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FORMAL INSTITUTIONS AND THE DEVELOPMENT OF ENTREPRENEURIAL ACTIVITY - THE CONTINGENT ROLE OF CORRUPTION IN EMERGING ECONOMIES

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ABSTRACT:

The paper aims to analyse the interplay between formal and informal institutions' and their impact on entrepreneurship rates in emerging economies.

This study expands previous research in examining the moderating effect of control of corruption on the relationship between formal institutions and the development of the entrepreneurial activity. The study utilizes longitudinal analyses of a dataset from 41 emerging economies over 11 years (2006-2016).

Findings provided robust support for the studyâ€™s hypotheses. The results suggested lower levels of corruption positively moderate the effects of a countryâ€™s number of procedures and education and training on the rates of entrepreneurial activity, while negatively moderating the effects of firm-level technology absorption on the rates of entrepreneurial activity.

The study has considered only one particular aspect of high-growth entrepreneurship, which is newly registered firms with limited liability. Although newly registered firms are recognized as one of the critical drivers of entrepreneurial activity. Future research should seek to examine other aspects of growth-oriented entrepreneurship such as activities involving a high level of innovation, corporate entrepreneurship or technology developments.

This study advanced the existing theories in the field of entrepreneurship and Institutional Economics as it merged the two theories as a driving framework in the design of the study in the context of emerging economies.

The study tested a theoretical model by expanding the number of emerging economies in the study and found comparable findings that explain factors that may inï¬‚uence the likelihood of individuals entering entrepreneurship.

This article adds to the current literature as it highlights the importance of the interplay of formal and informal institutions in determining their impact on entrepreneurship rates in emerging economies. This is of particular importance to policy-makers, and the business world as the empirical results of this study show the benefits of control of corruption in boosting entrepreneurial rates in these economies, which strive for economic diversification in their developmental endeavours.

FORMAL INSTITUTIONS AND THE DEVELOPMENT OF ENTREPRENEURIAL ACTIVITY - THE CONTINGENT ROLE OF CORRUPTION IN EMERGING ECONOMIES

Introduction

This study considers the interplay between formal and informal institutional factors that might affect entrepreneurial activity levels in emerging economies. The literature to date has highlighted the importance of the institutional environment to increase the rates of entrepreneurial activity (Fuentelsaz et al., 2018; Urbano et al., 2018). While reforming formal institutions is integral to overall institutional effectiveness, such improvements do not necessarily guarantee increased entrepreneurial activity in the case of emerging economies (Bruton *et al.*, 2013).

On the surface, governments in emerging economies pass laws and regulations similar to those seen in developed economies. However, these commercial laws that are conducive to entrepreneurship are not implemented efficiently (Aidis *et al.*, 2008; Tonoyan *et al.*, 2010; Smallbone *et al.*, 2014). In this realm, De Clercq *et al.* (2010) suggested that emerging economies that adopt rules and regulations from developed countries to accelerate the entrepreneurial activity may not find them useful without understanding the power of informal institutions such as local cultures and traditions.

In this vein, recent studies supported this argument and showed that informal institutions influence entrepreneurship more than formal ones (Urbano and Alvarez, 2014; Aparicio et al., 2016). Informal institutions such as cultural values (Hayton and Cacciotti, 2013; Fernández-Serrano and Romero, 2014); social networks (De Clercq et al., 2010; Estrin et al., 2013; Stenhom et al., 2013), media attention (Stenholm et al., 2013), social recognition (Stenhom et al., 2013; Urbano and Alvarez, 2014; Castaño-Martínez et al., 2015; Castaño et al., 2015), and

role models (Álvarez and Urbano, 2011), and these informal institutions' impact on entrepreneurial activity have seen considerable attention in the literature. However, while corruption has been purported to be among the most important negative indicators for entrepreneurship, to date, literature focusing on the interaction effect of corruption with other formal institutions is significantly underrepresented in the literature (Anokhin and Schulze, 2009; Aidis *et al.*, 2012).

Corruption is defined as the informal abuse of public assets for private gains that impact the allocation of the resources (Aidis et al., 2012; Payne et al., 2013; Chowdhury et al., 2015). It is argued that widespread corruption becomes embedded into the culture and subsequently forms into the social norm of behaviour (North, 1990; Williamson, 2000). In this vein, this study follows the work of Aidis et al. (2012) in considering corruption as an informal institution that impacts the entrepreneurial rate through interacting with formal institutions.

Concerning the methodology, the study incorporated a panel (longitudinal) data analysis to examine the interaction effect of formal and informal institutions of entrepreneurial activity in line with the methodology adopted by Ghura et al. (2019) and expanded the study population of the study to include 41 emerging economies over the years 2006-2016. Such panel data analysis was selected to enhance the validity of the findings by Ghura et al. (2019) by expanding the number of countries while considering sufficient controls to account for institutional differences in the context of emerging economies (Bruton et al., 2008; Levie and Autio, 2011).

This paper proceeds as follows. First, we theorise about the interactions of formal institutions, and informal institutions and their impact on entrepreneurial activity and subsequently offer a framework that is conducive for entrepreneurial activity. Second, we explain our sample data and methodology. Third, we present and discuss the statistical results and finally, we present the conclusion and future research recommendations.

Theoretical Background

Recent trends in entrepreneurship research have heightened the need for understanding the variations of entrepreneurial activity through the lens of institutional theory in the case of emerging economies. However, the review of both the theoretical and empirical literature has revealed that most studies addressing the development of entrepreneurial activity have neglected to consider the interaction effect of formal and informal institutions in emerging economies (Acs et al., 2014a, b; Aparicio et al., 2016; Urbano et al., 2018). Moreover, Boettke and Coyne (2009) highlight the lack of a clear understanding of the role institutional environment play in influencing entrepreneurship. Specifically, scholars have raised questions in regards to the role of institutions in increasing entrepreneurship and which institutional dimensions are most important for explaining entrepreneurial activity rates (Bruton *et al.*, 2010; Levie and Autio, 2011).

North (1990), posits that institutions are "rules of the game in a society, or more formally, the constraints that shape human interaction" (North, 1990, p. 3). Institutions can be classified into formal factors such as contracts, regulations and laws, and informal factors such as culture, values, and social norms of a given country. Moreover, he elaborated that formal institutions exist to decrease the transactional costs caused by laws, where the role of informal institutions is to reduce the uncertainties of human interactions.

In this vein, Williamson (2000) argued that formal institutions take a relatively short period to change, while informal institutions take longer to change than formal ones. Culturally derived informal institutions might limit the intended improvements of formal institutions and vice versa (North, 1990; Williamson, 2000). Therefore, the interactions between formal and informal institutions produce outcomes that have significant implications for increasing "productive" entrepreneurial activity (Baumol, 1990; North, 1990).

Therefore, building on North's (1990) and Williamson's (2000) argument, the efficiency of formal institutions, such as new laws and regulations, could depend on the cultural values in a particular society. An example of this interaction could be seen in the case of enforcing traffic laws in a specific country. Although traffic laws are generally standard across countries, the effectiveness of these formal laws depends on to what extent large numbers of drivers voluntarily adopt and accept such rules through prolonged self-commitment. Therefore, effective social norms such as honesty, hard work, and integrity can lower the cost of transactions and make productive outcomes possible (North, 1990; Boettke and Coyne, 2009).

This idea was examined recently by Krasniqi and Desai (2016), who examined the interaction effect of formal institutions (measured by the tax administration, trade and customs regulations, tax rate, and business licensing/permits), and informal institutions (measured by the functioning of the judiciary/courts, anti-competitive practices of competitors, policy uncertainty, and corruption) on the rates of high growth firms (HGFs) in 28 emerging economies. The authors found that the interaction effects between formal and informal institutions, rather than direct effects, positively impact the development of HGFs. In particular, informal institutions are positively associated with HGFs in emerging economies where formal institutions have slower reform conditions. This suggests that informal institutions have a slower rate of change and could hinder the development of formal institutions by greasing the wheels. On the other hand, when emerging economies have fast-reforming formal institutions, informal institutions have less influence on the facilitation of transactions (Krasniqi and Desai, 2016).

Relatedly, using the Global Entrepreneurship Monitor (GEM) survey in 42 countries (including both developed and developing countries) for 2001-2006, Estrin et al. (2013) found that higher levels of corruption (as an informal institution), weaker property rights and larger

size of the government significantly hinder the rates of entrepreneurial growth. Simultaneously, local social networks (as an informal institution) alleviate the effects of some of these institutional deficiencies (Estrin et al., 2013). These findings (Estrin et al., 2013; Krasniqi and Desai, 2016) were in line with Thornton *et al.* (2011) and Aparicio *et al.* (2016), who contended that informal institutions, although they are less dynamic, could influence entrepreneurship rather than formal institutions.

To this end, the study of institutional environment's dynamics with entrepreneurship is necessary to offer a better understanding of the various rates of entrepreneurial activity among emerging economies. In the next section, a new conceptual model is developed.

The Developed Framework

As above-mentioned, there is a need to understand the variations of entrepreneurial activity through the lens of institutional theory (e.g., Acs *et al.*, 2014a, b; Aparicio *et al.*, 2016) by focusing on the interaction effects between formal and informal institutions (Acs *et al.*, 2014a, b; Urbano *et al.*, 2018). Therefore, in this section, we can present a new institutional framework that permits the development of entrepreneurial activity based on the interplay between formal and informal institutions. This paper does not attempt to offer a complete institutional environment for entrepreneurship. We hope, however, that this study could contribute to the previous conceptual models of new business activity by developing a conceptual model that can help to explain the varying in rates of entrepreneurship in emerging economies.

In line with the discussion above, the criteria for developing the study's institutional framework for entrepreneurship were as follows:

First, to organise our discussion of the institutional factors included in our model, we rely on the model of Gnyawali and Fogel (1994). Gnyawali and Fogel (1994) suggested an entrepreneurial framework inclusive of five dimensions of the entrepreneurial environment:

(1) government policies and procedures, (2) social and economic factors, (3) entrepreneurial and business skills, and (4) financial and (5) non-financial assistance to businesses. In this regard, recent empirical studies found Gnyawali and Fogel's (1994) framework conducive in examining the impact of institutional dimensions on entrepreneurial activity (Álvarez and Urbano, 2011; Fuentelsaz *et al.*, 2015; Aparicio *et al.*, 2016).

Therefore, in the government policies and procedures dimension, this study focused specifically on whether and how government procedures affect new business start-ups. Next, the entrepreneurial and business skills dimension is proxied by society's education and training. As regards financial assistance, access to credit in an economy is discussed in this part. Also, non-financial assistance is identified through technology absorption by firms. Finally, social conditions are explained through the level of corruption in a specific country. The choice in selecting these institutional variables was informed by considerable evidence that these institutions are significant in shaping "productive" entrepreneurial activity (Álvarez and Urbano, 2011; Stenholm *et al.*, 2013; Aparicio *et al.*, 2016). Moreover, following the model, economic development related to GDP growth is included as a control variable in this study (Álvarez and Urbano, 2011; Levie and Autio, 2011; Álvarez *et al.*, 2014; Chowdhury *et al.*, 2015).

Second, the interaction between formal and informal institutions was presented in the framework (North, 1990; Williamson, 2000). Williamson (2000) suggested a hierarchy of institutional frameworks to differentiate the level of formal and informal institutions. Thus, our conceptual framework extends North's (1990, 2005) propositions on institutional dynamics, as well as Williamson's (2000) concept of the hierarchy of institutions. Recent studies used the ideas of North (1990, 2005) and Williamson (2000) to offer a better understanding of the institutional dynamics and their effect on increasing entrepreneurship rates (Aidis *et al.*, 2012; Estrin *et al.*, 2013).

As a result, government procedures, education and training, access to credit and technology absorption are considered as formal institutions, whereas corruption is considered as an informal institution in this study. Moreover, considering that corruption is located in the highest level of the hierarchy of institutions, the study's conceptual framework is designed to analyse the moderating effects of corruption on the relationship between formal institutions and entrepreneurial activity in emerging economies.

Finally, this framework attempted to develop hypotheses worth pursuing to be tested empirically using panel (longitudinal) data analysis, as suggested by the literature (Bruton *et al.*, 2008; Levie and Autio, 2011, Ghura et al., 2019).

Since the direct effect of formal institutions: the number of procedures (Urbano and Alvarez, 2014; Castaño-Martínez et al., 2015; Chowdhury et al., 2015; Fuentelsaz et al., 2015; Aparicio et al., 2016), Access to credit (Castaño-Martínez et al., 2015; Fuentelsaz et al., 2015; Aparicio et al., 2016), tertiary education (Castaño-Martínez et al., 2015; Chowdhury et al., 2015; Fuentelsaz et al., 2015; Aparicio et al., 2016), Technology absorption (Stenholm et al., 2013; Acs et al., 2014b), as well as effects of country-level corruption (El Harbi and Anderson, 2010; Aidis et al., 2012; Estrin et al., 2013; Chowdhury et al., 2015) on entrepreneurship has been empirically established, we refrained from engaging in a lengthy review of those effects. Thus, the study's conceptual framework is designed to analyse the moderating effects of control of corruption on the relationship between formal institutions and entrepreneurship activity, as shown in Figure 1.

Insert Figure 1 here.

By doing so, this study is able to extend the current literature, which only addresses these institutional variables separately (Stenholm *et al.*, 2013; Fuentelsaz *et al.*, 2015; Aparicio *et al.*, 2016; among others). It does this by designing a model that can help to explain the differences in entrepreneurial activity in emerging economies. This study is

building on Ghura et al. (2019), which explicitly argues that the impact of formal institutions on the development of entrepreneurial activity is more robust in the presence of lower levels of corruption and aims to ascertain whether similar results are accurate in terms of the impact of the interaction between formal and informal institutions on entrepreneurial activity albeit an expanded group of emerging economies.

The Importance of Control Corruption as a Moderator between Formal Institutions and Entrepreneurship (Hypotheses Development)

The current literature is discrepant when it comes to ascribing the role of corruption on entrepreneurship activity and economic growth (Dutta and Sobel, 2016). On the one hand, grease the wheel theory, suggests that corruption can help entrepreneurship by shortening the start-up process for aspiring entrepreneurs (Aidt, 2009; Dreher and Gassebner, 2013; Krasniqi and Desai, 2016). On the other hand, a larger body of research has demonstrated the overall negative impact of economic development in the long run, primarily due to rent-seeking from entrepreneurs by corrupt officials (Aidt, 2009; Anokhin and Schulze, 2009; Aidis et al., 2012; Avnimelech et al., 2014; Aparicio et al., 2016; Dutta and Sobel, 2016).

Consequently, in light of the current difference in the literature, hypotheses formed in this section aim to expand the understanding of the indirect effect of corruption as a moderator between formal institutions and entrepreneurial activity (Pathak *et al.*, 2015) as an expanded empirical study of Ghura et al., (2019). Consistent with assertions of the signalling theory (Spence, 1973), formal institutions (e.g., business regulations) are likely to have a more positive impact on entrepreneurial activity in a corruption-free environment (Levie and Autio, 2011). In other words, if corruption is low, formal institutions are likely to have a better impact on entrepreneurial activity. However, high levels of corruption, may undermine

entrepreneurs' confidence in the reform of formal institutions and, therefore, it will affect their decisions to start and grow their ventures (Levie and Autio, 2011).

Although corruption is positively correlated with the rule of law that differentiates developed from emerging economies (Payne *et al.*, 2013), legal (i.e., formal) institutions that enforce the rule of law may not offer a better understanding of the interaction between formal and informal institutions (North, 1990). In particular, De Clercq *et al.* (2010) suggested that Western conceptualisations about the "need" for a strict rule of law may not be useful in emerging economies; this is because it underestimates the power of local cultures and traditions that could be more effective in maintaining close business relationships. Therefore, corruption is categorised in the highest level of the institutional hierarchy that may take a more extended period to change and hinder other formal institutional reforms (North, 1990; Williamson, 2000).

Therefore, corruption is probably the most important (negative) indicator of an informal institution that is likely to influence entrepreneurial activity through the interaction with other formal institutions. This is because it "undermines the foundations of institutional trust that are needed for the development of trade and entrepreneurial and innovative activity" (Anokhin and Schulze, 2009, p. 1). This argument is supported by Griffiths *et al.* (2009, p. 627), who stated that "few studies have investigated how macro-environmental variables augment the individual-level perceptions of culture on influencing individual intentionality". Moreover, Pathak *et al.* (2015) suggested that there is a need to test corruption as a moderator as most previous studies treated corruption merely as a control variable.

In the following sections, therefore, this study proposes that corruption may have a moderating effect on the relationship between formal institutions (i.e., number of business procedures, education and training, access to credit, and firm-level technology absorption)

and entrepreneurial activity in the context of emerging economies (Payne *et al.*, 2013). A number of hypotheses are developed in the following sections.

Moderating Effect of Control of Corruption between the Number of Procedures Entrepreneurship

Governmental policies and procedures consist of legislative proceedings that can affect market mechanisms. These policies and procedures can encourage the market to function more efficiently throughout the life of the business by minimising market barriers and the rigid application of strict regulations (Gnyawali and Fogel, 1994; Álvarez *et al.*, 2014).

The above observations about the impact of procedures on entrepreneurship are particularly crucial in the context of emerging economies since aspiring entrepreneurs in such economies must tackle issues such as volatile or ineffective regulations (Aidis *et al.*, 2008).

In this realm, Klapper and Love (2010) found that government policy reforms in regards to reducing the number of procedures are more effective in countries with a better business environment. Conversely, the authors contended that improvements in procedures need much work in countries with a less favourable business environment. In accordance with Klapper and Love's (2010) findings, lower levels of corruption are one factor that could be beneficial to society regarding the promotion of greater trust in government reform policies and, as such, encourage aspiring entrepreneurs to formally register their ventures (Aparicio *et al.*, 2016). This argument is further supported by Naudé (2008), who suggested that reducing corruption levels will ultimately lead to better and more efficient entry procedures and thus, allow for increased market entry of new ventures. Accordingly, the following hypothesis is proposed:

H1: The negative relationship between the number of procedures and entrepreneurship within an emerging economy is moderated by the country's level of corruption, such that this negative relationship is stronger at lower levels of corruption.

Control of Corruption as a Moderating Effect between Tertiary Education and Entrepreneurship

Entrepreneurship education and training have been widely recognized to enhance entrepreneurial activity levels (Gnyawali and Fogel, 1994; Levie and Autio, 2008; Fuentelsaz et al., 2015). In particular, a tertiary education system that focuses on developing skills and competencies in the areas of market analysis, product and service development, and business and financial literacy, enables entrepreneurs to establish and manage high growth ventures (Bowen and De Clercq, 2008; Danis et al., 2011; Jiménez et al., 2015). Therefore, an educational system with a focus on entrepreneurship is more likely to equip entrepreneurs with the necessary skills for business design and growth strategies and consequently, enable them to better exploit entrepreneurial opportunities in the market (Levie and Autio, 2008; Fuentelsaz et al., 2015).

Literature suggested that educated workforce is an important ingredient for higher rates of entrepreneurship in the context of emerging economies (Baumol et al., 2007; Aidis et al., 2008; Valliere and Peterson, 2009). However, educated entrepreneurs may not react similarly to opportunities in all contexts, but rather their reactions may be conditioned by the institutional environment especially in the context of emerging economies (Baumol et al., 2007; Autio and Acs, 2011; Danis et al., 2011; Acs et al., 2014b). For example, Manolova et al. (2008) found that while some emerging economies, such as Bulgaria, Hungary and Latvia have higher levels of education, these countries tend to exhibit lower rates of entrepreneurship due to entrepreneur's lack of confidence and required skills to start new businesses. Apart

from the fact that this low confidence could be explained by the political and social transition (Manolova et al., 2008), literature suggested that improving education would be more effective on increasing entrepreneurship activity levels if it is accompanied by more control of corruption (Álvarez and Urbano, 2011; Aparico et al., 2016).

In this realm, Aparicio et al. (2016) contended that control of corruption increases trust in the system and as such, will create a better alliance between government policies and educational system. Moreover, Álvarez and Urbano (2011) suggested that control of corruption could allow future entrepreneurs to gain a greater share of their generated revenue and therefore, propel higher levels of entrepreneurial activity. In addition, control of corruption would allow an increase in the amount of budget allocated to the education infrastructure and research and development (R&D), which are extra variables to support entrepreneurship activity (Aparicio et al., 2016). Therefore, the primary challenge for policymakers in emerging economies is to overcome the high levels of corruption to improve the tertiary education effects on entrepreneurial activity (Acs *et al.*, 2014a; Castaño *et al.*, 2015; Aparicio *et al.*, 2016). As a result, this study proposes the following hypothesis:

H2: The positive relationship between education and training and entrepreneurship within an emerging economy is moderated by the country's level of corruption, such that this positive relationship is stronger at lower levels of corruption.

Control of Corruption as a Moderating Effect of Access to Credit and Entrepreneurship

As we mentioned earlier, financial support availability is among the most important pillars for entrepreneurs to start and grow their ventures (Gnyawali and Foger, 1994). Van Auken and Neely (1999) underscored the inadequacy in financial structure poses major

obstacle to venture creation, as with no access to credit, individuals are unable to materialize their ideas, and as a result, the entrepreneurial activity decreases. Although new businesses may depend on personal funds received from informal investors such as family and social networks (Szerb et al., 2007), financial resources such as venture capital and bank loans are integral for aspiring entrepreneurs who seek to expand their businesses either locally or in foreign markets (Bowen and De Clercq, 2008; Korosteleva and Mickiewicz, 2011; Stenhom et al., 2013; Fuentelsaz et al., 2015; Aparicio et al., 2016). To this end, various studies have suggested policies to improve access to bank credit through lowering capital requirements; credit with low-interest rates, and credit guarantee schemes, to promote new venture creation (Gnyawali and Fogel, 1994; Álvarez and Urbano, 2011; Bowen and DeClercq, 2008; Castaño-Martínez et al., 2015; Fuentelsaz et al., 2015; Aparicio et al., 2016).

Yet, the extent to which the financial system supports entrepreneurship activity in terms of providing resources to start and grow the business varies substantially across countries (Levie and Autio, 2008; Korosteleva and Mickiewicz, 2011; Chowdhury et al., 2015). In the context of emerging economies, the availability of financial resources is limited due to the lack of development in the financial institution (Aidis et al., 2008; Acs and Correa, 2014). In this regard, prior research suggested that higher levels of corruption and bribery adversely impact the development of a country's financial infrastructure (La Porta et al., 1999), and this uncertainty caused by corruption could generate distrust among entrepreneurs in the financial system, preventing its maturity (Aparicio et al., 2016). On the contrary, the prevalence of trust has been found to positively influence entrepreneurs to engage in high-growth business activities (Bowen and DeClercq, 2008). This suggests a potential interaction effect between a country's level of corruption and financial development on the one hand, and the new firm start-ups rates within its borders on the other (Bowen and DeClercq, 2008; Chowdhury et al., 2015).

In relation to the study's context, Johnson et al. (2002) analysed entrepreneurship in post-communist emerging economies and found that extra-legal payments (bribes) hinder entrepreneurial activity more than the lack of financing. Therefore, corruption (as well as other deficiencies in the governance of a country) may increase transaction costs while limiting the income for entrepreneurs (Álvarez and Urbano, 2011). Based on the previous discussion, it is more likely that emerging economies that are characterised with lower levels of corruption and a more developed financial system can provide higher availability of financial resources for entrepreneurs to pursue their ambitions towards new ventures. Accordingly, this reasoning leads to the proposition of the following hypothesis:

H3: The positive relationship between access to credit and entrepreneurship within an emerging economy is moderated by the country's level of corruption, such that this positive relationship is stronger at lower levels of corruption.

Corruption as a Moderating Effect of Technology Absorption and Entrepreneurship

The last formal institution analysed in this study is technology absorption (Gnyawali and Fogel, 1994). The diffusion of new technology, as well as the capacity for firms to absorb it, is an important factor for innovation and high growth ventures (Stenholm et al., 2013; Acs et al., 2014b). In this realm, improvements in information and communication technology (ICT) via the internet (e.g., cloud computing, social media, internet of things, mobile phone services and big data analytics) may motivate individuals to start new businesses due to potential for higher returns such as better exchange information, fewer expenses and less time consuming (Acs 2006; Acs et al., 2008a). Hence, public policies that allow faster access to information and Internet may further lead to more entrepreneurial activity and more

innovation in the context of emerging economies (Acs and Szerb 2007; Audretsch and Belitski, 2016).

Therefore, as suggested by the literature, it is essential to remove barriers that hinder the development of technological infrastructure policies in the context of emerging economies (Acemoglu and Robinson, 2006; Pathak *et al.*, 2015; Audretsch and Belitski, 2016). In particular, these barriers may point to efforts by the political elite to block technological and institutional development to protect their benefits under the *status quo* system (Acemoglu and Robinson, 2006). Thus, corrupt countries tend to benefit less from Foreign Direct Investments (FDI) by high tech companies, which are uncertain about expanding their businesses in markets that are characterised by higher potential costs of corruption (Anokhin and Schulze, 2009).

As a result, it is believed that corruption and access to foreign technology interact to produce significant outcomes for the rates of entrepreneurial activity in emerging economies. In particular, emerging economies that have lower levels of corruption may facilitate the transformation of technical knowledge through FDI that ultimately fosters innovation and higher rates of entrepreneurial productivity (Audretsch *et al.*, 2008; Anokhin and Schulze, 2009; Pathak *et al.*, 2015). Therefore, this study proposes the following hypothesis:

H4: The positive relationship between technology absorption and entrepreneurship within an emerging economy is moderated by the country's level of corruption, such that this positive relationship is stronger at lower levels of corruption.

Data and Methodology

Similar to other studies (De Clercq *et al.*, 2010; Danis *et al.*, 2011), the research population for this study consisted of all possible emerging countries that fit the

characterisations of emerging economies, as suggested by Hoskisson *et al.* (2000). In this context, emerging economies are described as low-income countries that go through encouraging private enterprise development and increased economic liberalisation (Hoskisson et al., 2000). In this sense, the selection criteria for emerging economies consider transition economies, such as post-communist countries, that are characterised by the encouragement of private enterprise and increasing liberalisation, as well as developing countries in Latin America, Asia and Africa that have gone through the adoption of a free-market system and economic liberalisation (Hoskisson *et al.*, 2000). While these countries shared common histories with respect to their pervasive corruption problems and inherited underdeveloped institutional legacies, differences in the pace and extent of economic liberalisation and institutional development provided the basis for our key research question (De Clercq et al., 2010; Kiss et al., 2012): Do formal institutions in emerging economies affect entrepreneurial activity levels in the same way under both conditions of endemic corruption and freedom from it?

In addressing our research question, we analysed the moderating effect of control of corruption as an informal institution on the relationship between formal institutions (i.e., the number of procedures for starting a business, education and training, access to credit, and technology absorption by firms) and entrepreneurial activity. The final sample consisted of 41 emerging economies using a panel of data for the period 2006–2016 in which data were available for all key variables (i.e., dependent and independent variables) of the study.

The data for this study is procured from different sources (see Table 1). The dependent variable related to entrepreneurial activity was derived from the New Entry Rate (NER) of the World Bank entrepreneurship dataset which tracks the new entry rate of registered firms with limited liability companies (LLCs) in government authorities (Acs et al.,

2008b). This index is often used in the literature to compare entrepreneurial activity across countries (Acs et al., 2008b; Belitski et al., 2016; Dvouletý, 2018).

The data about the informal institution, control of corruption (CC) as the independent variable, was obtained from the Worldwide Governance Indicators (WGI) project. Control of Corruption (CC) captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The scores in this database lie between -2.5 and 2.5, with higher scores corresponding to better outcomes of the institutions (Álvarez and Urbano, 2011; Aparicio et al., 2016).

Moreover, the source of data for the independent variables of formal institutions such as the number of procedures for starting a business (PRO) was taken from the World Bank's Doing Business project which provides the number of procedures that are officially required for an entrepreneur to start up and formally operate an industrial or commercial business (Álvarez and Urbano, 2011; Aparicio et al., 2016). The second formal institution for the education and training variable (TEDU) was measured as the percentage of the population with tertiary education in the country, as obtained from the UNESCO database, indicating the percentage of the population with business and entrepreneurial skills (Álvarez and Urbano, 2011; Chowdhury et al., 2015). The third formal institution for access to credit (AC) was measured from the overall domestic credit to the private sector provided by banks as a share of GDP; it comes from the WDI dataset (Álvarez and Urbano, 2011). A final dimension of the formal institution is the availability of the latest technologies in a country (TA). This variable was measured from how favourable the environment is for the diffusion of technological change and was obtained from the Global Competitiveness Report (GCR) (Acs et al., 2008b; Stenholm et al., 2013).

Finally, given that the level of economic development of countries is considered a critical factor in explaining entrepreneurial activity (Wennekers et al., 2005; Acs et al., 2014a), this study controlled the country's annual percentage growth rate of GDP at market prices (GDPg). In line with other studies, this data source was obtained from the World Bank (Bowen and De Clercq, 2008; Levie and Autio, 2011; Fuentelsaz et al., 2015).

Table 1 presents a list of dependent and independent variables used in this study, including their sources. Based on the availability of published data of entrepreneurship and institutional variables related to the study framework, the final sample consisted of a balanced panel of 41 countries over the years 2006 to 2016 (11 years). Also, the data were grouped by country and year, resulting in 451 country-year observations (see Appendix1 for a list of emerging economies with their mean values).

Insert Table 1 here.

As the study's dataset deal with a relatively substantial number of cross-sectional units (41 emerging economies) with different characteristics (e.g., cultural values, religions, social norms, and using different currencies), it is more likely to have heterogeneity in panel data (Wooldridge, 2012). Therefore, the authors applied the fixed effects (regression) model (FEM), which allows controlling for unobserved heterogeneity across countries that are fixed over time.

Accordingly, this study proposed the general model given below for the hypothesis's analyses; this indicated that a FEM provided a better fit for our data. However, this study takes into account that the FEM uses only within-country variation, which impacts the interpretation of the results (Aidis *et al.*, 2012).

$$NER_{it} = \beta_i + \beta_1 II_{it} + \beta_2 FI_{it} + \beta_3 CV_{it} + \beta_4 II_{it} FI_{it} + \varepsilon_{it}$$

Where β_i country specific fixed effect, II_{it} matrix of informal institutions in country i in year t, FI_{it} matrix of formal institutions in country i in year t. CV_{it} matrix of the control variable in country i in year t.

Results and Discussions

Table 2 indicates the means, standard deviations, and correlation coefficients of the variables used in this study. Our descriptive statistics showed that some variables might be highly correlated (e.g., control of corruption with education and training, credit and technology). Hence, to avoid the multicollinearity issues, that could affect the significance of the main parameters in the regressions through Variance Inflation Factor (VIF) computations, we followed Aiken and West's (1991) procedures to assess the interaction effects. In this approach, we formed interaction terms by multiplying the mean-centred values of the interacting variables, then include these terms in one regression equation. This approach was adopted in different studies to minimise the possibility of multicollinearity (De Clercq *et al.*, 2010; Danis *et al.*, 2011). As a result, the VIF scores are below the cut-off value of 5, and thus, multicollinearity is not a concern in the analysis (Mehmetoglu and Jakobsen, 2017).

Insert Table 2 here.

Aiming to analyse and compare the role of the institutional environment's effect on entrepreneurial activity, we created two different models. Model 1 included the direct effect of informal and formal factors for entrepreneurial activity, whereas Model 2 included the moderating effect of control of corruption as an informal institution on the relationship between formal institutions and entrepreneurial activity (see Table 3).

In order to estimate all the regressions, we tried to develop a panel data analysis. As earlier discussed, this study assumes that FEM was more appropriate to estimate Model 1 and 2. This specification model enables us to study the impact of variables that vary over time (Wooldridge, 2012). Moreover, to address the possibility of heteroskedasticity,

autocorrelation and cross-sectional dependence, we followed Roman's *et al.* (2018, p. 517) study and applied Driscoll and Kraay's (1998) "standard errors for the coefficients estimated by the within-group regression, robust to heteroskedasticity and the very general forms of cross-sectional and temporal dependence".

In Table 3, the results of Model 1 showed that corruption played a significant role in emerging economies as it was significant at the 95% level and with the expected sign. Thus, living in a country where entrepreneurship has a high-level corruption-free environment often increases the probability of entrepreneurial activity (Anokhin and Schulze, 2009; Aidis et al., 2012; Avnimelech et al., 2014; Aparicio et al., 2016; Dutta and Sobel, 2016). However, formal factors results were inconsistent in Model 1. In this regard, the effect of the number of procedures for starting a business was highly significant at ($p < 0.01$) with a negative sign. Also, the effect of education and training on entrepreneurial activity was highly significant at ($p < 0.01$). In contrast, the relationship between and access to credit and the firm-level technology absorption with entrepreneurial activity was not significant. The latest findings were contrary to previous studies which have suggested that access to capital (Bowen and De Clercq, 2008; Aparicio et al., 2016) and technology absorption (Gnyawali and Fogel, 1994; Stenholm et al., 2013; Acs *et al*., 2014b) are a critical success factor when developing new start-ups. The explanatory power, based on the $R^2 = 0.89$, showed a significant, strong correlation between institutions and entrepreneurial activity.

Insert Table 3 here.

The results of Model 2 (see Table 3) demonstrated that the interaction effect of informal and formal institutions was related to the entrepreneurial activity. In this model, we included control of corruption as the moderating factor between the relationship of formal institutions and entrepreneurship. The results found that the moderating coefficients of the number of procedures in this model were highly significant at ($p < 0.01$), the moderating

coefficient of education and training was significant at ($p < 0.05$). Also, the moderating coefficient of technology absorption was highly significant at ($p < 0.01$) with a negative sign. In comparison with Model 1, the results of Model 2 were indicative that control of corruption has both a direct and indirect impact on entrepreneurial activity; thus, we confirmed the importance of the control of corruption to promoting entrepreneurial activity in emerging economies as it behaved as a moderator as well (Pathak et al. 2015). Moreover, the explanatory power in Model 2, based on $R^2 = 0.91$, implied a close and robust relationship between informal and formal institutions' interaction effect and the entrepreneurial activity.

Concerning the hypotheses testing, Hypothesis 1 suggested that the number of procedures for starting a business has a negative influence on entrepreneurship in each emerging economy that has lower levels of corruption. While Model 1 showed that number of procedures has a negative and significant influence on entrepreneurial activity for each emerging economy ($\beta = -0.132$; $p < 0.01$), Model 2 showed that the interaction effect between the number of procedures and control of corruption has a negative and significant influence on entrepreneurial activity for each emerging economy ($\beta = -0.203$; $p < 0.01$). The results showed that the interaction effect of control of corruption and the number of procedures coefficient is higher than the coefficient of the direct effect of the number of procedures in each emerging economy, supporting Hypothesis 1. Although the results of Model 1 were congruent with the literature (the more days required for the creation of a new firm, the less likely it is that the entrepreneurial activity will occur) (Álvarez and Urbano, 2011; Aparicio et al., 2016), the results of Model 2 showed that the number of procedures has a better impact on entrepreneurial activity in emerging economies that have lower levels of corruption as suggested by the literature (Naudé, 2008; Klapper and Love, 2010; Aparicio et al., 2016).

Hypothesis 2 proposed that lower levels of corruption positively influence the relationship between education and training with entrepreneurial activity in each emerging

economy. While Model 1 showed that education and training was significant to entrepreneurial activity ($\beta = 0.024$; $p < 0.01$), Model 2 showed that the interaction effect of education and training with control of corruption coefficient is higher than the coefficient of the direct effect of the education and training ($\beta = 0.070$; $p < 0.05$). The results for the moderating role of corruption were in line with our expectations, supporting Hypothesis 2. Therefore, an educational system with an entrepreneurial focus is more likely to increase entrepreneurial activity in emerging economies that have lower levels of corruption rather than higher levels of corruption as suggested by literature (Álvarez and Urbano, 2011; Aparicio et al., 2016).

Hypotheses 3 suggested that access to credit from banks has a positive influence on entrepreneurial activity in the context of each emerging economy that has lower levels of corruption. While Model 1 showed that access to credit was not significant to entrepreneurial activity, Model 2 also showed that the interaction effect between control of corruption and access to credit has no significant influence on entrepreneurial activity. The interpretation of the previous results could be explained in three ways. First, the previous results could suggest that entrepreneurs who are associated with higher risk levels tend to obtain financial resources from social networks and family connections; this may be because existing financial institutions are underdeveloped and less likely to support their new ventures (Ho and Wong, 2007; Chowdhury et al., 2015b; Fuentelsaz et al., 2015; Ghura et al., 2017). Second, another interpretation for the findings was suggested by Wennekers et al. (2005), who argued that emerging economies have higher rates of necessity entrepreneurship (i.e., informal entrepreneurship), which does not require large amounts of credit. Lastly, although this latter idea could be right, the results also suggested that entrepreneurs may later depend on alternative sources to fund their growing businesses, such as venture capital funds, angel

investors and corporate investors, due to the lack of adequate financial infrastructure (Bowen and De Clercq, 2008; Aidis, 2012; Ghura et al., 2017).

Finally, Hypotheses 4 suggested that firm-level technology absorption has a significant influence on entrepreneurship in each emerging economy that has lower levels of corruption. The results were contrary to the study's expectations as the coefficient regression was not significant in Model 1 and highly significant in Model 2 ($\beta = -0.951$; $p < 0.01$) with a negative sign. Although not what we predicted, the previous results could suggest that new business activities in emerging economies that have lower levels of corruption are still not technology-based and characterised by imitative entrepreneurship. In this regard, entrepreneurs in emerging countries tend to copy technologies from developed economies to expand their economy of scale (Acs, 2006; Minniti and Lévesque, 2010). Entrepreneurs are, therefore, less likely to invest in R&D, even though imitative entrepreneurship is significant to economic growth. This is especially true in the case of emerging economies, as they increase competition and product availability when the revenues to R&D expenditure are low (Minniti and Levesque, 2010).

We also acknowledge the possibility of alternative explanations drawn from the literature that suggested educated individuals may work for technology-based corporations to seek higher returns in emerging economies with lower levels of corruption. Anokhin and Schulze (2009) found that economies with lower costs of corruption are more likely to benefit from FDI investment by attracting high tech companies to enter markets (Anokhin and Schulze, 2009). Therefore, educated people are free to behave entrepreneurially within existing companies, and they enjoy high-wage employment and high remunerations. This could suggest that corporate entrepreneurship substitutes for start-up activity and has a positive relationship with technology absorption in emerging economies with lower corruption (Turró et al., 2014).

In general, the estimated coefficient of the control variable of economic growth was not congruent with the existing literature (Models 1 and 2), which argued a positive and significant influence between economic growth and entrepreneurial activity (Levie and Autio, 2011; Fuentelsaz et al., 2015).

To this end, the inconsistencies in findings between model 1 and model 2 provided quasi support for the conceptual premise that it is pertinent to consider the interactions between formal and informal institutions and their impact on entrepreneurial activity (North 1990, 2005, Williamson, 2000; Acs et al., 2014a; Ghura et al., 2017). These results were in line with previous literature and the empirical work by Ghura et al., which this study aimed to expand upon and validate in suggesting certain institutional variables such as control of corruption can be conducive for entrepreneurial activity levels in the context of emerging economies (Aidis et al., 2008; Tonoyan et al., 2010; Bruton et al., 2013; Aparicio et al., 2016; Dvouletý and Blažková, 2018).

Conclusion

Given that entrepreneurship is a key driver for economic growth and development (Acs et al., 2014a, b; Aparicio et al., 2016; Ghura et al., 2017), understanding which institutional variables contribute to fostering and enhancing entrepreneurship appears to be a remarkable phenomenon (Levie and Autio, 2011; Stenholm et al., 2013; Fuentelsaz et al., 2018; Urbano et al., 2018). In this study, building on the work by Ghura et al., (2019) balanced longitudinal panel data (for the period 2006-2016) were used to empirically examine the simultaneous effect of institutional variables on the development of entrepreneurial activity in the context of 41 emerging economies. By developing a conceptual framework of institutional economics, this study analysed the interaction effect of informal (i.e., corruption) and formal institutions (i.e.,

the number of procedures involved in starting a business and education and training, access to credit, and technology absorption) on the rates of entrepreneurial activity.

The main findings shed more light on the importance of the environmental factors on entrepreneurship in which formal institutions such as the number of procedures necessary to create a new business, entrepreneurship education and training and technology absorption should have to be accompanied by more control of corruption (Álvarez and Urbano, 2011; Aparicio et al., 2016). Overall, control of corruption showed that it behaves as a moderator between formal institutions and entrepreneurship. Our empirical findings in this study replicates the result of Ghura et al., (2019) in applying the same framework to post-communist emerging economies. In particular, the evidence from this study showed that formal institutions, such as the number of procedures, and education and training, are more likely to encourage individual's choice to become an entrepreneur and start a new business activity in emerging economies that have a perception of lower levels of corruption. Therefore, it is inappropriate for policymakers in emerging economies to rely on the reform changes of the formal institutions without considering the reforms of the informal institutions, such as corruption (Dvouletý and Blažková, 2018).

The study has several contributions. First, it advanced the existing theory in the field of entrepreneurship and Institutional Economics as few empirical papers are grounded in both theories (Acs et al., 2014a, b). Second, we tested a theoretical model by expanding the study the number of emerging economies and found comparable findings that explain factors that may influence the likelihood of individuals entering entrepreneurship. Third, our findings have implications for policymakers who are interested in fostering and promoting entrepreneurship for the benefit of economic and productivity growth in the context of emerging economies.

The generalizability of the study's findings is subject to certain limitations that could become future research lines. First, more accurate measures for both dependent and independent

variables could be used. On the one hand, our study has considered only one particular aspect of high-growth entrepreneurship, which is newly registered firms with limited liability. Although newly registered firms are recognised as one of the critical drivers that entrepreneurial activity may make to economic growth (Acs et al., 2008b; Levie and Autio, 2011), future research should seek to examine other aspects of growth-oriented entrepreneurship such as activities involving a high level of innovation, corporate entrepreneurship or technology developments (Bowen and De Clercq, 2008; Turró et al., 2014). On the other hand, using other (or more) environmental variables (e.g., national culture) is crucial to understanding entrepreneurship in emerging countries where institutional arrangements can vary significantly from those in developed countries (Bruton et al., 2008; Hayton and Cacciotti, 2013; Fernández-Serrano and Liñán, 2014; Fernández-Serrano and Romero, 2014; Sambharya and Musteen, 2014; Brancu et al., 2015). Second, the examined models to explain entrepreneurial activity through institutions are quite adequate and robust, but it is necessary to complement them and consider emerging economies at different levels of economic development (Stenholm et al., 2013; Acs et al., 2014a). Third, it is recommended that further research is undertaken in larger samples across more countries or in different regions such as resource-based economies, African or Asian contexts in which corruption is prevalent in many of those nations (Pathak et al., 2015). We hope that our study will inspire further investigations in future into the interaction's impact between formal and informal institutions on entrepreneurial activity.

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FIGURES & TABLES

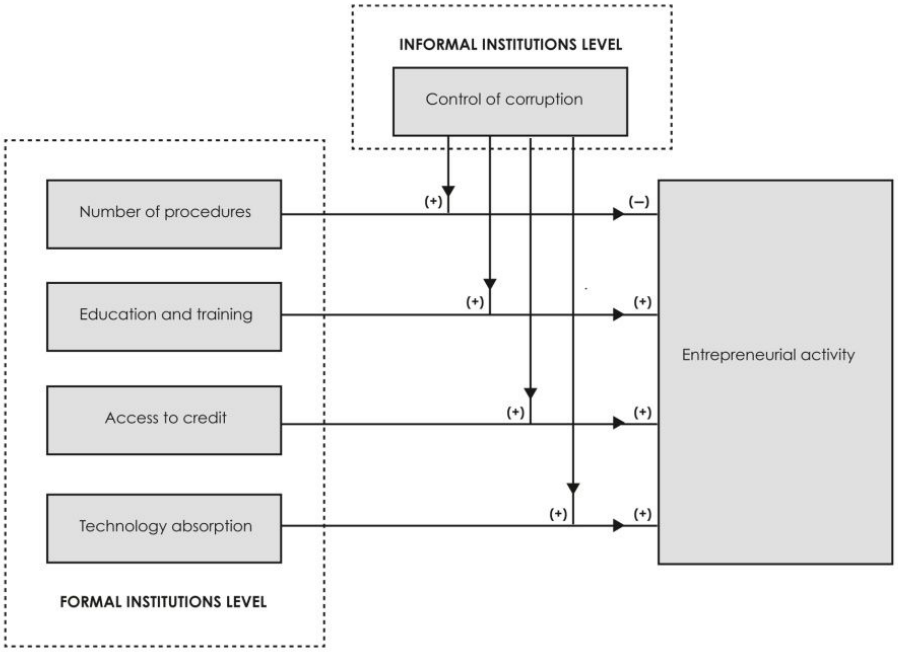

Figure 1: The developed conceptual framework of the study

Source: Ghura et al. (2019)

Table 1: Description of variables and their sources

Variable	Abbreviation	Description	Data source and availability
Dependant variable	New Entry Rate (NER)	"The number of newly registered firms with limited liability per 1,000 working-age people (ages 15-64) per calendar year."	Doing Business 2006 to 2016 http://www.doingbusiness.org/data/exploretopics/entrepreneurship
Environmental factors Informal institutions	Control of Corruption (CC)	"Control of corruption (CC) – capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The values are between -2.5 and 2.5 with higher scores corresponding to better outcomes of institutions".	WGI 2006-2016 https://data.worldbank.org/data-catalog/worldwide-governance-indicators
Environmental factors formal institutions	Procedures for starting a business (PRO)	"The number of procedures required to legally operate a commercial or industrial firm are recorded, including interactions to obtain necessary permits and licenses and to complete all inscriptions, verifications, and notifications for starting operations. Data are for limited liability companies	Doing Business 2006 to 2016 https://data.worldbank.org/data-catalog/doing-business-database

	with certain standardized characteristics in order to facilitate comparisons between economies."	
Tertiary Education (TEDU)	"Total enrolment in tertiary education, regardless of age, expressed as a percentage of the total population of the five-year age group following on from secondary school leaving."	UIS 2006 to 2016 https://data.worldbank.org/indicator/SE.TER.ENRR?view=chart
Access to Credit (AC)	"Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises."	World Bank 2006 to 2016 https://data.worldbank.org/indicator/FD.AST.PRVT.GD.ZS
Firm-level Technology Absorption (TA)	To what extent do businesses in your country absorb new technology? [1 = not at all; 7 = aggressively absorb]	Global Competitiveness Report 2006 to 2016

			http://reports.weforum.org/global-competitiveness-report-2015-2016/downloads/
Control variable	GDP Growth (GDPG)	"Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value."	World Bank 2006 to 2016 https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?view=chart
	GDP Per Capita PPP (GDPpc)	"GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates."	World Bank 2006 to 2016 https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD

Table 2: Descriptive statistics and correlation matrix

		Emerging economies			
		Mean	**Std. Dev.**	**Min**	**Max**
	1. New Entry Rate (NER)	3.17	3.48	0.20	20.76
Informal	2. Control of corruption (CC)	-0.06	0.65	-1.32	1.58

Formal	3. Procedures for starting a business (PRO)	7.60	3.28	2	18
	4. Education and training (TEDU)	47.00	22.47	5.00	104.21
	5. Access to credit (AC)	53.00	33.52	3.46	247.52
	6. Firm-level technology absorption (TA)	4.73	0.58	3.11	6.15
Control	7. GDP growth (GDPg)	3.63	4.54	-14.81	34.5

	1	**2**	**3**	**4**	**5**	**6**	**7**
1. NER	1						
2. CC	0.586***	1					
3. PRO	-0.356***	-0.249***	1				
4. TEDU	0.275***	0.328***	-0.296***	1			
5. AC	0.253***	0.512***	-0.224***	0.386***	1		
6. TA	0.062	0.539***	-0.007	0.217***	0.474***	1	
7. GDPg	-0.099*	-0.171***	0.242***	-0.251***	-0.182***	-0.036	1

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 3: Regression analysis explaining entrepreneurial activity (NER)

	Model 1 Coef. (std. error)	Model 2 Coef. (std. error)
Informal institution		
Control of corruption (CC)	1.276** (0.37)	1.354*** (0.36)
Formal institutions		
Procedures for starting a business (PRO)	-0.132*** (0.021)	-0.157*** (0.02)
Education and training (TEDU)	0.024*** (0.00)	0.021** (0.00)
Access to credit (AC)	-0.000 (0.00)	-0.001 (0.00)
Firm-level technology absorption (TA)	-0.213 (0.23)	-0.233 (0.20)
H1: Control of corruption (CC) x Procedures for starting a business (PRO)		-0.203*** (0.03)
H2: Control of corruption (CC) x Education and training (TEDU)		0.070** (0.01)
H3: Control of corruption (CC) x Access to credit (AC)		0.000 (0.00)
H4: Control of corruption (CC) x Firm-level technology absorption (TA)		-0.951*** (0.25)
Control variable		
GDP growth (GDPg)	0.034 (0.02)	0.033 (0.02)

Constant	4.007** (1.27)	2.485*** (0.14)
Prob.(*F*-statistic)	0.0027	0.0061
R^2	0.89	0.91
Observations	451	451
Countries	41	41

Notes: Driscoll-Kraay standard errors between parentheses.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Responses to the reviewers

We greatly appreciate your constructive comments which have enabled us to improve the paper. For convenience, we reproduced each of your comments in italics below followed in turn by our responses in bold.

Reviewer(s)' Comments to Author:

Reviewer: 1

Recommendation: Major Revision

Comments:

1. The authors may want to link their contribution to Claudia Williamson's work on informal institutions and that by Boettke, Coyne, and Leeson on institutional stickiness. Both have a much clearer analytical understanding of the issues than the one currently in the manuscript.

The authors have added significant explanation from the works of Williamson and Boettke to both introduction and the theoretical segments of the paper. All added elements are highlighted in yellow.

2. The theoretical discussion is lacking. The major problem is that the authors frame corruption as an informal institution. I am not a fan of the distinction between formal and informal institutions in general, especially for analytical purposes. In this case, it is even less helpful since the extent of corruption within a country is an outcome of the existing institutions (i.e., an equilibrium behavior) not an institution. Furthermore, the authors do not discuss the fact that corruption is by definition the result of the lack of enforcement of formal institutions. Thus, the presence of corruption is itself a measure of the quality of the de-facto institutional environment.

The authors have addressed the reasoning behind selecting corruption as an informal institution and have added the related literature in support of this decision. The related literature is added briefly in the introduction and covered in a more-in depth format in the theoretical section of the paper. All added elements are highlighted in yellow.

3. Overall, the authors could improve the clarity of their writing. Especially in the theoretical sections. Just two examples of confusing writing:

"however, if corruption is high, entrepreneurs may undermine confidence in the reform of formal institutions and, therefore, it will affect their decisions to start and grow their ventures" (11) This sentence was rephrased.

"corruption is considered as an interdisciplinary and complex phenomenon that includes political, economic, and socio-cultural backgrounds, and consequences whereby it is not limited to essential effects of a weak rule of law" (12) This sentence was rephrased.

The authors have edited the paper for improved readability and grammatical issues such as for those sections mentioned in examples above.

*4. Finally, there are a few issues in the discussion of the empirical results. One problem is the use of the specifications' r^2 as supportive of the validity of their empirical strategy. By itself, a high r^2 does not mean that the variables of interest really do explain much about the variation in the dependent variable. Another problem lies in the discussion of the coefficient on the interaction between technology adoption and corruption. Since this relationship plays a major role in their theoretical and empirical discussion, the fact that they find a very large and very significant effect of the *wrong sign* warrants more discussion of what it may mean and how it could be reconciled with the theoretical discussion. Instead, the authors offer some unconvincing justification which itself does not seem compatible with the results.*

The recommendations were addressed in the discussion.

Reviewer 1 Continued

Additional Questions:

1. *Originality and appropriateness: Does the paper contain new and significant information adequate to justify publication? Does the manuscript contribute to the reader's understanding of entrepreneurship, public policy, economic development, or a combination of these, as it applies to JEPP's Aims & Scope?: Barely. That is very little that is surprising or new in the manuscript's results.*

   We thank the reviewer for the valuable feedback.

2. *Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: The authors do a decent job placing the paper in the existing empirical literature.*

   We thank the reviewer for the feedback on our use of current literature.

3. *Methodology: Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate? Are the methods employed correctly?: Not really. The theoretical discussion is confused. For example, they seem to think that corruption is an "informal institution" rather than the equilibrium effect of lack of enforcement for formal institutions. This lack of analytical clarity undermines their empirical investigation as well.*

   We thank the reviewer for this comment and have addressed the role of corruption as an informal institution in the above comments. The new support for this decision could be seen in the introduction and theory section of the paper.

4. *Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper? Does the paper achieve its objectives?: The discussion of the results is good overall. However, I found the discussion of the specifications' r^2 out of place. By itself, a high r^2 does not tells us very much about the actual explanatory power of the variables of interest. Also, the results tables are almost unreadable.*

   We thank the reviewer and the comments have been taken into consideration.

5. *Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? Are the paper's implications consistent with the findings and conclusions of the paper?: Yes, that is probably the strongest feature of the paper.*

   We thank the reviewer for their comments in terms of our paper's addition to the literature.

6. *Quality of Communication: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.?: The writing and clarity of expression can be improved.*

   We thank the reviewer for their feedback. The authors have undertaken a comprehensive editorial update in the paper.

Reviewer: 2

Recommendation: Minor Revision

Comments:

Thank you for a thoroughly researched, well-organized submission! You will find suggestions for minor revisions spelled out in item 6 above.

We thank the reviewer for their positive feedback on our paper.

Additional Questions:

1. *Originality and appropriateness: Does the paper contain new and significant information adequate to justify publication? Does the manuscript contribute to the reader's understanding of entrepreneurship, public policy, economic development, or a combination of these, as it applies to JEPP's Aims & Scope?: This paper makes an important contribution to the literature on entrepreneurship and public policy by*

examining the interaction between corruption and five well-established determinants of entrepreneurial activity. While there is a broad existing literature regarding institutional determinants of entrepreneurship, to this reviewer's knowledge there is little if any work on the specific interaction between informal institutions (as characterized by the author(s) in the form of levels of corruption) and formal institutions and the cumulative effects on entrepreneurship and new business formation. Additionally, the paper presents an apparently robust empirical examination of this interplay between various institutional interactions and entrepreneurship. This paper is well in line with JEPP's Aims and Scope and represents a step forward in institutional analysis of entrepreneurship.

The authors thank the reviewer for the comments on our paper.

2. *Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?: The paper appears to be very well informed regarding and the authors show an extensive familiarity with relevant research. Each foundational argument presented in the paper is supported with citations to relevant literature. The only potential omission of important institutional literature this reviewer found was that of the work of Hernando de Soto. De Soto's book, The Mystery of Capital, would be a relevant addition to the literature on formal institutions and development cited both in the introductory section and the section discussing the effect of business registration procedures (De Soto has an extended discussion of the retarding impact of lengthy and obtuse licensure and registration requirements on business formation and relates this to the prevalence of under-capitalized, informal businesses in developing economies.*

We thank the reviewer for their comments and recommended additions, we have used additional references in addressing the suggested points on the effect of number of procedures on entrepreneurship.

3. *Methodology: Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate? Are the methods employed correctly?: The paper employs regression analysis of longitudinal data to*

test the interaction of measures of an economy's informal institutional quality (level of corruption) and formal institutional development (measured across four institutional categories established as relevant determinants of business formation) and their impact upon levels of entrepreneurship (measured as the rate of new corporate registrations). While this reviewer is admittedly not as well versed in the econometric techniques used here as is the author(s), the method employed (fixed effects model) appears to be appropriate and is well-grounded in the relevant empirical literature.

The authors thank the reviewer for their comments on the design of our study.

4. *Results: Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper? Does the paper achieve its objectives?: The author(s)' hypotheses are clearly stated in a testable manner, and the analysis section clearly applies the regression results to each hypothesis in turn. The paper indeed achieves its objectives in testing the stated hypotheses per the regression model, and the author(s) does an excellent job of summarizing the regression results and evaluating the hypotheses in light of these results.*

The authors thank the reviewer for their comments on the results of our study.

5. *Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? Are the paper's implications consistent with the findings and conclusions of the paper?: The paper adds to an refines a large and important body of research regarding institutions, entrepreneurship, and economic growth. This literature has important implications for understanding the conditions under which entrepreneurs can best thrive, and the factors policymakers need to consider in efforts to promote entrepreneurship as a vehicle to economic prosperity. Two particular findings are of great interest to this reviewer and suggest interesting avenues for further research.*

1. *Reinforcing existing literature, the paper finds that legal procedural hurdles significantly hinder entrepreneurship in the form of corporate startups, while*

higher levels of tertiary educational attainment are associated with more business formation. Interestingly, the paper finds that technology absorption rates and formal sector credit access were not significant factors in business formation. This last finding is particularly intriguing as it possibly refutes, at least in part, existing literature on the "finance-led growth hypothesis."

2. *Of even greater interest is the paper's findings regarding the interplay between corruption levels and the four above-mentioned determinants of formal entrepreneurial activity (legal procedures, education levels, credit access, and technology absorption). Specifically, the paper finds that, as corruption increases, a given level of legal procedures becomes less of a hindrance to business formation. This suggests that entrepreneurs use corruption (bribery) as a workaround for burdensome regulations, and opens an avenue of exploration into entrepreneurial resiliency in the face of uneconomical regulations.*

We thank the reviewer for the comments our study's contribution.

6. *Quality of Communication: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.?: The only real problem with this paper is a lack of clarity. Throughout the paper, the author(s) omit modifiers and/or contextual details, abuse punctuation and definite articles, and otherwise write in a stilted manner that challenges the reader to discern the intended meaning. This reviewer found himself re-reading several passages over and over before grasping the author(s)' point. The prose needs a major overhaul For instance, the author(s) repeatedly uses the phrase "number of procedures" or the term "procedures" to refer to the legal procedures (regulations) required for registering a business. Likewise, the author(s) uses the phrase "education and training" by itself on several occasions at the beginning of the paper; only later does it become evident that this is referring to the level of tertiary educational attainment in the economy in question.Additionally, the authors commit several varieties of grammatical sins, such as misspellings (e.g. signaling- p. 11; rationally- p. 23) dangling participles (p. 29—first sentence of the conclusion), and omission or superfluous inclusion of the definite article—just to name a few. It is highly recommended that the author(s) carefully edit the manuscript for*

readability and/or obtain the services of a copy editor who can find and correct all such errors and make the essay clearer and readable.

The authors thank the reviewer immensely for the constructive feedback. The authors have made correction in the verbiages used when possible as some of the verbiage is part of the verbiage used in the framework. Other spelling and grammar issues have been addressed to the best of the authors' ability.

Overall, thank you very much again for all your insightful comments which have helped us to strengthen this paper.