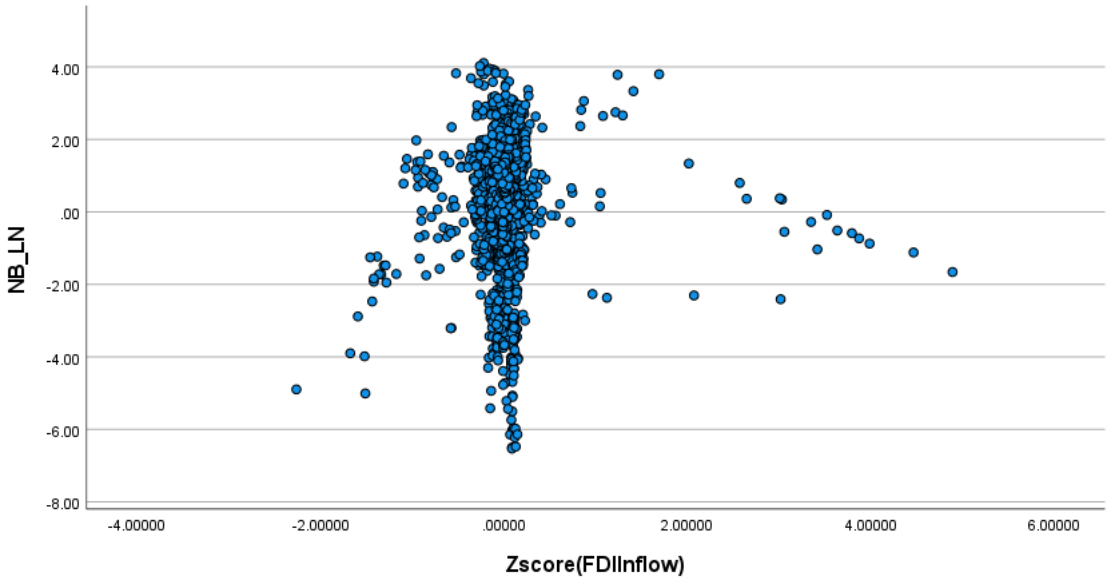
Table 4.2. Parameter Estimates for Linear Model Predicting Natural Log of NB with Interactions.

			95% CI		
Parameter	*B*	Std. Error	Lower	Upper	Sig.
(Intercept)	8.41	0.36	7.69	9.12	< .001
FDIInflow	0.05	0.04	-0.04	0.13	.308
GDPLvl	0.10	0.04	0.02	0.18	.021
Pop	0.62	0.16	0.30	0.93	< .001
CorLvl	0.08	0.07	-0.05	0.21	.222
TradeOpen	0.07	0.04	-0.01	0.16	.101
EducLvl	0.66	0.10	0.46	0.86	< .001
DevLevl 4 [ref: 1]	0.63	0.49	-0.33	1.60	.200
DevLevl 3 [ref: 1]	0.05	0.45	-0.84	0.93	.920
DevLevl 2 [ref: 1]	0.32	0.45	-0.57	1.20	.482
GovEff	-0.05	0.06	-0.18	0.07	.421
FDIInflow x EducLvl	0.02	0.02	-0.03	0.06	.490
FDIInflow x GovEff	-0.04	0.03	-0.10	0.03	.253

Source: Stata software output.

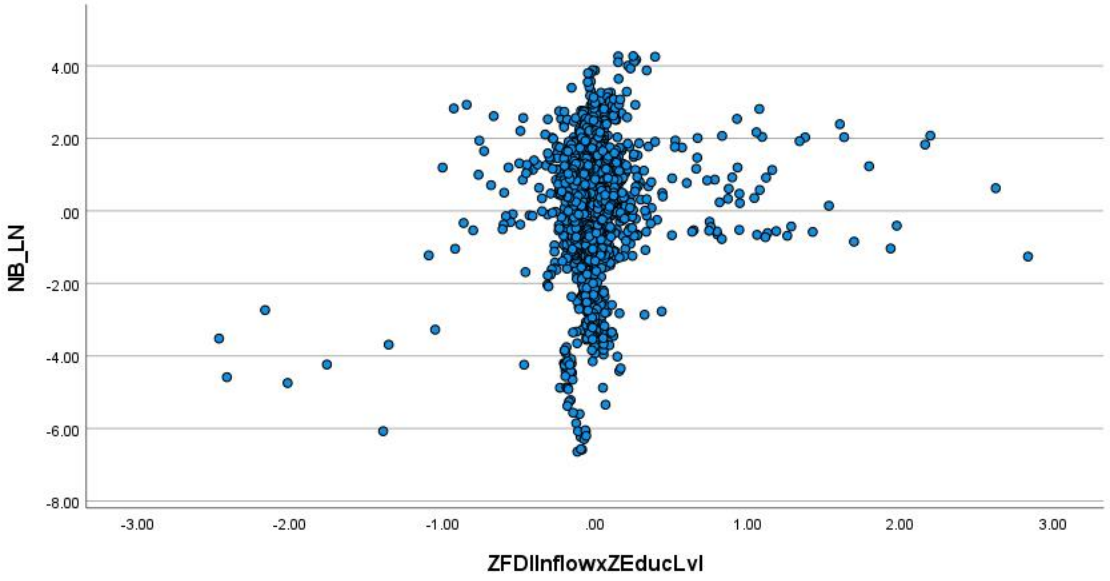
To examine whether the interactions may have had curvilinear effects, partial scatterplots were examined between *FDIInflow* and *#NB* (Figure 4.2.) and each of the interaction terms with *#NB* (Figures 4.3 and 4.4). The patterns in the scatterplots showed that there may be a curvilinear relationship, with the most parsimonious curvilinear function being the cube root function. Therefore, cube root terms were added to the model to test for significance of the curvilinear function. The parameter estimates of this model are displayed in Table 4.3. The cube root term for *FDIInflow* was significant (B = 0.17, p = .019), suggesting a significant direct curvilinear relationship between *FDIInflow* and *#NB*. The cube root interaction terms for *FDIInflow x EducLvl* (B = -0.01, p = .919) and *FDIInflow x GovEff* (B = -0.08, p = .330) were not significant, suggesting that *EducLvl* and *GovEff* do not moderate the curvilinear relationship between *FDIInflow* and *#NB*.

Figure 4.2. Partial Scatterplot of FDIInflow Versus Natural Log of NB.



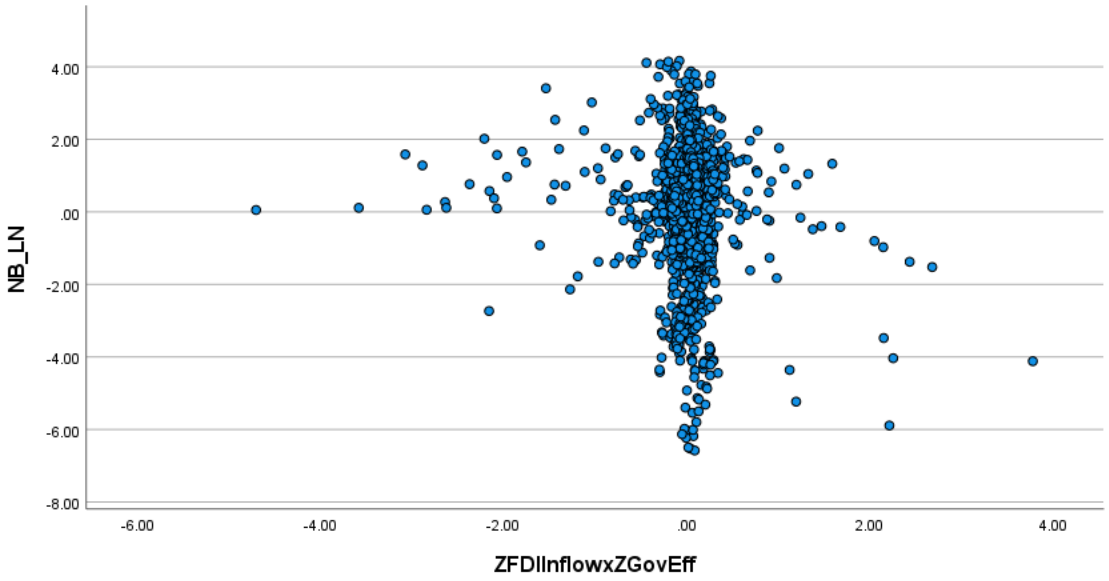
Source: Stata software output.

Figure 4.3. Partial Scatterplot of FDIInflowxEducLvl Versus Natural Log of NB.



Source: Stata software output.

Figure 4.4. Partial Scatterplot of FDIInflow x GovEff Versus Natural Log of NB.



Source: Stata software output.

Table 4.3. Parameter Estimates for Curvilinear Model Predicting Natural Log of NB with Interactions.

			95% CI		
Parameter	*B*	Std. Error	Lower	Upper	Sig.
(Intercept)	8.51	0.37	7.78	9.24	< .001
FDIInflow	-0.06	0.04	-0.14	0.02	.150
GDPLvl	0.11	0.05	0.02	0.21	.020
Pop	0.59	0.16	0.28	0.91	< .001
CorLvl	0.08	0.07	-0.05	0.21	.239
TradeOpen	0.07	0.04	-0.02	0.16	.108
EducLvl	0.66	0.11	0.45	0.87	< .001
DevLevl 4 [ref: 1]	0.58	0.50	-0.39	1.55	.241
DevLevl 3 [ref: 1]	0.02	0.45	-0.87	0.90	.973
DevLevl 2 [ref: 1]	0.31	0.45	-0.58	1.19	.498
GovEff	-0.08	0.08	-0.23	0.07	.313
FDIInflow x EducLvl	0.00	0.03	-0.06	0.05	.932
FDIInflow x GovEff	0.03	0.04	-0.04	0.11	.371
Cube root FDIInflow	0.17	0.07	0.03	0.32	.019
Cube root FDIInflow x EducLvl	-0.01	0.06	-0.13	0.12	.919
Cube root FDIInflow x GovEff	-0.08	0.08	-0.23	0.08	.330

Source: Stata software output.

In summary, a generalized estimating equation was computed to determine interactive effects on the relationship between *FDIInflow* and *#NB*. As shown in Chapter 3, there was no significant linear relationship between *FDIInflow* and *#NB*. Additionally, *DevLevl* was not significantly related to new business creation (*#NB*). Therefore, hypotheses H1, H2, H3, and H4 were not supported. Although there was a significant curvilinear relationship between *FDIInflow* and *#NB*, tests of interactions showed that *EducLvl* and *GovEff* did not moderate the linear or curvilinear relationship between *FDIInflow* and *#NB*. Therefore, H5 and H6 were also not supported.

Analysis of Results

Analysis of FDI Inflows by Development Level

This study found no evidence that economic development level influenced or moderated the relationship between FDI inflows and country level entrepreneurship. It is possible that this is a result of using a proxy measurement that is not very robust. The World Bank (2020) classification system for economic development level is based on the Atlas method of calculating gross national income (GNI) per capita, with set ranges for the four classifications of lower income (LI), lower middle income (LMI), upper middle income (UMI) and higher income (HI). Because these are categorical variables, they were coded 1-4 as dummy variables and are not linear variables. Movement between categories is rare, and movement within the range is not captured by a categorical variable.

The four categories have a diverse set of countries within these ranges, particularly in the high-income (HI) category. For example, Panama and Romania, which have GNI per capita of $14,010 and $14,170 respectively, both recently (after the dates of

this study) moved into the high-income category with the United States and Singapore which have per capita GNI of $69,288 and $116, 487 respectively (World Bank 2022). The income range within the top two categories (*HI* and *UMI*) is very wide, and the countries' differences in size, both geographically and population, are often dramatic. Again, consider the geographic, population, and cultural differences between United States, Singapore, Luxemburg, and United Arab Emirates, which are all classified as high-income countries by this categorical measurement.

Finally, the absence of a statically significant influence of economic development level should not be taken as evidence that this variable is not important to the inward FDI and entrepreneurship relationship. In fact, a curvilinear relationship was found in this study which could be evidence that some factors related to economic development level may be significant to the FDI inflow and entrepreneurial activity relationship. This point will be discussed further in a later section. Overall, despite considerable literature support for differences in the FDI inflow and entrepreneurship relationship by economic development level, this study was not able to validate that finding.

Analysis of FDI Inflows and Government Effectiveness Interaction Variable

It was anticipated that the interaction variable of FDI inflows and government effectiveness (*FDIInflow x GovEff*) would have a moderating effect producing a curvilinear relationship between FDI inflows and entrepreneurial activity. Unfortunately, that result was not valid in this study. In addition, this interactive variable also did not have a significant direct linear effect on the number of new businesses created (*#NB*). It should also be noted that government effectiveness (*GovEff*) was also not found to have a direct significant linear influence on the country-level entrepreneurial activity despite

being theorized as an important variable influencing new venture creation (Buchanan, Le, and Rishi 2012; Moya, Revuelto-Taboada, and Guerrero 2014; Slesman, Abubakar, and Mitra 2021). Again, the absence of a direct linear relationship between any of the potential predictor variables, with the exception of education level, could be attributed to the existence of the curvilinear relationship found between FDI inflows and new business starts.

The anticipated interactive influence of FDI inflows and government effectiveness (*FDIInflow x GovEff*) was based on the theory that government effectiveness, which is a subset of institutional quality, is enhanced by the introduction of inward FDI and that relationship is reciprocal (Estrin, Korosteleva, and Mickiewicz; Doytch and Epperson 2012). Further, some researchers have suggested that this interaction variable (*FDIInflow x GovEff*) crowds out entrepreneurial activity at the lower and higher levels of inward FDI and stimulates more new business creation at the middle levels of FDI inflows, producing a curvilinear relationship between those two variables of interest in this study (Hanousek, Kocenda, and Maurel 2011; Ghio et al. 2015; Sun, Lee, and Hong 2017). Again, this theory was not validated in this study.

As noted in the literature review in Chapter 3, the government effectiveness measure captures perception of the quality of government services, policies, and the political independence to implement policies (World Bank 2021). In a study this size it is possible this proxy variable, which is based on a perception index, was not capable of capturing the nuanced differences between countries. It is also possible that the interaction effect has a longer lag time on the variable of interest within this study (FDI Inflows and #NB) which is not captured by the one-year lag in the regression model. If it

is true that these two variables have an interaction effect, it would be hard to identify which is the leading or lagging influence and it is possible that this effect is different on a country-by-country basis. For example, one country might enhance their government effectiveness in an effort to attract FDI inflows, while another country improves their government effectiveness as a result of receiving new FDI inflows. Each of these scenarios are supported by existing literature and create a cyclical picture of the relationship which may be difficult to isolate statistically (Crespo and Fontouro 2007; Duade and Stein 2007; Freytag and Roy 2007; Ifikhar, Maha, and Audretsch, 2020). Overall, the interaction effect between FDI inflows and government effectiveness was not validated in this study in any form.

Analysis of FDI Inflows and Education Level Interaction Variable

The hypothesized outcome of the interaction variable of FDI inflows and education level (*FDIInflow x EducLvl*) producing a curvilinear relationship on FDI inflows and entrepreneurial activity was also not validated by this study. Nor was this interaction variable found to have a significant linear influence on the FDI inflow and entrepreneurship relationship at all, despite education level having a direct significant linear influence on new businesses created.

The expected interaction effect between FDI inflows and education level (*FDIInflow x EducLvl*) was based on theory that suggests inward FDI produces a crowding out effect at lower and higher levels of education which directly influences a curvilinear relationship between FDI inflows and country level entrepreneurship (Kher, Streeter, and Just 2012; Duran and Ryan 2014; Berrill, O'Hagan-Luff, and van Stel, 2018). This view is based on the idea that higher education levels increase the

opportunity cost of high wage employment versus starting a new business (Kher, Streeter, and Just 2012; Fujimori and Sato 2015). On the low end of the education level spectrum, it is believed that occupational choice also leads potential necessity-based entrepreneurs to choose steady employment from FDI created opportunities, and the low education level equates to a workforce with low absorptive capacity preventing future entrepreneurial activity (Aitken and Harrison 1999; Avci and Akin 2020). The results of this study find that education level (EducLvl) does have a direct linear influence on new business creation, while the FDI inflows and education level (*FDIInflow x EducLvl*) interaction variable has no significant linear impact on the number of new businesses (#NB) or significant influence on the curvilinear relationship found between the two variables of interest (FDI inflows and #NB).

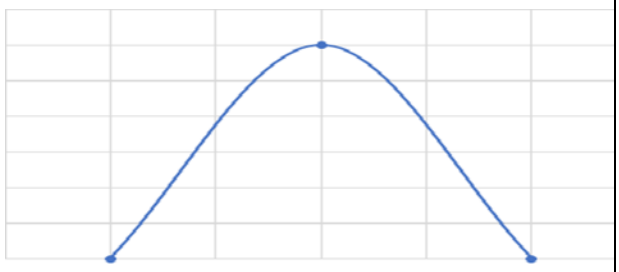
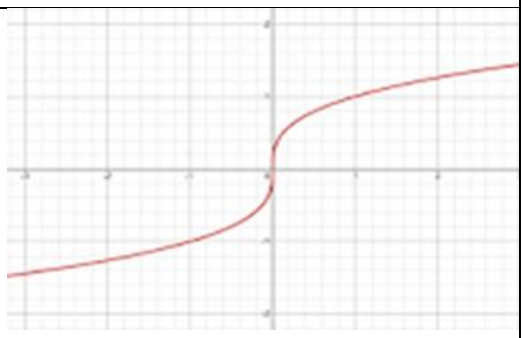
There are many potential reasons for this outcome. It is possible that education level is truly a direct linear influence on entrepreneurship, as many theorists would suggest (Crespo and Fontouro 2007; Baudino 2016). In other words, the higher the education level of a country the greater the level of entrepreneurship would be achieved. The results of this study support that view. In addition, it is possible the relationship between FDI inflows and education is more nuanced than represented in the literature. The theorized curvilinear relationship might be more applicable to horizontal spillovers than to vertical spillovers. For example, when a new FDI factory comes to a country it may lead some potential highly educated individuals to choose employment with the foreign MNC rather than competing by creating a startup. The same FDI event may cause another less educated individual to open a pallet making business or a laundry service to support the new factory. The difference between horizontal and vertical FDI spillovers

may explain the lack of validation of this result. Finally, it is possible that the lag time for the spillover is longer than the one year used in the study. Overall, there was no evidence of an interactive effect between FDI inflows and education level.

Analysis of the Significant Curvilinear Relationship

One of the key findings in this study is that there was a significant cube root curvilinear relationship between *FDIInflow* and *#NB*. While a curvilinear relationship was expected, the anticipated function was a U-shaped quadratic relationship and not an S-shaped cube root function. Figure 4.4. illustrates the anticipated function versus the actual finding in this study. This unanticipated finding requires more analysis.

Figure 4.5 Anticipated versus Actual Curvilinear Relationship of FDI Inflows and Entrepreneurial Activity.

Anticipated Function	**Actual Function**
	

One possible explanation for the cube root function finding is that the S-shape curvilinear relationship is close to the anticipated inverted U-shape function, with lower levels of FDI inflows producing less entrepreneurial activity and medium levels showing the expected rapid increase in new business starts while the higher end experiences a diminished return. In other words, the difference between the anticipated curve and the actual curve is that FDI inflows produce low growth or diminished returns in

entrepreneurial activity rather than declining returns on the low and high end of the investment spectrum. This also means the expectation that moderate levels of inward FDI does produce significant increases in new business starts is valid in this study.

The difference between declining and diminished returns is an important distinction in the findings in this study and other literature. It is possible that this cube root function is evidence that higher levels of crowding do occur at the lower and higher ends of the FDI investment continuum, although not enough to produce a declining effect overall on new venture creation. In this perspective, the S-curve function is in line with much of the rationale in the previously discussed literature which contends that FDI inflows have very different influences on entrepreneurship based on the context of the host country (Meyer and Sirani 2009; Qian and Acs 2013; Ali, Canter, and Roy 2016). The finding of a significant curvilinear relationship between FDI inflows and country-level entrepreneurial activity also explains the mixed results of the previous literature on this topic. While the relationship found in this study was not the anticipated inverted U-shaped curvilinear relationship, it does serve to validate those theorists who have argued that the relationship between FDI inflows and entrepreneurship activity is not linear (Sun, Lee, and Hong 2017; Berrill, O'Hagan-Luff, and van Stel 2018). Finally, the finding of a significant curvilinear relationship in this expanded model explains the lack of a finding of a significant linear relationship in the Chapter 3 study.

The finding of a significant S-shaped cube root function in this study has important implications. First, this finding does mean that not all FDI inflows are equal. Policymakers should consider where their respective countries sit on the continuum of inward FDI, as well as the types of FDI they pursue and the variety of entrepreneurial

support initiatives they provide. For example, countries on the lower end of the FDI curve should expect more entrepreneurial opportunities based on lower impact vertical linkages than horizontal spillovers that rely on absorptive capacity. Countries on the higher end of the FDI continuum should expect a diminishing return around spillover effects. Finally, countries in the mid-range of this continuum have tremendous opportunities to leverage inward FDI into domestic entrepreneurial activity.

Overall, the finding of a curvilinear relationship serves to support both the occupational choice model (OCM) and the knowledge spillover theory of entrepreneurship (KTSE) under certain conditions. This result is consistent with many previous studies which say that spillover effects are conditional on many nuanced country level factors (Burk, Gorg, and Hanley 2008; Meyer and Sirani, 2009; Ha and Giroud 2015).

Limitations of the Study

This study has many limitations including several that were discussed in Chapter 3. The limitations discussed in Chapter 3 were predominately focused on the challenges of finding suitable proxy measures for the variables in the study and dealing with missing data in the available measures in this field. To achieve the study's goal of having a large panel data set, it is possible that the measurements used might have missed some nuanced elements of the desired item being measured. It is also possible that the regression model lacks other key influences in the relationship between FDI inflows and entrepreneurship. In other words, the regression model may not be robust enough to capture the full complexity of the subject of this study. In addition, the study used a one-year lag time between the dependent variable and the predictor, interactive, and moderating variables

in search of both a linear and curvilinear relationship. It is possible that the effects of inward FDI on entrepreneurial activity may take longer to materialize than one year. Finally, as previous discussed, the nuanced conditions and potential for interactive effects between variables could put some limitations upon the analysis, although every effort was made to address these issues within the existing data and regression analysis.

Recommendations for Future Research

This study points to some key recommendations for future research. First, as previously discussed, there is a need to improve the quality and measures for many of the variables of intertest within this study. Also, as mentioned in the limitations, it is possible that future research could look at the time between FDI inflow and potential spillovers into entrepreneurial activity. It is likely that this time frame will vary depending on the industry and type of technology and processes that are involved. Also, future research should work to delineate between low impact and low-technology vertical spillovers and high impact, high technology spillovers. While this issue has been explored on a single company or single country basis, it has not been analyzed in a large-scale panel study. More effort needs to be made in future research to find or produce measures of key variables of interest that can be used for instrumentation into more comprehensive regression models of the FDI inflows and country level entrepreneurship activity. In short, there is a need for more theory on the relationship and more practical instrumentality to facilitate empirical research on this subject.

The finding of a cube root curvilinear relationship between inward FDI and country-level entrepreneurial activity should be explored further. Future research can study the effects of each level of the curve to see if there are other conditions producing

the S-shaped curve. It is possible that much of the theoretical logic predicting an inverted U-shaped curve applies to the S-shaped curve found in this study, but more work is needed to understand the nuanced differences between the results. Previous studies failing to find a direct linear relationship between inward FDI and country-level entrepreneurship might be rerun to see if a cube function was present in the data. Finally, future research might consider using an entrepreneurial ecosystem (EE) approach to understanding this key relationship. This study is the first to report a cube root function on this subject. Therefore, it will be important to see if other studies find a similar relationship,

Conclusions

In conclusion, the results of the study did not produce the anticipated results. The development level of the country did not significantly moderate the influence of FDI inflows on country-level entrepreneurial activity leading to the rejection of hypotheses 1-4. In addition, the two predictor interaction variables of FDI inflows and education level (*FDIInflow x EducLvl*) and FDI Inflows and government effectiveness (*FDIInflow x GovEff*) did not influence the relationship between FDI inflows and entrepreneurial activity or significantly directly influence the predicted curvilinear relationship. Finally, the anticipated curvilinear relationship between FDI Inflows and entrepreneurial activity did not take the inverted U-shape function, but rather was found to be significant in a cube root S-shaped function indicating a diminishing return of FDI spillover on entrepreneurship at the lower and higher ends of the investment curve. The results of this study, while not producing the anticipated findings, do contribute to the growing body of

knowledge in both the fields of FDI spillover and comparative entrepreneurship literature.

CHAPTER V – SUMMARY AND CONCLUSIONS

Summary of the Dissertation

This 3-study dissertation examined emerging topics within the fields of comparative entrepreneurship and foreign direct investment (FDI) spillovers. The study was designed to first test the similarities among existing comparative entrepreneurship measures. That study was described in chapter 2. The primary focus of this dissertation was concerned with the relationship between FDI inflows and domestic entrepreneurship. Specifically, this study was interested in exploring if inward FDI increases or decreases country-level entrepreneurial activity. Two competing theories argue for different outcomes related to the impact of inward FDI on domestic entrepreneurship. The knowledge spillover theory of entrepreneurship (KSTE) contends that domestic entrepreneurship is increased by FDI inflows, while the occupation choice model (OCM) asserts that domestic entrepreneurial activity decreases with the injection of inward FDI (Berrill, O'Hagan-Luff, and van Stel 2018). Study 2 (Chapter 4) tested the direct linear relationship between FDI inflows and country-level entrepreneurship, as well as the direct linear impact of some selected control variables on domestic entrepreneurship. Finally, study 3 (Chapter 4) examined country specific moderating and interaction variables believed to influence the relationship between the two variables of interest. The following section summarizes each of the three studies.

Study 1

Comparative entrepreneurship is an important emerging subfield within the domain of international entrepreneurship (Baker, Gedajiovic, and Lubatkin 2005). However, this subfield seems to be constrained by a lack of available measures needed to

do comprehensive quantitative empirical work and a lack of clear definitional specifications for these proxy variables (Acs, Desai, and Klapper 2008; Marcotte 2013). This study confirms that viewpoint as six key measures of comparative entrepreneurship were used in a correlation matrix to analyze how similar the measures are statistically. An overview of the study and its results are included in Table 5.1. The study collected data on 6 country-level measures from 172 countries and territories during the years of 2005 to 2019 and a correlation matrix was run to look for levels of similarity. Due to large amounts of missing data, full information maximum likelihood estimation was utilized. In general, the study found that most of the comparative entrepreneurship measures had large amounts of missing data and that these measures are not as similar as expected based on correlation results.

Table 5.1. Overview of Chapter 2 (Study 1).

Purpose of the Study	**Research Question**	**Summary of Findings**
The purpose of this study was to compare the existing measures of entrepreneurship available for comparative entrepreneurship research.	How well do the existing comparative entrepreneurship measures correlate to each other?	The number of new businesses created (*#NB*) did not have a high correlation (r>.6) with Total Early-stage Entrepreneurship (*TEA*).

Table 5.1 Continued

		The number of new businesses created did not have a high correlation (r>.6) with the (GEI) Global Entrepreneurship Index.
		Total Early-stage Entrepreneurship (*TEA*) did not have a high correlation (r>.6) with the (GEI) Global Entrepreneurship Index.
		Business ownership (*GEM Own*) rate did not have a high correlation (r>.6) with the (*WBDen*) World Bank Business Density Rate.
		The (*GEI*) Global Entrepreneurship Index did not have a moderate correlation (r>.3) with TEA-Opportunity (*TEAOpp*).
		All 5 hypotheses were rejected.

Table 5.1 Continued

		Key findings in the study would be the high rate of missing data within many of the leading measures of comparative entrepreneurship, and the low levels of correlation between measures purporting to measure similar constructs.

Study 2

The relationship between FDI inflows and entrepreneurial activity is complex and multifaceted as this study has illustrated. Study 2 focuses on examining the relationship between FDI inflows and the number of new businesses started (*#NB*) as a proxy for country-level entrepreneurship. The study utilized a linear regression model to test the relationship between FDI inflows and country-level entrepreneurial activity using seven additional control variables. In addition, four of the seven control variables were expected to have a significant direct influence on new businesses created. Those variables include government effectiveness, control of corruption, trade openness, and education. Data was collected from 154 countries and territories from the year 2005 to 2019 and likewise exclusion was used to account for missing data.

An overview and results of Chapter 3 (Study 2) are displayed in table 5.2 below. In short, a significant direct linear relationship was not found between FDI inflows and

country-level entrepreneurial activity. Neither were there any significant, direct linear relationships between three control variables of government effectiveness, control of corruption, trade openness and the dependent variable of new businesses created which served as the proxy variable for country-level entrepreneurship. There was a significant direct linear relationship between education level and new ventures created.

Table 5.2. Overview of Chapter 3 (Study 2).

Purpose of the Study	**Research Question**	**Summary of Findings**
The purpose of this study was to test the influence of FDI inflows on country-level entrepreneurship.	Do FDI inflows influence entrepreneurial activity at the country level?	There was no significant direct linear relationship between FDI inflows (*FDIInflows*) and the number of new businesses created (*#NB*).
		There was no significant direct linear effect between government effectiveness (*GovEff*) and the number of new businesses created (*#NB*).
		There was no significant direct linear effect between control of corruption (*CorLvl*) and the number of new businesses created (*#NB*).

Table 5.2 Continued

		There was no significant direct linear effect between trade openness (*TradePol*) and the number of new businesses created (*#NB*).
		There was a significant direct linear relationship between education level and the number of new businesses created (#NB).
		Hypotheses 1-4 were rejected, and Hypotheses 5 was accepted.
		The major application in this study is that education level (*EducLvl*) does significantly and directly influence country-level entrepreneurship.

Study 3

The third study in this dissertation expanded on the research model used in Chapter 3 to examine if a country's economic development level moderated the

relationship between FDI inflows and country-level entrepreneurial activity. The study also tested to see if a non-linear relationship existed between FDI inflows and number of new business startups and, if so, was the curvilinear relationship moderated by the interaction of FDI inflows with government effectiveness and education level. The data was analyzed using scatterplots to test if a curvilinear relationship existed between the two variables of interest. When the shape of the scatterplot indicated that a cube root function, rather than a quadratic function, might exist in this relationship, a regression model was run to test if there was a significant cube root function.

An overview and summary of the findings are found in Table 5.3. Overall, this study determined that economic development level did not moderate the relationship between inward FDI and country-level entrepreneurial activity. The study did find a significant direct cube root relationship between these two variables. However, the two interaction variables were not found to significantly influence the relationship.

Table 5.3. Overview of Chapter 4 (Study 3).

Purpose of the Study	**Research Question**	**Summary of Findings**
The purpose of this study was to test the influence of potential moderating and interaction variables on the relationship between FDI inflows and entrepreneurial activity at the country-level.	Do some country-specific variables produce a change in the effect of the influence of FDI inflows on entrepreneurial activity at the country level?	Economic development level did not have moderating effect on the FDI inflow and country-level entrepreneurship relationship at any of the 4 income levels.

Table 5.3 Continued

		The interaction of FDI with education level and government effectiveness did not significantly influence the FDI inflow and country-level relationship in any manner.
		This study did find a significant direct cube root curvilinear relationship (S-curve) between FDI inflows and country-level entrepreneurial activity.
		All 6 hypotheses were rejected.

Importance of the Topic for Economic Policy Makers

The availability of measures of comparative entrepreneurship is a very important issue for economic policy makers. This study has clearly indicated that these measures are not interchangeable nor are they readily available for statistical testing or even for

basic trend analysis in many countries due to missing data. This is a serious problem for economic development leaders who need real empirical data to evaluate the results of policies initiatives. The amount of missing data in the comparative entrepreneurship datasets is extremely high. This makes it very difficult to spot trends or evaluate results of policy decisions. All leaders need the best data available to make sound economic decisions. Currently, in many countries data related to national entrepreneurship is not available. For this reason, the topic of producing sound measures for comparative entrepreneurship is vitally important to economic policy makers. These leaders should demand and facilitate improvement in this area.

The relationship between FDI inflows and domestic entrepreneurship is very important to economic policy makers. As noted earlier, economic policy makers need to know if inward FDI will encourage domestic entrepreneurship or suppress it. The existence of two competing theories seems to suggest that the answer is that it depends on country-level conditions which are highly nuanced. The finding in this study of an S-curve relationship between FDI inflows and entrepreneurial activity would support the idea that certain conditions dictate better gains from FDI spillovers. Gaining a better understanding of when and how FDI spillovers lead to increased domestic entrepreneurship would be an asset to economic development officers and policy makers in all countries, but especially in developing economies. This topic is highly relevant to economic development around the world.

Importance of the Topic for Future Researchers

The availability of measures of comparative entrepreneurship is a critically important issue for future researchers in this field. In addition, researchers using

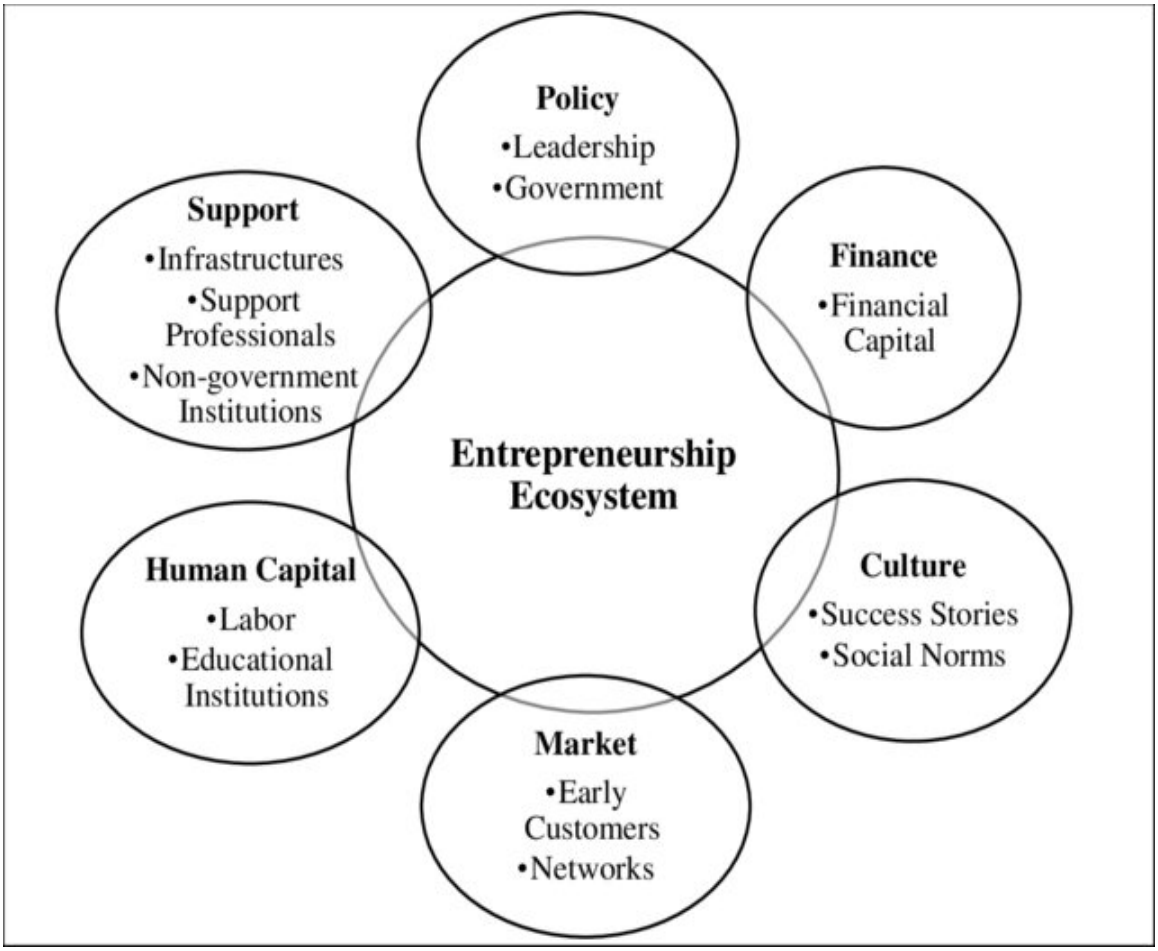
comparative entrepreneurship as a control or moderating variable in other fields of study will also need assessable measures. The lack of availability of these measures due to missing data is a major challenge to conducting research as this study has demonstrated. Scholars should work together with institutions such as the World Bank to find new ways of defining potential measures of comparative entrepreneurship and ensuring that the data is collected on an annual basis to eliminate the large gaps of missing data that currently exist within these datasets. Academic membership and thought groups such as the Academy of International Business (AIB) or the International Council for Small Business (ICSB) should make these actions a top priority to ensure that future research can advance in this field. Without improving the quality and accessibility of comparative entrepreneurship measures the field of study will continue to be underdeveloped (Marcotte 2013).

The relationship between FDI inflows and domestic entrepreneurship is also a very important topic to future researchers. Scholars in the fields of economic development, international political economy, international business, and other related fields will need to continue to conduct research in this field. As previously discussed, economic policy makers need empirical data to help determine the best policy choices for economic growth and development. The existence of mixed empirical results related to this topic is likely the result of challenges with measurement as previously discussed and due to the possibility, as confirmed in this study, that these two variables do not have a linear relationship. The many nuanced differences in types of FDI spillovers and other country-level conditions need to be explored more deeply to create a stronger theoretical basis for this topic.

Conclusions

In conclusion, this dissertation has examined the existing measures of comparative entrepreneurship and tested the relationship between FDI inflows and country-level entrepreneurial activity. The results of most of the statistical analysis with the three studies were not anticipated. However, the study has illustrated that the existing measures used in comparative entrepreneurship studies are not interchangeable and that these measures also have serious problems regarding the availability of such data for use in large sample time-series panel studies. The two studies testing the relationship between FDI inflows and country-level entrepreneurial activity did not find a significant direct linear relationship between these two variables of interest. However, a significant direct linear relationship between education level and country-level entrepreneurial activity was found. Additionally, a significant, direct, cube root curvilinear relationship was found, which is a major result that has important implications for this field of study. It is the conclusion of this study that much of the mixed results of previous empirical research on this topic is due to the existence of a non-linear relationship between the variables of interest. Overall, this study has contributed new empirical research findings to the literature of FDI spillovers and comparative entrepreneurship.

APPENDIX A –Isenberg's Model of Entrepreneurial Ecosystems (2011)



APPENDIX B List of Countries in Chapter 2 Data Set

Afghanistan	Dominican Republic	Lebanon	Samoa
Albania	Ecuador	Lesotho	Sao Tome/Principe
Algeria	Egypt	Liberia	Saudi Arabia
Angola	El Salvador	Libya	Senegal
Antigua/Barbuda	Estonia	Liechtenstein	Serbia
Argentina	Ethiopia	Lithuania	Seychelles
Armenia	Finland	Luxembourg	Sierra Leone
Australia	France	Macedonia	Singapore
Austria	Gabon	Madagascar	Slovakia
Azerbaijan	Gambia, The	Malawi	Slovenia
Bahrain	Georgia	Malaysia	South Africa
Bangladesh	Germany	Maldives	South Sudan
Barbados	Ghana	Mali	Spain
Belarus	Greece	Malta	Sri Lanka
Belgium	Grenada	Mauritania	St. Lucia
Belize	Guatemala	Mauritius	St. Vincent/Grenadines
Benin	Guinea	Mexico	Suriname
Bhutan	Guyana	Moldova	Swaziland (Eswatini)
Bolivia	Haiti	Mongolia	Sweden
Bosnia/Herzegovina	Honduras	Montenegro	Switzerland
Botswana	Hong Kong	Morocco	Taiwan
Brazil	Hungary	Mozambique	Tajikistan
Brunei Darussalam	Iceland	Myanmar	Tanzania
Bulgaria	India	Namibia	Thailand
Burkina Faso	Indonesia	Nepal	Timor-Leste
Burundi	Iran	Netherlands	Togo
Cabo Verde	Iraq	New Zealand	Tonga
Cambodia	Ireland	Nicaragua	Trinidad/Tobago
Cameroon	Israel	Niger	Tunisia
Canada	Italy	Nigeria	Turkey
Central African Rep.	Jamaica	Norway	Uganda
Chad	Japan	Oman	Ukraine
Chile	Jordan	Pakistan	United Arab Emirates
China	Kazakhstan	Panama	United Kingdom
Colombia	Kenya	Paraguay	United States
Comoros	Kiribati	Peru	Uruguay
Congo, Dem. Rep.	Korea	Philippines	Uzbekistan
Costa Rica	Kosovo	Poland	Vanuatu
Côte d'Ivoire	Kuwait	Portugal	Venezuela
Croatia	Kyrgyz Republic	Puerto Rico	Vietnam
Cyprus	Lao PDR	Qatar	Zambia
Czech Republic	Latvia	Romania	Zimbabwe
Denmark		Russia	
Dominica		Rwanda	

APPENDIX C –List of Countries in Chapters 3 & 4 Data Set

Afghanistan	Czech Republic	Latvia	Rwanda
Albania	Denmark	Lesotho	Samoa
Algeria	Dominica	Liberia	Saudi Arabia
Antigua/Barbuda	Dominican Rep.	Lithuania	Senegal
Argentina	Egypt	Luxembourg	Serbia
Armenia	El Salvador	Macedonia	Seychelles
Australia	Estonia	Madagascar	Sierra Leone
Austria	Ethiopia	Malawi	Singapore
Azerbaijan	Finland	Malaysia	Slovakia
Bahrain	France	Maldives	Slovenia
Bangladesh	Gabon	Mali	South Africa
Barbados	Georgia	Malta	South Sudan
Belarus	Germany	Mauritania	Spain
Belgium	Ghana	Mauritius	Sri Lanka
Belize	Greece	Mexico	St. Lucia
Benin	Grenada	Moldova	St. Vincent/Grenadines
Bhutan	Guatemala	Mongolia	Suriname
Bolivia	Guinea	Montenegro	Swaziland (Eswatini)
Bosnia/Herzegovina	Guyana	Morocco	Sweden
Botswana	Haiti	Mozambique	Switzerland
Brazil	Hong Kong	Myanmar	Tajikistan
Brunei Darussalam	Hungary	Namibia	Tanzania
Bulgaria	Iceland	Nepal	Thailand
Burkina Faso	India	Netherlands	Timor-Leste
Cabo Verde	Indonesia	New Zealand	Togo
Cambodia	Iraq	Niger	Tonga
Canada	Ireland	Nigeria	Tunisia
Central African	Israel	Norway	Turkey
Republic	Italy	Oman	Uganda
Chad	Jamaica	Pakistan	Ukraine
Chile	Japan	Panama	United Arab Emirates
China	Jordan	Paraguay	United Kingdom
Colombia	Kazakhstan	Peru	Uruguay
Comoros	Kenya	Philippines	Uzbekistan
Congo, Dem. Rep.	Kiribati	Poland	Vanuatu
Costa Rica	Korea	Portugal	Vietnam
Côte d'Ivoire	Kuwait	Qatar	Zambia
Croatia	Kyrgyz Republic	Romania	Zimbabwe
Cyprus	Lao PDR	Russia	

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