The popularity of entrepreneurship as a practice is matched by scholars’ increasing attention to the phenomenon. In the management literature, entrepreneurship has become a field in its own right. Several scholars have argued that the right types of entrepreneurship, such as opportunity entrepreneurship, are an important driver of economic development and growth through employment, innovation, and structural transformation. Thus, it is unsurprising that finding ways to encourage entrepreneurship, especially the preferred types, is of interest to researchers and policymakers alike. In order to do so, they need to understand why the incidence of entrepreneurship is different from one country to another, and in that respect, country-level factors are determining the rate of entrepreneurship. These factors create the environment in which entrepreneurial opportunities and activities can be defined, generated, and also limited. Surprisingly, however, our understanding of the ways in which these national and institutional environments are fertile or fatal for entrepreneurship is limited, and study results on the benefits of various aspects of institutions to entrepreneurship continue to be debated.

The overall objective of this thesis and the cases presented herein is to investigate how institutions and institutional factors affect opportunity exploitation at country level. We acknowledge that both institutional settings and the process of opportunity exploitation are complex phenomena. To address the research objective, this thesis builds on two co-authored research articles and one sole-authored.

The methodological approach of the current work is nomothetic and quantitative. Moderation analysis at country level is the main approach applied in all the articles. As a result, we examined regression models that include interaction terms. In the articles, we perform fixed effect regression analyses. To be able to do the analyses, we utilize data from Adult Population Surveys of Global Entrepreneurship Monitor (GEM). Previously a challenge in studying country-level entrepreneurship, institutions, and policymaking has been the lack of data. In recent years, the rise of GEM as harmonized and internationally comparable database on entrepreneurial activities has created the opportunity more effectively to conduct research in those areas. This thesis fills two specific gaps. First, our articles examined under-investigated institutional settings, in order to stimulate future research. This furthered our understanding, recognizing several theoretical concepts such as institutional incongruence. Additionally, we conclude that different aspects of institutions should not be considered and studied in isolation. Second, instead of studying direct impacts on startup rates, we examined how opportunities are discovered and exploited at country level. This is important because opportunity discovery is a major step in the entrepreneurship process, and we learned more about economic development through entrepreneurship, following the research stating that opportunity entrepreneurship is the preferred type of entrepreneurship for that purpose.
Entrepreneurial Opportunity Exploitation under Different Institutional Settings
Entrepreneurial Opportunity Exploitation under Different Institutional Settings

Key words: entrepreneurship, opportunities, institutional theory, corruption, regulative institutions, greasing the wheels, informal economy, institutional incongruence, perceived opportunities, panel data, GEM, WDI, GCR, WGI, nonlinear moderation, mediated moderation, fixed effects, general method of moments

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Ashkan Mohamadi
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1 INTRODUCTION

1.1 Background

Entrepreneurship as a scholarly concept and as a practice has attracted a great deal of attention. Its popularity as a practice is expanding as many see entrepreneurship as a career that makes you liked, feel important, financially successful, feel secure, feel distinctive, and satisfies your feelings of curiosity (Wagner, 2012). Stories of successful entrepreneurs can be found everywhere. From countries in the Far East such as China and Japan, and to the West such as Canada and Finland, successful entrepreneurs are setting examples for others to follow (Anokhin, Grichnik, & Hisrich, 2008). The popularity of entrepreneurship as a practice is matched by scholars’ increasing attention to the phenomenon. In academia, economists of the Austrian School and more recently others have recognized entrepreneurs as an important part of the economy (Holcombe, 2003; Parker, 2004). Especially after Schumpeter (1934) suggested a radical role for entrepreneurs, scholars have devoted more attention to studying their importance. In the management literature, entrepreneurship has become a field in its own right. At the beginning of the millennium in particular, the process of recognizing entrepreneurship as an independent subject in the literature quickened following the contribution of Shane and Venkataraman (2000). Several scholars have argued that the right types of entrepreneurship, such as opportunity entrepreneurship (Acs & Amorós, 2008), are an important driver of economic development and growth through employment, innovation, and structural transformation (Acs, Desai & Hessels, 2008; Anokhin et al., 2008; Gries & Naudé, 2010; Naudé, 2010).

Thus, it is unsurprising that finding ways to encourage entrepreneurship, especially the preferred types, is of interest to researchers and policymakers alike. In order to do so, they need to understand why the incidence of entrepreneurship is different from one country to another, and in that respect, country-level factors are determining the rate of entrepreneurship. These factors create the environment in which entrepreneurial opportunities and activities can be defined, generated, and also limited (Manolova, Eunni, & Gyoshev, 2008). Surprisingly, however, our understanding of the ways in which these national and institutional environments are fertile or fatal for entrepreneurship is limited, and study results on the benefits of various aspects of institutions to entrepreneurship continue to be debated (Dutta & Sobel, 2016; Hechavarria & Reynolds, 2009; Manolova et al., 2008). Naudé (2010) notes two points that could explain this gap. First, institutions are by nature “black box”, and second, until recently, there has been a lack of country-level data on entrepreneurial factors.

Institutions are treated as a black box because they are context specific (Chang, 2007). They are also complex, since they correspond to the business environment. Entrepreneurs’ behavior is formed through the “rules of the game” that are enforced by law, expected by society, or a matter of self-conduct as standardized taken-for-granted rules (North, 1990; Scott, 1995). Institutions comprise “the fundamental political, social, and legal ground rules that establish the basis for production and distribution, and organizations must conform to it if they are to receive support and legitimacy” (Manolova et al., 2008, p. 204). Institutions, as expected, have many aspects to them. One academically accepted and applied framework for institutions, developed by Scott (1995), defines three aspects: regulative, cognitive, and normative (Bruton, Ahlstrom, & Li, 2010). As institutions are context specific and multifaceted, the tasks of gauging them

1 Please find the definitions in section 2.2.1
and examining their relationship with entrepreneurship are challenging. There have been numerous attempts to investigate the impacts of the three aspects on the rate and type of entrepreneurship (e.g. Busenitz, Gomez, & Spencer, 2000; Manolova et al., 2008; Stenholm et al., 2013). Even so, further studies on unlocking the black box of institutions are still valuable since complications in institutions can affect entrepreneurship in unexpected ways. Further studies could help us in understanding why the rate of entrepreneurship is different across countries, and how to promote entrepreneurship in a country.

Promoting entrepreneurship can be counterproductive, if the increased rate of startups is due to the growth of unproductive or destructive types of entrepreneurship (Baumol, 1996). One type believed to be productive for economies (e.g. Aparicio, Urbano, & Audretsch, 2016; Gries & Naudé, 2010) is opportunity in comparison to necessity entrepreneurship. As such, it is important to understand the country-level process in which opportunities are discovered and exploited (Eckhardt & Shane, 2003). Entrepreneurship, specifically opportunity entrepreneurship, occurs through a process in which entrepreneurs exploit entrepreneurial opportunities (Dimov, 2011; Shane & Venkataraman, 2000; Short, Ketchen Jr, Shook, & Ireland, 2010). Thus, to make effective policies, we should learn about the country-level process through which, specifically, opportunities are exploited at country level.

Investigating entrepreneurship and entrepreneurial opportunities has been challenging, with cross-country data on its aspects rarely available. In recent years, however, the rise of Global Entrepreneurship Monitor (GEM) has made studying the entrepreneurial process at country level (Acs et al., 2008) easier and more effective. In this thesis, we take the opportunity to fill the gap in the literature that has caused a lack of understanding on several sets of institutional arrangements and how they affect opportunity exploitation. We focus on two sides, namely institutions, and their effects on entrepreneurship. On the institutional side, we examine the different aspects and complexity of institutions, while on the entrepreneurial side, we assume opportunity discovery and exploitation to be parts of the entrepreneurial process at country level. We limit our investigations to three specific topics, chosen because we found few previous attempts to study them or that studying them triggers further discussion in academia.

First, we focus on rate of entrepreneurship under institutions featuring corruption and different degrees of government efficiency. Governments with too low or too high levels of efficiency in terms of the burden of regulation, government wastefulness, regulation transparency, and the efficiency of legal frameworks, create an institutional setting that can breed red tape. How corruption plays a role in favor of opportunity exploitation under institutions with red tape is an interesting topic to study because of the opposing values promoted by corruption and efficient government. Furthermore, previous studies have found contradicting results (e.g. Dreher & Gassebner, 2013; Dutta & Sobel, 2016). This study focuses on how the institutional aspect of government efficiency in combination with the institutional setting of corruption affects opportunity exploitation.

Second, and another example of contradictory institutional settings, policies to develop regulative institutions and formalize the economy create institutional incongruence (Webb, Tihanyi, Ireland, & Sirmon, 2009) in a large informal economy, where a shared understanding and cognitive institutions promote the mindset and know-how to perform informally. As the informal economy can be a large part of the economy as a whole, it could be interesting to know how policies to regulate and formalize affect opportunity exploitation.

---

2 For definitions, please refer to section 2.1.1
3 Please see section 2.1.3
exploitation. In other words, we focus on how such institutional incongruence affects the most productive type of entrepreneurship for economic development, i.e. opportunity vs. necessity entrepreneurship. The study focuses on a combination of two aspects of institutions and its effect on how opportunities are discovered and exploited.

Third, we study specifically the process of entrepreneurship at country level, i.e. not only the rate of opportunity exploitation but also that of perceived opportunities. We study how regulative institutions play a role in that process. A key point of interest is to highlight the importance of discovering opportunities to how regulative institutions affect the process of entrepreneurship. To understand how policies can promote entrepreneurship, we need to know how they affect important stages of the entrepreneurship process. Thus, we focus on the role played by an aspect of institutions regarding how opportunities are not only exploited, but also (and especially) discovered.

As institutions represent policies as well as cognitive and normative rules of the game in a society, it is crucial to study and understand the institutional settings under which the process of entrepreneurship occurs. It is also vital to recognize that entrepreneurship at country level involves opportunities. This is often neglected when scholars study institutions and offer recommendations to improve the state of entrepreneurship in a country (Alvarez, Young, & Woolley, 2015; Aparicio et al., 2016). Thus, it is valuable for both research and policy to study how different institutional settings affect opportunities at country level. We investigate a number of situations and shed light on institutional complexities, entrepreneurship, and the relationships among them. Each of the chosen topics adds to our understanding in different ways. First, we expand our knowledge on the role of corruption in greasing the wheels of entrepreneurship, while both low and high efficiency governments create red tape. Second, we investigate the role of institutional incongruence created by formalizing regulations in a large informal economy regarding opportunities and entrepreneurship. Third, we highlight opportunity discovery as an important part of the process that cannot be neglected while developing regulative institutions.

1.2 Research Objectives

The overall objective of this thesis and the cases presented herein is to investigate how institutions and institutional factors affect opportunity exploitation at country level. We acknowledge that both institutional settings and the process of opportunity exploitation are complex phenomena. We aim to examine complexities on both sides of the studies. The theoretical developments in both fields of entrepreneurship and institutions are wide. As a result, a study aiming at exploring these two subject areas needs to be narrowed down to specific research questions. In this study, on the entrepreneurial side, we study opportunities in their different forms of objectively existing, subjectively acknowledged, or realized and the role of the formal and informal institutions therein.

The thesis and its objectives are detailed in three studies. First, we examine how the control of corruption is related to the rate of entrepreneurship at country level, and how government efficiency affects that relationship. As red tape forms in both low and high levels of government efficiency, we examine the nonlinear relationship between corruption and nascent entrepreneurship, with a focus on how it is moderated through government efficiency. In sum, how one aspect of institutions, control of corruption, combines with another, government efficiency, and affects opportunity exploitation.

Second, we aim to discover if and how, in countries with different-sized informal economies, the development of regulative institutions increases the productivity of
entrepreneurship, namely the ratio of opportunity-to-necessity entrepreneurship. Here, the objective is to examine the influence of informal economy size on the rate of opportunity-to-necessity entrepreneurship at country level. We also examine the extent to which investments in regulative institutions promote the ratio at different levels of the informal economy. As such, the objective is to address the question of how regulative institutions siding cognitive institutions of informality affect opportunity exploitation.

Finally, we study the role of regulative institutions in the process of transition of emerged opportunity at country level to perceived opportunities and finally to startups. The aim is to study the role of perceived opportunities, and how their interactions with institutions impact the way those institutions affect opportunities and startup rates. We also investigate the process through which a change in economic efficiency leads to higher startup rates. The focus is on examining the role of the rate of perceived opportunities at country level as well as regulative institutions. We study how regulative institutions affect opportunity discovery and, in turn, opportunity exploitation.

1.3 Approach

To address the research questions and objectives, this thesis builds on two co-authored research articles and one sole-authored. All relate to the overall thesis objective, i.e. the study of different institutional settings and their effects on the process of opportunity exploitation at country level. Each article corresponds to a set of specific objectives described in section 1.2. Together, the thesis and articles make several assumptions with regard to ontology, epistemology, human nature, and research approach. Although each assumption can be challenged, researchers at some point must choose one approach over another, and the chosen approach in this thesis is described in the following.

To explain the overall assumptions and approach in this thesis, we borrow concepts from the Burrell and Morgan (1979) sociological paradigms. First, regarding the ontology, the present work considers the phenomena objective. Understanding the nature of reality, i.e. whether phenomena exist independently or their existence has no meaning without humans, has been a matter of interest to thinkers since the inception of philosophical discussion. More pertinent to the subject of this thesis, there is a discussion in the entrepreneurship literature on whether entrepreneurial opportunities are objective or subjective (Alvarez & Barney, 2007). Some scholars believe opportunities are extant and ready to be discovered, others argue they are subjective and created by entrepreneurs. While recognizing that opportunities, at some point, exist as ideas, measured as perceived opportunities in our articles, our general attitude towards the nature of opportunities is in line with opportunity discovery, i.e. objectivism.

We have adopted positivism as our epistemological approach in this thesis. We assume that entrepreneurial and institutional factors are related, and the relationships can be established by studying those factors. As mentioned in section 1.2, the objective of this thesis is to uncover how institutional settings are related to entrepreneurship. We have therefore assumed that there are indeed relationships between the two sets of institutional and entrepreneurial factors. Finding those relationships will make it possible to understand entrepreneurship, predict entrepreneurial factors, and create policies to improve the state of entrepreneurship in different institutional environments.

The next dimension employed to clarify the approach of this thesis is human nature or determinism vs. voluntarism. Absolute voluntarism and determinism assumptions are two ends of a spectrum. The debate as to whether human behavior is dictated or we shape our own environment has been ongoing since the era of the ancient philosophers. Hence, we avoid claiming absolute voluntarism or determinism. To explain further, we divide
the discussions into two levels, individual and country. We recognize that at the individual level, leaning towards voluntarism is a better approach. Individual entrepreneurs decide which opportunities to grasp and how to exploit them. Nevertheless, at the country level, the assumption is closer to determinism, that entrepreneurial factors, such as startup rates or share of opportunity entrepreneurship, are determined by institutional settings. Although individuals decide how to choose to become entrepreneurs, the rates are determined at country level. For example, in a country where institutional arrangements breed high rates of corruption and red tape, some actors choose to engage in corrupt practices to become entrepreneurs, while others prefer not to become entrepreneurs because they do not want to engage in corruption to bypass regulative difficulties. However, at country level, some corruption might increase the overall rate of entrepreneurship (Dreher & Gassebner, 2013), which means overall that the combination increases the rate at which individuals choose to exploit the situation to become entrepreneurs. In other words, the surroundings determine how individuals behave at country level.

Finally, the methodological approach of the current work is nomothetic and quantitative. We have assumed that phenomena can be measured in numbers and statistical tools can be used to determine whether there are relationships among them. Institutional issues such as governance quality and government efficiency are measured and presented in numbers. Entrepreneurial issues such as perceived opportunities, share of opportunity entrepreneurship, and startup rates at country level are also measured in numbers. Furthermore, we employ statistical tests, including hierarchical fixed effects regression analyses, to uncover how different institutional settings are related to opportunity exploitation.

Next, in section 2 we describe the theoretical background and overall theoretical framework of the thesis. The theoretical background is related to entrepreneurship in section 2.1 and institutions in section 2.2. We present a theoretical framework that covers the articles in the thesis in section 2.3. Section 3 details the research methods. In section 4, we summarize the articles and show how they contribute to the overall theme of the thesis. In section 5, Discussion and Conclusions, we present the contributions of the thesis to research and policy, its limitations, and our concluding remarks.
2 THEORETICAL BACKGROUND AND FRAMEWORK

Both entrepreneurship and institutions are wide subject studies. In this section, first an introduction is given to the general arguments in each of the fields that could be used to frame the theoretical arguments in this manuscript. Then few detailed topics that are discussed in the case articles are presented. In the final part, I summarize the theoretical framework of this research.

2.1 Entrepreneurship

Entrepreneurship has been widely discussed in economic literature especially after Schumpeter (1934) acknowledged a central role for entrepreneurs in the economy. Other Austrian economists (e.g. Kirzner, 1973; Mises, 1966) thereafter contributed to the discussion. In management studies, by recognizing opportunities as a central concept in entrepreneurship, scholars such as Shane and Venkataraman (2000) have pioneered establishing entrepreneurship as a distinctive field of research. Entrepreneurial opportunities, accordingly, constitute the foundation of this study.

Entrepreneurship scholars have studied opportunities. They view opportunities at least in three forms: opportunities that objectively exist in market place, those that are subjectively acknowledged by potential entrepreneurs, and those that are realized in form of startups (Anokhin & Abarca, 2011; Davidsson, 2015; Dimov, 2011).

In recent years, theoretical arguments have been developed regarding each of these forms of opportunities. While discussing the objectively existing opportunities, for example, scholars have categorized the factors leading to their creation (e.g. Eckhardt & Shane, 2003). Additionally, different forms of such objectively existing opportunities, including arbitrage or innovative opportunities have been recognized (Anokhin & Wincent, 2014).

When it comes to subjective discovery of opportunities, entrepreneurs’ alertness to the opportunities becomes a central concept (Kirzner, 1979; Shane, 2000). Additionally, the motivation of entrepreneurs, whether they become entrepreneurs because in absence of other sources of income, or because they discover opportunities that improve their sufficient income (Bosma & Levine, 2009) is a topic related to discovery of opportunities. At the individual level, the motivations of entrepreneurs for engaging in entrepreneurship often include both necessity reasons, when they find certain difficult situations in their lives, and opportunity reasons, without which there could be no entrepreneurship (Williams, 2009). This proportional nature can be aggregated to the country level and a ratio of opportunity-to-necessity entrepreneurship could better capture that nature.

As of realized opportunities in form of startups, effects and productivity of different forms of entrepreneurship for the economy have been a discussion in entrepreneurship literature (Baumol, 1996). Entrepreneurship have been categorized to different forms based on the motivation of entrepreneurs and the types of opportunities they pursue, and the effects of the different forms on economic growth have been found to be different (Acs & Varga, 2005; Anokhin & Wincent, 2014; Wennekers, Van Wennekers, Thurik, & Reynolds, 2005). For example, and related to this research, studies show that opportunity entrepreneurship is a type that could lead to structural transformation and economic growth (Gries & Naudé, 2010) while necessity entrepreneurship entails no such benefits.
2.1.1 Entrepreneurial Opportunities

Entrepreneurial opportunities have become a center of attention for entrepreneurship scholars. Those such as Davidsson (2015), and Dimov (2011), summarize the findings of previous authors on opportunities. They distinguish three phases of opportunity: objectively existing, subjectively identified, or realized. The phases could also be called opportunities as instituted in the market structure or external enablers, as happening or new venture ideas, and as expressed in actions or opportunity confidence. The first phase implies that opportunities arise from changes in the economic and market structure, such as technological change. Changes in economic efficiency are part of this group and can be a source of opportunity at country level (Anokhin & Wincent, 2014). Other examples are changes in political and regulative settings, as well as in societal and demographic environments (Eckhardt & Shane, 2003). The second phase suggests that opportunities, at some point, exist in the entrepreneur's imagination (Short et al., 2010); they are merely ideas about the existence of an opportunity to start a business. Entrepreneurs encounter this phase when they discover an opportunity to start new businesses. In the last phase, entrepreneurs act to exploit the opportunity. Startup rates illustrate the intensity of this phase of opportunities.

All three phases of opportunity are discussed in the thesis. In fact, the subject of Article 3 is the association among these phases in the presence of regulative institutions. Article 2 uses the second phase (perceived opportunities) as an additional dependent variable to verify the results. All three articles measure the last phase (actions to start businesses) as the dependent variable.
Table 1. Types, examples, and measures of opportunity

<table>
<thead>
<tr>
<th>Type of opportunity</th>
<th>Objectively Existing (external enablers; opportunities as instituted in market structure)</th>
<th>Subjectively Identified (new venture ideas; opportunities as happening)</th>
<th>Realized (opportunity confidence; opportunities as expressed in actions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples</td>
<td>Technological advances; demographic changes; political changes; changes in consumer tastes</td>
<td>Ideas for new businesses in the entrepreneur’s mind; the psychological procedure leading to new idea creation</td>
<td>Startups; actions toward starting businesses</td>
</tr>
<tr>
<td>Measures in the thesis</td>
<td>Change in economic efficiency (DEA analysis)</td>
<td>Perceived opportunities; ratio of opportunity-to-necessity entrepreneurship</td>
<td>New business density; nascent entrepreneurship rate; ratio of opportunity-to-necessity entrepreneurship</td>
</tr>
</tbody>
</table>

2.1.2 Discovering Entrepreneurial Opportunities

As explained in section 1.3, since the analyses in this thesis are at country level, we view the opportunities as objective phenomena existing in the market place. Therefore, opportunity discovery, a subjective procedure, is also measured at country level, as the rate of perceived opportunities in a country. Finally, we assume a part of discovered opportunities turns into realized opportunities in form of startups (Anokhin & Abarca, 2011).

In order to discover the opportunities, individual entrepreneurs need to be alert (Kirzner, 1979). Tang, Kacmar, and Busenitz (2012) summarize three different forms of alertness and opportunity discovery: scanning and search, association and connection, and evaluation and judgment. Scanning and search “allow entrepreneurs to be persistent and unconventional in their attempts to investigate new ideas” (ibid., p. 79); association and connection “focus on receiving new information, creativity, and making extensions in logic” (ibid., p. 80); while evaluation and judgment decides whether an opportunity is a first-person or a third-person opportunity. As McMullen & Shepherd (2006) define, a first-person opportunity is one that an entrepreneur deems he or she can pursue personally. A third-person opportunity, on the other hand, is one that an entrepreneur recognizes but decides is best pursued by other people since it is costly or not within the entrepreneur’s own reach.

Institutional factors could influence opportunity discovery at country level. For example, one could argue that in general, a better quality of governance could support opportunity discovery (Aparicio et al., 2016; Kshetri & Dholakia, 2011). A clear guideline by the government reduces the uncertainties, which helps entrepreneurs better to connect information, find opportunities, and due to the lower risks provided by clear regulations they judge the opportunities as first-person. However, when cognitive institutions of business implementation and know-how among the social groups surrounding individual entrepreneurs (e.g. customers, suppliers, partners, sub-contractors) do not
match the regulative institutions applied by governments, the conflicting values could lead to ambiguity that makes it difficult for entrepreneurs to associate and connect information (Tang et al., 2012) in order to discover opportunities (Kim, Wennberg, & Croidieu, 2016). This, however, does not imply that developed regulative institutions are always a burden on opportunity discovery. On the contrary, when they are supportive, clear, and alongside cognitive institutions, they could promote opportunity discovery and exploitation.

2.1.3 Opportunity and Necessity Entrepreneurship

The literature distinguishes between two types of entrepreneurship: opportunity and necessity (e.g. Amorós, Ciravegna, Mandakovic, & Stenholm, 2017; Block & Sandner, 2009; Williams, 2009). Opportunity entrepreneurs have options to work otherwise but become involved in business creation because they find business opportunities that could increase their current incomes (Sautet, 2013; Wennekers et al., 2005), whereas necessity entrepreneurship refers to starting a business in the absence of other ways to make a living (Bosma & Levie, 2009). At the individual level, the boundaries between opportunity and necessity entrepreneurs are blurry. Individual entrepreneurs often have a mixture of reasons why they start their business, which include both an availability of opportunities, without which no entrepreneurship is possible, and factors related to challenging circumstances in the entrepreneurs' lives. However, the proportions of these underlying reasons could differ.

Individuals' entrepreneurial motivations ultimately reflect upon larger aggregate levels of analysis. Studying the ratio of opportunity-to-necessity entrepreneurship in a country reveals information about the broader mix of underlying entrepreneurial drivers and thus is more informative than solely examining the prevalence of entrepreneurship or a single type of it. The ratio also captures economic development through technological change and structural transformation (Acs & Varga, 2005; Gries & Naudé, 2010) irrespective of the total rate of entrepreneurship in a country, which can vary due to the level of structural development. A high opportunity-to-necessity ratio implies a stronger prevalence of pull factors under the institutional settings, that is, individuals more often perceive that their entrepreneurial endeavors are primarily motivated by the pursuit of entrepreneurial opportunities. A low ratio, on the other hand, points to the prevalence of institutional conditions that push individuals out of wage employment and into entrepreneurship in the absence of better alternatives to make a reasonable living.

Institutional conditions shape the balance of the intertwined push and pull factors through influencing both the opportunities at the country level and the opportunity costs of starting new businesses (Amorós et al., 2017; Levie & Autio, 2011). More available opportunities and higher levels of opportunity identification and pursuit strengthen the pull factors, which favors opportunity entrepreneurship. In contrast, if the opportunity costs of entrepreneurship are low in a country, and especially if they are below what would satisfy a person's basic needs, the stronger the push factors, and the more favorable the conditions for necessity entrepreneurship.

2.2 Institutions

Institutional theories in economic and management studies have been widely applied in research. Institutions are in essence “the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction” (North, 1990, p. 3). Institutions shape the taken-for-granted rules in a society, shared understandings of how to interact, and of good and bad, as well as the rules set by governments. People and
organizations in different institutional environments might react differently to a same phenomenon, since they play by different rules (Campbell, 2007). Therefore, institutions are a significant determinant of how a society functions. Among all other outcomes, related to this study, institutions could affect the state of entrepreneurship in a country. Individual entrepreneurs behave differently when they operate in different institutional environments (Aparicio et al., 2016; Stenholt et al., 2013). In fact, “how entrepreneurial opportunities are formed and exploited depends upon the institutional environment in which they are embedded” (Young, Welter, & Conger, 2017, p. 1). For that reason, scholars have put considerable effort into studying which institutional environments involve different cultural items or qualities of governing that benefit entrepreneurship (Liñán & Fernandez-Serrano, 2014; Puffer, McCarthy, & Boisot, 2010; Van Stel, Storey, & Thurik, 2007; Young et al., 2017).

Institutional scholars have furthermore for a long time distinguished between institutions that are imposed by sociopolitical factors (e.g., regulations) and the cognitive and normative ones that are representative of internalized understandings of the world and are based upon historical culture, traditions, and what are considered to be appropriate behaviors (Aldrich & Fiol, 1994; Scott, 1995). The rules of institutions thus arise either from explicit sociopolitical and governmental regulations aiming at constraining and incentivizing individual or organizational actions or from implicit guiding principles of how to behave and what is appropriate within social relationships (Powell & DiMaggio, 1991; Roberts, 1994; Stephan, Uhlaner, & Stride, 2015). The former are formal and constitute regulative institutions, and the latter are informal and form cognitive and normative institutions (Scott, 1995). Accordingly, the entrepreneurship literature has evolved into two streams of research on institutions. Those that follow institutional economics focus on formal regulative institutions (e.g. Amorós et al., 2017; Autio & Fu, 2015; Levie & Autio, 2011), while the other stream examines the roles of cultural and sociology-based factors as well as cognitive and normative values on the state of entrepreneurship (e.g. Autio, Pathak, & Wennberg, 2013; Liñán & Fernandez-Serrano, 2014; Tan, 2002). In recent years, researchers have proposed the possibility and necessity of acknowledging and combining both formal regulations and informal institutions in studying entrepreneurship (Bruton et al., 2010; Cullen, Johnson, & Parboteeah, 2014; Kim & Li, 2014; Stephan et al., 2015).

### 2.2.1 Institutional Pillars

Scott (1995) builds a framework for institutions that classifies them into three pillars, namely regulative, cognitive, and normative. The cognitive and normative pillars are informal dimensions of institutions. The normative pillar is about expectations and appropriateness, while the cognitive refers to shared understandings and beliefs that are taken for granted. The regulative pillar concerns formal institutions. That is, it corresponds to the formal legal framework executed by governments, rewarding favored behavior and punishing violations of laws and regulations (Bresser & Millonig, 2003; Miller, Kim, & Holmes, 2015).

In the articles, we investigate the regulative dimension and different aspects thereof. More specifically, government efficiency and the extent to which governments control corruption are the subjects of Article 1. In the other two articles, a measure of governance quality is used to examine overall regulative institutions. The measure includes six indices: voice and accountability, political stability, governance effectiveness, regulatory quality, rule of law, and control of corruption. In addition to regulative institutions measured by governance quality, Article 2 assumes that cognitive institutions in a large informal economy comprise shared understandings of how informal businesses are
practiced. Table 2 describes how two of the institutional pillars are included in the articles.

Table 2. Institutional pillars and their use in the thesis

<table>
<thead>
<tr>
<th>Articles</th>
<th>Pillars</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article 1</td>
<td>Regulative</td>
<td>Government efficiency and control of corruption</td>
</tr>
<tr>
<td>Article 2</td>
<td>Regulative and Cognitive</td>
<td>Governance quality including six indices: voice and accountability, political stability, governance effectiveness, regulatory quality, rule of law, and control of corruption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Size of informal economy as an indication of cognitive institutions of informal business practices</td>
</tr>
<tr>
<td>Article 3</td>
<td>Regulative</td>
<td>Governance quality including the six indices mentioned above</td>
</tr>
</tbody>
</table>

2.2.2 Institutional Incongruence

Different dimensions of institutional pillars set different rules of the game in a country. While in this study we attempt to study both formal and informal institutions, we find that sometimes, the rules set by different aspects of institutions are in opposition. We refer to such conditions as institutional incongruence: individuals find themselves in a situation where one aspect of one of the pillars encourages them to behave in a certain way, while another aspect leans on them to behave differently. A special case of institutional incongruence is captured by institutional anomie theory, initially developed in the fields of sociology and criminology (Durkheim, 1951; Merton, 1995; Messner & Rosenfeld, 1997; Orru, 1986). It argues that cognitive institutions promote values such as capitalism, monetary eagerness, and the “American Dream”, while normative institutions promote opposing values such as family values and altruism; and this situation, since cognitive institutions are dominant in this case, could lead to deviant behavior (Passas, 1990). Cullen et al. (2014) apply the theory into entrepreneurship research and introduce, but not explicitly mention, few instances of institutional incongruence. Another example of institutional incongruence in entrepreneurship literature is the co-existence of the norm of formality, encouraged by regulative institutions, and the legitimacy of informal business activities according to cognitive institutions (Webb et al., 2009). We refer to this type of institutional incongruence as formal-informal institutional incongruence.

2.2.3 Corruption and the Grease the Wheels Hypothesis

Corruption, as an aspect of institutions, refers to the abuse of public power for private gain (Rodriguez, Uhlenbruck, & Eden, 2005), and control of corruption refers to the extent to which it is contained. Corruption is often viewed as a negative phenomenon (Warren, 2004). Various researchers have studied the effects of corruption on different economic factors (e.g. Mauro, 1995; Méndez & Sepúlveda, 2006; Mo, 2001), and more recently on entrepreneurship. The results concerning entrepreneurship have, however, been mixed. Most studies, including that of Dutta and Sobel (2016), found negative effects of corruption on entrepreneurship. Anokhin and Schulze (2009) found negative but nonlinear effects. On the other hand, few studies have found no direct country-level
effects (Aidis, Estrin, & Mickiewicz, 2012), while Dreher and Gassebner (2013), and Belitski, Chowdhury, and Desai (2016), found positively moderated effects.

Some documented moderated effects, related to a hypothesis often referred to as “grease the wheels”, are of particular interest here. A few studies, including those by Lui (1985) and more recently Dreher and Gassebner (2013), show that under institutions with poorly functioning bureaucracies, corruption acts as a tool to reduce the time and effort involved in starting and running a business. In other words, under inefficient governments, corruption, to some extent, could be beneficial to entrepreneurship. That is, corruption positively moderates how high red tape influences entrepreneurship.

Institutional configurations set by different degrees of corruption and government efficiency, which are aspects of formal institutions, could bring mixed results on entrepreneurship. Specifically, under institutions with high red tape, corruption can be beneficial. Nonetheless, that does not necessarily mean corruption is good for entrepreneurship, because the best situation might be to have less of both red tape and corruption (Dutta & Sobel, 2016; Guriev, 2004).

2.2.4 Governance, Informal Economy and Formal-Informal Institutional Incongruence

In general, one could argue that high quality of governance in a country provides clear and strong regulative institutions that encourage entrepreneurship (Kshetri & Dholakia, 2011). On the other hand, a body of research have found that this is not always the case (Kim & Li, 2014; Portes & Haller, 2010). Especially, for regulative institutions to be beneficial, they should be in line with the rules of the game that are informally shared by market actors. A large informal economy provides a situation where majority of people accept and expect informal business activities, which is at odds with formal regulative institutions of the country. The informal understandings of the rules of the game, which are shared among businesses in the informal economy, contradict the regulations imposed by government that target formalization. A condition of this nature, as described in section 2.2.2, is termed institutional incongruence (Webb et al., 2009), where different aspects of institutions are in disagreement with one another. The co-existence of the norm of formality encouraged by regulative institutions, with the legitimacy of informal business activities according to cognitive institutions, is an example that can be termed formal-informal institutional incongruence. In an incongruent situation such as this, investments in improving quality of governance in a country could have adverse effects on entrepreneurship.

2.3 Theoretical Framework: Institutions and Entrepreneurship

The fundamental theories of entrepreneurship and institutions, which are applied in this research could be described as follows. Entrepreneurship involves opportunities, and those could be objectively existing, subjectively identified, or finally, realized (Anokhin & Abarca, 2011; Davidsson, 2015; Dimov, 2011). Institutions are built of the formal and informal rules of the game (North, 1990; Scott, 1995). Entrepreneurship researchers recommend studying effects of different aspects of both formal and informal institutions on entrepreneurship (Bruton et al., 2010; Cullen et al., 2014; Kim & Li, 2014; Stephan et al., 2015).

We attempt to study different aspects of institutions and opportunity exploitation at the country level. Previously, several researchers have studied how institutions and entrepreneurship are related, and many of them share an interest in economic
development (Acs et al., 2008). For example, Goedhuys and Sleuwaegen (2010) studied the role of entrepreneurship in the institutional context of Sub-Saharan Africa. De Clercq, Hessels, and Van Stel (2008) investigated how institutions experiencing knowledge transfer due to a large amount of Foreign Direct Investment (FDI) and international trade, affect the rate of export-oriented entrepreneurship, a preferred type of entrepreneurship. Studies related to the role of corruption in greasing (or “sanding”) the wheels of entrepreneurship (Dreher & Gassebner, 2013; Dutta & Sobel, 2016; Méon & Sekkat, 2005) also fit here. Furthermore, several scholars have studied the roles of formal or informal institutions in entrepreneurship (Aparicio et al., 2016; Cullen et al., 2014; Puffer et al., 2010; Van Stel et al., 2007). Stenholm et al. (2013) have studied the three pillars of institutions in detail, and investigated how they impact the rate of innovative and high-growth entrepreneurship. Building on the work of Busenitz et al. (2000), Manolova et al. (2008) also examine how the three pillars affect entrepreneurship.

Similarly to the abovementioned studies, institutions and entrepreneurship constitute two sides of the theme of this thesis, and we are interested in studying how institutional arrangements improve the level and productivity of entrepreneurship. As previous studies have revealed, institutions are complex with numerous aspects to them, so on the institutional side we examine the effects of development or the size of an institutional aspect, alone or in combination with another. As discussed in section 2.2, we focus on different aspects of institutions. The development of regulative institutions in general, or the co-existence of different dimensions thereof, e.g. government efficiency and control of corruption, is one example. The cognitive institutions of acting in the informal economy, combined with developed regulative institutions, also fit this category.

On the entrepreneurial side, noting the importance of opportunities, we investigate both opportunity discovery and exploitation. Sometimes opportunity discovery is only theorized. For example, in the case of formal-informal institutional incongruence, it negatively affects opportunity discovery because fewer entrepreneurs can associate and connect to find opportunities. That process reveals a decrease in the share of opportunity entrepreneurship. We additionally use a measure of opportunity discovery, namely perceived opportunities, in Article 3.

This thesis argues that institutional factors, one aspect, alone or in combination with another, affect opportunity discovery, and consequently opportunity exploitation at country level. Figure 1 depicts the overall model of the thesis.

![Figure 1. Overall model of the thesis; Institutions and Entrepreneurship](image-url)
3 RESEARCH METHODS

3.1 Data

As discussed in section 1.1, previously a challenge in studying country-level entrepreneurship, institutions, and policymaking has been the lack of data. In recent years, the rise of GEM as harmonized and internationally comparable database on entrepreneurial activities has created the opportunity more effectively to conduct research in those areas. GEM started in 1999 as a global project run by Babson College and London Business School. The aim of its creation was to uncover whether levels of entrepreneurial activities differ across countries and whether the levels change over time. Other aims included to understand why some countries are more entrepreneurial than others, which policies promote entrepreneurship, and if entrepreneurship and economic growth are related (Sternberg & Wennekers, 2005). The number of countries in the database has been increasing since its inception. Each year, data is collected in each GEM country of currently more than 100. The strategy for data collection includes Adult Population Surveys (APSs) and National Expert Interviews (NEIs). In this research, we use data collected through APSs. The aim of the surveys is to provide harmonized data on perception of opportunities, capacity to start businesses, and actual activities in relation to starting and managing business ventures (Reynolds, 2017). To handle the surveys, a random sample of population, 2000 of which is assumed to be the minimum needed for each country, participate in short interviews with straightforward questions. The data on each participant additionally include basic demographic information. Then, the data related to each country is sent to a coordination team. There, the collected data is checked for possible errors, for example if a variable is not coded properly or is omitted from the initial dataset. The coordination team moreover uses weights for sub-groups (e.g. age, gender, ethnicity) and harmonizes the data so to make it internationally comparable (Reynolds et al., 2005).

Reliability and validity of GEM have been further discussed in entrepreneurship literature (e.g. Acs, 2006; Reynolds et al., 2005). Reliability refers to whether a measure would show similar value if the data collection is replicated. Thus, the actual numbers are not dependent on the observations or subjective judgments of individuals. GEM insures the reliability of the data by replicating same procedure for same periods in some of the countries. The replications have not raised concerns of statistically different data. Additionally, one could observe that the data related to each country is correlated with the data from same country in different years, and that in most countries, the data moves to the same direction when there is a change in global economic conditions. Furthermore, the measures of entrepreneurial activities in in different country-years are correlated with measures from other databases, e.g. “new business density” of WGI. Validity refers to whether the collected data measure what they intend to. Looking at the interview questions in APSs and subjectively judging them, one could see that face validity of the measures are evident in most of the cases. For example, the following question in APSs obviously helps identifying individuals who are active in starting new businesses: “Are you, alone or with others, currently trying to start a new business, including any self-employment or selling any goods or services to others?” (“GEM Global Entrepreneurship Monitor”). Additionally, as several measures of entrepreneurial by GEM has been shown to be correlated with variables from other databases, one could argue that convergent validity also adds up. Since the questions, in most cases, are well-designed, direct, and straightforward, there is little chance that participants in different subgroups and different countries would understand them in different ways. Therefore, one could argue that most measurements are invariant. Here it should be noted that the validity and measurement invariance of one set of specific variables in GEM database has been questioned by researchers (e.g. Acs, 2006; Reynolds et al., 2005). That is necessity...
and opportunity entrepreneurship. These issues are discussed in sections 2.1.3, 3.2, and 5.3.

In addition to GEM, we utilized several other databases to employ a multisource data set for the articles in this thesis. All the databases are available online. One database includes items from the World Governance Indicators (WGI) of the World Bank, to measure regulative institutions including control of corruption. WGI has reported data on six different dimensions of governance for over 200 countries since 1996 (Kaufmann, Kraay, & Mastruzzi, 2016). Another database from the World Bank used in this thesis is WDI, from which we borrowed most of the control variables in the articles and some of the main variables. The database compiles hundreds of development-related indicators from over 150 countries, from officially recognized international sources. It covers the years 1960-2016 with major gaps in some indicators.

We also obtained data for the articles from the Global Competitiveness Report (GCR). GCR gauges twelve different broad pillars, each comprising several sub-indexes, to measure the competitiveness of different countries. The degree of competitiveness is reported as a global competitiveness index. Started in 2004 and with major changes after 2006, GCR covers over a hundred counties worldwide (Schwab & Sala-i-Martín, 2015). A few control variables and main variables in the articles use indexes reported in GCR.

In addition to the above-mentioned databases, we referred to the data provide by other sources including Dau and Cuervo-Cazurra (2014) to get an alternative measure for the size of informal economy as it is described in section 3.2.

3.2 Measures

In this section, the main measures that are utilized in the articles are described. Additionally, the rationale for using them and not others are presented. In general, the approach for using them, as well as the control variables, was based on three reasons. We found theoretical arguments for choosing them; we found that other scholars in entrepreneurship studies have used them, and we found that there are enough available datapoints that would preserve a reasonable size for our panel datasets. In most cases, both regarding the main variables and the control variables, altering them would not change the direction of the relationships, but it would change the size of observations and change the significance of the results.

The topic of the present thesis concerns the influence of institutions on entrepreneurship. That means the dependent variables in the articles are measures of entrepreneurship and opportunity exploitation. In Article 1, the dependent variable is specifically a nascent entrepreneurship rate. “Nascent entrepreneurs are those individuals, between the ages of 18 and 64 years, who have taken some action toward creating a new business in the past year” (Acs, Arenius, Hay, & Minniti, 2004, p. 16). It is collected through APSs of GEM. It particularly measures the percentage of population who are active in creating a new firm but have not done that yet. The challenge with this measure remains that not all nascent entrepreneurship lead to business creation. An alternative to this measure would have been Total Entrepreneurship Activity (TEA) from the same database. TEA measures the percentage of nascent entrepreneurs and people who are involved in managing a firm of younger than 3.5 years (Wong, Ho, & Autio, 2005). We chose nascent entrepreneurship as a dependent variable in Article 1 because a large portion of our dataset involves countries with large informal economies. In those, many entrepreneurs decide not to officially register their firms. Therefore, it would be appropriate if we study how institutional conditions with varying levels of corruption and government efficiency is related to the percentage of population who are active in
creating a business, formal or informal. As a result, the results of the article show that red tape and corruption significantly affect even those who are active in creating informal ventures.

Another measure that gauges an amount of entrepreneurship is the WDI’s “new business density”. It measures new business registrations per 1000 people of 15 to 64 years-old. This measure is used to estimate the last type of opportunity, opportunities as expressed by actions. The challenge with this variable is that it only measures the percentage of businesses that are officially registered. The alternatives could have been TEA and nascent entrepreneurship of GEM. However, since the theoretical arguments in Article 3 required that the variable should measure the opportunities that are surely acted upon, we can only be sure we are measuring this type of opportunities if entrepreneurs actually have formed businesses.

Another entrepreneurship-related dependent variable is intended to examine the share of productive types of entrepreneurship. To be more specific, one dependent variable in an article is the ratio of opportunity-to-necessity entrepreneurship. GEM provides data on both opportunity entrepreneurship and necessity entrepreneurship. GEM defines opportunity entrepreneurship as “percentage of individuals involved in early-stage entrepreneurial activity (as defined above) who (1) claim to be driven by opportunity as opposed to finding no other option for work; and (2) who indicate that the main driver for being involved in this opportunity is being independent or increasing their income, rather than just maintaining their income”. (Singer, Amorós, & Moska, 2014, p. 24). Necessity entrepreneurship, by comparison, is defined as “percentage of individuals involved in early-stage entrepreneurial activity (as defined above) who claim to be driven by necessity (having no better choice for work) as opposed to opportunity”. (ibid., p. 24).

Similarly to several prior research (e.g. Acs & Amorós, 2008; Thompson, Jones-Evans, & Kwong, 2010; Williams & Youssef, 2014), the dependent variable here is opportunity entrepreneurship divided by necessity entrepreneurship. We additionally performed the tests solely on both rates of necessity and opportunity entrepreneurship as a robustness check to ensure they behave as hypothesized. Here it should be noted that scholars have put critics on these measurements in GEM. One could argue that there are issues with face validity. The questions asked to determine the motivation of entrepreneurs involve words that are known to scholars but can have different meaning to that outside academia. For example, the word necessity to describe a type of entrepreneurship is defined in academia but for general public it could mean different things. This is indeed an issue since in developed and developing countries individuals interpret the word differently (Reynolds, 2017). This difference would also undermine the invariance of the measurement. To add to that, in developing countries there is a tendency to report opportunity entrepreneurship even if the necessity element is strongly present. Using the ratio instead of separate necessity and opportunity entrepreneurship, to some extent solves this problem (Acs, 2006). Additionally, in our research, it should be noted that time-invariant systematic measurement errors are controlled for by having country-level fixed effects. As another challenge, at the individual level, entrepreneurs often have a mixture of reasons why they start their business, which include both an availability of opportunities, without which no entrepreneurship is possible, and factors related to challenging circumstances in the entrepreneurs’ lives. However, the proportions of these underlying reasons could differ. Yet, the question in APSs measures a dummy variable of whether the entrepreneur is motivated by necessity or opportunity unless the respondents themselves state that the cannot be categorized as such (Reynolds et al., 2005). Although the motivation behind entrepreneurship could have been measured differently to be as extents of necessity and opportunity motivations for each individual, the assumption is that the dummy measure would present the primary or dominant motivation of an entrepreneur. Despite these issues, the measure has been used in entrepreneurship research and can represent a proxy for productivity of
entrepreneurship (e.g. Acs & Amorós, 2008; Thompson et al., 2010; Williams & Youssef, 2014). Alternative measures of productivity of entrepreneurship include orientations of entrepreneur, for example whether they are export oriented or growth oriented (Sternberg & Wennekers, 2005). The ratio of opportunity-to-necessity entrepreneurship, however, fits this research because of two reasons. First, our study focuses on institutions and second, it focuses on opportunities; the ratio reflects the institutional factors that affect opportunity identification and pursuit, as well as opportunity costs of entrepreneurship in a country.

“Perceived opportunities” from GEM acts as additional dependent variable in a post hoc analysis in Article 2. It additionally measures the second type of opportunity at country level, i.e. opportunities as happening, in Article 3 where it is not considered a final dependent variable but a mediator. GEM defines it as “Percentage of 18-64 who see good opportunities to start a firm in the area where they live” (Bosma & Levie, 2009, p. 61). As one of GEM’s purposes, it has provided internationally comparable data on perception of opportunities. At the country-level there are no alternatives of good quality that could capture the level to which individuals perceive business opportunities in a country. Perceived opportunity has enabled us to conduct research on institutional factors that affect level of opportunity identification, as utilized in Articles 2 and 3.

Regarding other main variables, the first type of opportunity, i.e. opportunities as instituted in market structure, are independent variables in one article. We measure them using a method introduced by Anokhin et al. (2011). The technique measures changes in efficiency and changes in technology at country level by measuring factor productivity. Factor productivity is calculated using Data Envelopment Analysis (DEA), a nonparametric programming technique. By following the standard formula of calculating a country’s labor and capital as inputs and GDP as output, it measures the ‘best practice’ production frontier showing the best technology available (Nelson & Winter, 2009). A change in efficiency to get closer to what current technology provides is traceable using the technique. The DEA’s inputs, labor (Total Labor Force) and capital (Gross Fixed Capital Formation over 10 years depreciated at 10%), and output (GDP Market Price constant USD 2005) are borrowed from WDI’s database. Inverted efficiency change is used to measure changes in country level efficiency (Anokhin et al., 2011). DEA is performed using the DEAP software by Coelli (1996). External enabler opportunities include a wide variety of factors. They can be demographic, political, environmental, technological, or economic changes among others. Efficiency of the economy in terms of utilization of the input is chosen for this study. When there are possibilities to enhance economic efficiency, there exists technological arbitrage opportunities (Anokhin & Wincent, 2014). This serves as a measure for objectively existing opportunities in Article 3. The alternative could have been a measure of technical change from DEA analysis, patents, or other socio-political factors. In Article 3 the focus is on objectively existing opportunities raised by possibilities of improvements in economic efficiency and therefore this particular measure is used.

Corruption is a center of attention in another article. Among other governance related measures, “control of corruption” is provided by WGI’s. It captures the extent to which corruption, i.e. “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” (Kaufmann, Kraay, & Mastruzzi, 2011, p. 4) is controlled. We followed the approach of Dreher and Gassebner (2013) and Anokhin and Schulze (2009) using the WGI’s control of corruption data. This measure of corruption is very common in in the areas of interest in this research. The alternatives include survey-based data on corruption such as “Perceived Corruption Index” of Transparency International (cf. Luo, 2006).
Another variable in one of our articles is efficiency of government, and we referred to an index provided by GCR to measure it. In its institutions section, the GCR lists a measure of government efficiency that includes sub-indices relating to regulation burdens, government wastefulness, regulation transparency, and legal framework efficiency in changing regulations and settling disputes. Looking at its definition, the measure suits our study. An alternative that is more often used is Government Effectiveness of WGI. We decided instead to use government efficiency of GCR because our other variable in the same Article is Control of Corruption of WGI. Because the indicators in WGI are highly correlated (Langbein & Knack, 2010) and because using a variable from another database would serve as an additional convergent validity check, we opted for government efficiency of GCR.

For a broader view on governance and regulative institutions, we also used all the WGI governance indices. In articles 2 and 3, an aggregate measure of governance was used, the sum of all six WGI indices for each country-year. The six dimensions, i.e. voice and accountability, political stability, governance effectiveness, regulatory quality, rule of law, and control of corruption, overlap and interlink, so we study them as a whole (cf. Langbein & Knack, 2010). However, studying the dimensions individually can also be beneficial, as it was in the case of measuring “control of corruption”. This measure, since it involves several dimensions of quality of governance, would best measure what is intended in the articles. Entrepreneurship scholars often use a same measure when they deal with formal institutions (e.g. Amorós et al., 2017; Stephan et al., 2015).

Finally, moving on to the subject of measuring the size of the informal economy, it is a difficult task since many of those acting in that economy are unwilling to provide information about their activities. Nevertheless, scholars have put a great deal of effort into the task (Kim, 2005). Schneider and colleagues (1997, 2002, 2010, 2016) are among the leading scholars whose efforts to measure comparable sizes of informal economy around the world have been published by organizations such as the Organization for Economic Co-operation and Development (OECD), Heritage Foundation, and the International Monetary Fund (IMF) (Andrews, Sánchez, & Johansson, 2011; Miller & Kim, 2016; Schneider & Enste, 2003). To obtain data on the size of informal economies, we borrow from Hassan and Schneider’s (2016, p. 6) database, where they measure “the size of the shadow economy”. We adopt a measure based on a MIMIC model that uses tax burden, regulatory burden, unemployment rate (first differenced), and economic freedom (first differenced) as causes (inputs), and GDP growth and currency held by the public (first differenced) as indicators (outcomes) (Table 3 in Hassan and Schneider (2016, pp. 6–8)). This estimation variant choice does not include the self-employment rate in the estimation model, which increases the availability of data. However, the informal economy size estimates of Hassan and Schneider (2016) do not vary dramatically as a result. This estimation method aims to obtain values for comparably sized informal economies in both developed and developing countries. There are available alternatives to this measure, and, considering the difficulties in measuring the size of informal economy, we have used one them to triangulate our results in Article 2. Specifically, as an alternative measure, we borrowed from the data provided by Dau and Cuervo-Cazurra (2014) which represents the growth in informal economic activity from one year to the next. We found results that are in line with our theorizing but show less levels of significance.

### 3.3 Methods of Analysis

Moderation analysis at country level is the main approach applied in all the articles. As a result, we examined regression models that include interaction terms. In the articles, we perform fixed effect (FE), i.e. within estimators, regression analyses to control for
endogeneity arising from time-invariant unobserved heterogeneity. The regression models are presented as hierarchical. That is, models with only control variables and models with only direct effects precede models that include interaction terms. In the case of analyzing moderation of a nonlinear relationship, more regressions are added to the hierarchy. Article 3 includes mediated moderation analysis. That particular article includes two sets of hierarchical regression models to perform the analysis (Muller, Judd, & Yzerbyt, 2005). Additionally, in order to perform the moderation analysis, independent and moderating variables are centered (Frazier, Tix, & Barron, 2004) and lagged (Kenny, 2015; Kraemer, Wilson, Fairburn, & Agras, 2002). We chose to lag the direct independent variables by one year and the moderating variables by two years as recommended by Kenny (2015). Changing the years of lagging, in most cases, would not change the direction of the results, but would change the number of observations and level of significance. Furthermore, we performed one or more post hoc analyses after the main analyses. The post hoc analyses include removing outliers, using different dependent variables, and/or applying an additional method of analysis. Specifically, in Article 2 we applied the difference general method of moments (GMM) as a robustness check. In addition to controlling for time-invariant unobserved heterogeneity, it allows for the use of lagged dependent variables, which may also proxy for various forms of time-variant unobservables. Moreover, in the absence of applicable external instrumental variables, the estimator can utilize lagged regressor values to create internal instruments for the lagged dependent variable and other variables in the model that may be endogenous. We conducted all our model estimations using Stata SE (versions 12, 13, and 14).
4 SUMMARY OF ARTICLES

In section 1.2, the main objective of the manuscript is detailed into three research questions. The dissertation includes three articles each of which addresses one of the detailed objectives described there. This section summarizes the articles in three subsections. Each subsection starts with introducing the topic of the article, explaining how it integrates into the manuscript, and clarifying what theories and arguments are used in the article. Then the data sample and specific quantitative methods are described. Finally, the main results and conclusions of each article are discussed.

4.1 Article 1

Title: Government efficiency and corruption: A country-level study with implications for entrepreneurship.

Authors: Mohamadi, Ashkan; Peltonen, Juhana; & Wincent, Joakim.


4.1.1 Topic and Theoretical Arguments

In this manuscript, as argued in section 2.3, we posit that institutional factors influence opportunity identification and pursuit. Institutional factors, specifically formal and regulative institutions, can be measured in terms of the quality of governance (Amorós et al., 2017; Stephan et al., 2015). Quality of governance has several dimensions, including how corruption is contained and how efficient the governance is. The topic of the first article is in fact about these specific factors and how they affect entrepreneurship. Previous research on the impact of corruption under different levels of governance efficiency have found mixed results. Therefore, a research on this specific topic could stimulate the discussions.

Corruption, defined as the abuse of public power for private gain, is often viewed as a negative phenomenon (Warren, 2004), yet can have a complex impact on the economy (e.g. Méndez & Sepúlveda, 2006). Similarly, studies on entrepreneurship suggest corruption can have nonlinear, insignificant, or moderated impacts at the country level (Aidis et al., 2012; Anokhin & Schulze, 2009; Dreher & Gassebner, 2013). In other words, corruption in different contexts has varying effects on entrepreneurship. One factor that alters the effects of corruption is the ways in which businesses are regulated (Tonoyan, Strohmeyer, Habib, & Perlitz, 2010). Red tape, over-regulation and rigidity could redefine how corruption impacts entrepreneurship, as corruption under such conditions can grease the wheels of entrepreneurship (Dreher & Gassebner, 2013).

We examine the nonlinear relationship between corruption and nascent entrepreneurship, focusing on how it is moderated through government efficiency, defined here as the absence of over-regulation, ambiguity, and wastefulness. Although nonlinearity in the relationship has been studied before (Anokhin & Schulze, 2009), we investigate how it is shaped by different levels of government efficiency. Our findings have implications for determining how much effort policy makers should dedicate to combating corruption under different levels of government efficiency while fostering entrepreneurship.
The findings of Anokhin and Schulze (2009) suggest corruption and entrepreneurship may have a convex relationship, also known as concave upward. Other authors, such as Dreher and Gassebner (2013), discuss how corruption can grease the wheels of entrepreneurship, i.e. in countries with inefficient governments, corrupt practices such as “speed money” favor businesses (Mauro, 1995). Thus, under inefficient governance with over-regulation, initial efforts to combat corruption can damage entrepreneurial actions. However, as Rothstein and Uslaner (2005) note, when governments continuously combat corruption, they establish trust in society from which entrepreneurship benefits. Consequently, under inefficient government, the relationship between control of corruption and entrepreneurship is first downward and then upward i.e. convex.

As governments become more efficient, the effects of both the “grease the wheels” hypothesis and trust decrease. First, since regulations are more transparent, less burdensome, and less excessive, entrepreneurs do not need to bribe officials to get their business started. Second, as societal trust is higher in countries with efficient governments, pushing for higher control of corruption has a less positive effect. However, when governments become highly efficient, some degree of rigidity and inflexibility, a type of red tape, emerges because of the transparent and unquestionable nature of regulations. Under such institutional settings, some corruption can once again grease the wheels of entrepreneurship. Taken together, as government efficiency increases, the relationship between control of corruption and entrepreneurship grows less convex, and in extreme cases can become concave.

![Figure 2. Hypothesized model of Article 1](image)

### 4.1.2 Data Sample and Methods

We performed the empirical analysis using a multisource 339 country-year dataset of 59 countries for 2008 to 2015. The databases used in this article include GEM, GCR, WGIs, and WDIs. The resulting panel dataset was strongly unbalanced with several lengthy gaps; therefore, we used observations belonging to subpanels with at least three consecutive years of data for a country. Additionally, after the main analysis, as a robustness check, we removed the extreme ±2.5% of residuals.

We analyzed the data by applying FE models that include interaction with government efficiency and a second degree of the variable for corruption, namely control of corruption. This would make it possible to examine whether government efficiency changes the convexity of a non-linear relationship between control of corruption and nascent entrepreneurship.
### 4.1.3 Results and Conclusions

Table 3. Regression estimates in Article 1: FE Models for Nonlinear Moderation Analysis

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control of corruption</td>
<td>-1.503 (1.097)</td>
<td>-1.525 (1.151)</td>
<td>-0.657 (1.107)</td>
<td></td>
</tr>
<tr>
<td>Control of corruption Squared</td>
<td>1.099 (0.708)</td>
<td>1.439* (0.701)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government Efficiency</td>
<td>1.178 (0.712)</td>
<td>1.276† (0.719)</td>
<td>1.932** (0.699)</td>
<td></td>
</tr>
<tr>
<td>Control of corruption X Government Efficiency</td>
<td>-0.638 (0.733)</td>
<td>-0.456 (0.741)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control of corruption Squared X Government Efficiency</td>
<td>1.099 (0.708)</td>
<td>1.439* (0.701)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population a</td>
<td>6.144 (9.220)</td>
<td>4.572 (9.592)</td>
<td>2.516 (9.600)</td>
<td>2.860 (9.610)</td>
</tr>
<tr>
<td>Financial Market Development</td>
<td>-0.152 (0.533)</td>
<td>-0.377 (0.557)</td>
<td>-0.479 (0.567)</td>
<td>-0.569 (0.544)</td>
</tr>
<tr>
<td>Innovative Environment</td>
<td>0.382 (0.914)</td>
<td>-0.363 (1.046)</td>
<td>-0.478 (1.059)</td>
<td>-0.590 (1.037)</td>
</tr>
<tr>
<td>Per capita GDP (PPP)</td>
<td>0.293† (0.156)</td>
<td>0.314* (0.138)</td>
<td>0.324* (0.152)</td>
<td>0.341* (0.147)</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>0.107 (0.0661)</td>
<td>0.116† (0.0618)</td>
<td>0.129* (0.0639)</td>
<td>0.145† (0.0623)</td>
</tr>
<tr>
<td>FDI a</td>
<td>0.0220 (0.0712)</td>
<td>0.0155 (0.0764)</td>
<td>0.0299 (0.0698)</td>
<td>0.0631 (0.0679)</td>
</tr>
<tr>
<td>Openness</td>
<td>0.0409 (0.0261)</td>
<td>0.0374 (0.0247)</td>
<td>0.0372 (0.0242)</td>
<td>0.0442† (0.0233)</td>
</tr>
<tr>
<td>Year Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

| R² (within) | 0.127 | 0.143 | 0.155 | 0.166 |
| Adjusted (within) R² | 0.090 | 0.100 | 0.108 | 0.117 |
| R² (between) | 0.087 | 0.078 | 0.093 | 0.090 |
| R² (overall) | 0.084 | 0.079 | 0.109 | 0.107 |
| ΔR² (within) | 0.016† | 0.016† | 0.012 | 0.011* |
| Cohen’s F² (within) | 0.019 | 0.014 | 0.014 | 0.013 |
| Average VIF (within) | 2.71 | 2.68 | 2.60 | 2.64 |

N=339 country-years; 59 countries. Constant included in all models. Independent variables lagged by one year.

a ±log(|x|+1): Positive unless x is negative.

Standard errors clustered by country in parentheses.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1
Table 3 summarizes the FE-regression estimates of the results in Article 1. The main results can be seen from Model 4 in the table. Particularly, the coefficient of control of corruption squared is positive and statistically significant ($\beta = 1.439; p < 0.05$). That shows that, as theorized, if government efficiency is kept at its average, the relationship between control of corruption and nascent entrepreneurship is first downward, and then upward. Additionally, Model 4 in the table shows that coefficient of the interaction term of control of corruption squared times government efficiency is negative and statistically significant ($\beta = -0.877; p < 0.05$). That means if the level of government efficiency decreases, the non-linear relationship mentioned above would be stronger, and if the level increases, the non-linear relationship becomes less steep, and in extreme cases it can become the opposite: first upward and then downward. This supports the main theoretical argument of the article.

Article 1 contributes to the whole manuscript as it uncovers specific complexities in how institutional factors affect entrepreneurship. It contributes to the ongoing academic discussions of if and how corruption, under different levels of government efficiency, helps entrepreneurship. Our results imply that corruption is not universally good or bad for entrepreneurship. Both the effectiveness of efforts to control corruption and overall government efficiency determine how corruption affects entrepreneurship. However, we also acknowledge prior research arguing that corruption can harm the economy in general through other means, for example, by increasing unproductive or destructive entrepreneurship (Baumol, 1996) or by decreasing growth-oriented entrepreneurship (Aidis & Mickiewicz, 2006). As a result, an alternative approach to greasing the wheels of entrepreneurship—one with low corruption and minimal “red tape”—is beneficial for the economy as a whole (i.e., not just for entrepreneurship).

### 4.2 Article 2

**Title:** A Country-level Institutional Perspective on Opportunity-to-Necessity Entrepreneurship: The Effects of Informal Economy and Regulative Efforts.

**Authors:** Mohamadi, Ashkan; Peltonen, Juhana; & Wincent, Joakim.

**Submitted:** Journal of Business Venturing. (Under review and revise process)

#### 4.2.1 Topic and Theoretical Arguments

Institutions are the rules of the game for market participants in a country (North, 1990). As discussed in section 1, these rules determine, among other outcomes, the entrepreneurial activities. Sometimes some of these rules can contradict others. In such institutionally incongruent situation (section 2.2.2), due to ambiguity, individual entrepreneurs find it difficult to identify and pursue opportunities. Additionally, the incongruence the opportunity costs of starting a business, i.e. employment, could also be affected. That pushes entrepreneurs more likely to have more necessity-based motivations to start a business. These arguments are the essence of Article 2.

In that article, we are particularly interested in ratio of opportunity-to-necessity entrepreneurship (section 2.1.3) and how the size of informal economy, as well as formal-informal institutional incongruence (section 2.2.4) would affect that ratio. We study how informal institutions associated with a large informal economy negatively impact the ratio of opportunity-to-necessity entrepreneurship. We also study the negative effects of improving regulative institutions in presence of a large informal economy on the ratio.
We first argued that it is harder to identify opportunities in a large informal economy due to restrictions on resources and that this negatively influences the opportunity-to-necessity ratio. Due to a lack of formal networks that provide knowledge-based resources, such as those formed around universities and innovative corporations (cf. Arenius & De Clercq, 2005; O’Shea, Allen, Chevalier, & Roche, 2005), a large informal economy restricts access to high-quality human resources at the aggregate level. Additionally, acquiring formal financial resources is harder when the businesses are not formal (Webb, Bruton, Tihanyi, & Ireland, 2013). We further theorized that a large informal economy exhibits lower opportunity costs for entrepreneurship. That is, employment as the alternative to entrepreneurship does not provide sufficient income to cover for the basic needs of a significant portion of the population. The implicit rules of the game often motivate informal employers not to offer high incomes and proper working conditions. Institutional factors that restrict opportunity identification and pursuit and decrease the opportunity costs of entrepreneurship, we hypothesized, lead to a lower opportunity-to-necessity ratio.

We argue in our second hypothesis that higher levels of quality of governance in a large informal economy amplify the limitations that informal economy puts on opportunity identification and pursuit as well as opportunity costs of entrepreneurship. The hypothesis challenges the view that developing regulative institutions provides clarity and is always beneficial for opportunity identification and pursuit (Aparicio et al., 2016; Baumol, Litan, & Schramm, 2007; Dau & Cuervo-Cazurra, 2014). In line with research such as that by Kim and Li (2014), we argue that the benefits of improving the quality of governance rely on the state of cognitive and normative institutions. We theorize a situation where regulative institutions restrict what is encouraged by informal institutions. We argued that this formal-informal institutional incongruence, primarily brought about by seeking to improve the quality of governance in presence of a large informal economy, is detrimental. The introduced formal rules of the game are not consistent with the informal ones, and therefore entrepreneurs find it challenging to connect and associate information in order to identify opportunities (Tang et al., 2012). It would be costly and risky to pursue opportunities because following either the formal or informal rules of the game comes at a cost. In addition, increasing the quality of governance in a large informal economy further decreases the opportunity cost of entrepreneurship. That is, the availability of alternatives to entrepreneurship, i.e., employment, declines further. That is because the increasing ability and willingness of the state to formalize employment adds to obstacles for informal employers to employ workers. Thus, the opportunities for earning sufficient income to cover one’s basic needs in the informal sector decreases further by the introduction of new formal rules. To meet their basic needs, individuals turn to necessity entrepreneurship, while entrepreneurial opportunities are difficult to identify and pursue. Thus, the opportunity cost mechanism prevails in the short term until the formal and informal institutions eventually converge.

Figure 3. Hypothesized model of Article 2
4.2.2 Data Sample and Methods

We use a multisource dataset to examine the research hypotheses, the data available from 60 countries for the ten-year period of 2005–2014. We include data that are usable in FE analyses. GEM provides our database with data on entrepreneurship. We turn to WGIs and WDIs to measure regulative institutions and the macroeconomic control variable. Finally, to obtain data on the size of informal economies, we borrow from Hassan and Schneider’s (2016) database where they measure “the size of the shadow economy”. As one of the robustness checks, we remove ±2.5 of the outlier residuals.

We perform additional robustness checks by altering the dependent variable to perceived opportunities, as well as separated opportunity and necessity entrepreneurship. These analyses are performed by fitting FE regression models. While this method is common in the literature (e.g. Meek, Pacheco, & York, 2010; Sarkar, Rufín, & Haughton, 2018; Urbano & Aparicio, 2016), it relies on a strict exogeneity assumption for identification. Furthermore, despite common claims to the contrary, it has been recently underscored that lagging variables does not provide an effective remedy for endogeneity concerns emerging from simultaneity (Bellemare, Masaki, & Pepinsky, 2017). Therefore, we chose to extend our analysis by performing additional robustness checks using alternative methods. We particularly employ a difference GMM estimator (Arellano & Bond, 1991). In addition to controlling for time-invariant unobserved heterogeneity, this allows for the use of lagged dependent variables, which may also serve as proxies for various forms of time-variant unobservables. Moreover, in the absence of applicable external instrumental variables, the estimator can utilize lagged regressor values to create internal instruments for the lagged dependent variable and other variables in the model that may be endogenous. However, the number of countries in the data (60) places limitations on the models’ complexity due to instrument proliferation. Hence, we use only the lagged dependent variable and year dummies in addition to the main regression variables in our GMM models (Acemoglu, Johnson, Robinson, & Yared, 2008). We further scrutinize the models by varying the time lags used for the internal instruments (Roodman, 2009a). We apply the forward orthogonal deviations (FOD) transformation instead of first differences to improve data availability due to gaps in the data (Arellano & Bover, 1995). The Windmeijer (2005) finite sample correction is applied to two-step standard error estimates. The independent and moderator variables and their multiplicative interaction term are treated as endogenous, the lagged dependent variable is treated as predetermined, and the time dummies are treated as exogenous (cf. Roodman, 2009b).
### 4.2.3 Results and Conclusions

Table 4. Regression estimates of Article 2: FE Models for Moderation Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of Informal Economy</td>
<td>-0.0187*</td>
<td>-0.0412***</td>
<td>(0.00789)</td>
</tr>
<tr>
<td>Quality of Governance</td>
<td>-0.0123</td>
<td>0.0109</td>
<td>(0.0512)</td>
</tr>
<tr>
<td>Size of Informal Economy x Quality of Governance</td>
<td></td>
<td></td>
<td>-0.00525**</td>
</tr>
<tr>
<td>Population a</td>
<td>-0.318</td>
<td>-0.518</td>
<td>-0.379</td>
</tr>
<tr>
<td>Per Capita GDP a</td>
<td>0.781*</td>
<td>0.756*</td>
<td>0.650†</td>
</tr>
<tr>
<td>GDP (PPP) Growth</td>
<td>1.290†</td>
<td>0.668</td>
<td>0.374</td>
</tr>
<tr>
<td>Official Exchange Rate (Relative Change) a</td>
<td>0.506*</td>
<td>0.547**</td>
<td>0.619**</td>
</tr>
<tr>
<td>Inflation Rate (Customer Price) a</td>
<td>-0.0302</td>
<td>-0.0392</td>
<td>-0.0372</td>
</tr>
<tr>
<td>TEA a</td>
<td>-0.0264</td>
<td>-0.0253</td>
<td>-0.0360</td>
</tr>
<tr>
<td>Openness</td>
<td>-0.00379</td>
<td>-0.00525</td>
<td>-0.00645†</td>
</tr>
<tr>
<td>FDI a</td>
<td>0.0319</td>
<td>0.0364</td>
<td>0.0296</td>
</tr>
<tr>
<td>Unemployment Rate a</td>
<td>-0.347*</td>
<td>-0.331*</td>
<td>-0.238</td>
</tr>
<tr>
<td>Year Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Observations</td>
<td>373</td>
<td>373</td>
<td>373</td>
</tr>
<tr>
<td>Countries</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>R-Squared (within)</td>
<td>0.240</td>
<td>0.257</td>
<td>0.286</td>
</tr>
<tr>
<td>Adjusted R-Squared (within)</td>
<td>0.202</td>
<td>0.215</td>
<td>0.244</td>
</tr>
</tbody>
</table>

Standard errors clustered by country in parentheses. Constant included in all models.

*** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1; two-tailed t-tests.

a log-transformed: ±log(|x|+1); positive unless x is negative.
Here in this section, only the estimates of the main model (FE, all available observations, as dependent variable) is reported above. Primary results by FE models supported Hypothesis 1 of the article. As Model 2 in Table 4 shows, the coefficient of size of informal economy is negative and significant ($-0.0187; p<0.05$). However, further investigations including those by GMM models, revealed that Hypothesis 1 receives partial support. In majority of countries, size of informal economy negatively affects opportunity entrepreneurship. However, in minority of countries where aggregate governance is very low, the relationship can even turn positive. For those countries, it appears that the informal economy may act to fill the void of formal institutions by providing satisfactory but lower-quality resources, such as informal business networks, to fuel opportunity identification and pursuit (Puffer et al., 2010). Nonetheless, our results suggest that one needs to take into account the quality of governance to determine if the informal economy is harmful or beneficial to the ratio of opportunity-to-necessity entrepreneurship in a country.

Regarding the second hypothesis, our results using both the main FE models and difference GMM provide full support for the claim that formal-informal institutional incongruence amplifies the limitations of a large informal economy and leads to a lower opportunity-to-necessity ratio. Model 3 in Table 4 shows a negative and significant coefficient for size of informal economy x quality of governance ($-0.00525; p<0.01$). That is, quality of governance moderates the relationship between size of the informal economy and ratio of opportunity-to-necessity entrepreneurship. Results from GMM also support this argument. Our results leave larger theoretical implications for the relationships between size of informal economy and opportunity entrepreneurship, quality of governance, and institutional incongruence.

Related to the objectives of this manuscript (section 1.2), Article 2 contributes to the manuscript by examining how institutional conditions of entrepreneurship (cf. Bruton et al., 2010; Urbano & Alvarez, 2014; Webb et al., 2013) institutional factors create the environment in which entrepreneurial opportunities and activities can be identified, explored, and exploited. One important step is the discovery of opportunities. As such, the institutions, including regulative, should promote the ratio of opportunity-to-necessity entrepreneurship, as dependent variable.
opportunity discovery among individuals. As Baumol and Strom (2007, p. 233) put, one “goal of good policy ... is redesign of institutions so as to attract entrepreneurial activity to beneficial directions.” We claim promoting opportunity identification in a country leads to higher possibilities that primary motivations of entrepreneurs will be to pursue opportunities, which is an indicator of a more beneficial entrepreneurship (Acs & Varga, 2005).

Despite the extant knowledge of the importance of institutions for startup rates, the fact that entrepreneurship is a process that includes opportunity discovery is often neglected. Entrepreneurs, at some stage before starting their business, come up with an idea (Short et al., 2010). Over time, they develop the seeds of the idea into a clear grasp of the market, product conception, strategies, and how to start the venture (Dimov, 2011). This is an important stage in entrepreneurship, and several scholars in the field have studied the role of this opportunities stage at the individual level, as to whether it might best be termed the stage of perceiving, identifying, discovering, or creating opportunities (Alvarez & Barney, 2007; Ardichvili, Cardozo, & Ray, 2003; Gaglio & Katz, 2001). Yet, when the concern is startup rates and institutions at country level, the role of rate of perceived opportunities has received less attention. This is a significant shortcoming since, as theorized and empirically tested in this article, the rate of perceived opportunity at country level influences how institutions affect startup rates. Filling this gap adds to our understanding of the process through which institutions affect startup rates and provides practical implications.

Thus, the objective of Article 3 is to study the role of perceived opportunities in determining how institutions in an efficient economy promote startup rates. The aim is to investigate the process through which a change in economic efficiency affects startup rates. Specifically, the focus is to examine the role of the rate of perceived opportunities at country level, as well as the role of regulative institutions.

Different phases of opportunity, objectively existing (external enablers), subjectively discovered (ideas), and realized (startups) are related (Davidsson, 2015). As more opportunities are created by changes in the economy and market structure, in this article particularly due to an increase in economic efficiency, more potential entrepreneurs can perceive opportunities. Similarly, as more individuals perceive opportunities to start businesses, startup rates can increase. Nevertheless, an increase in economic efficiency does not necessarily lead to higher startup rates. If regulative institutions are not sufficiently developed to support an environment favorable to opportunity perception and entrepreneurship, an increase in economic efficiency might not increase startup rates (Kshetri & Dholakia, 2011). Thus, we argue, regulative institutions positively moderate the relationship between changes in economic efficiency and startup rates. This arguments could of course, as discussed in Article 2, be challenged if the size of the informal economy is large in a country.

This moderating role may in addition be less influential once perceived opportunities are taken into consideration. First, regulative institutions positively moderate how efficiency change influences perceived opportunities, because potential entrepreneurs can more easily connect and associate information under clear and developed institutions (Tang et al., 2012; Valdez & Richardson, 2013). Also, as they find it less risky under developed institutions, they can judge the opportunities as first-person, opportunities seen by entrepreneurs to pursue by themselves, rather than third-person opportunities, those that might be pursued by others (McMullen & Shepherd, 2006). Second, once opportunities are perceived, they more easily manifest as real businesses, and thus the moderating role of regulative institutions becomes less sound. Therefore, perceived opportunities mediate the moderating role of regulative institutions in the relationship between changes in economic efficiency and startup rates.
4.3.2 Data Sample and Methods

Our data set comprises three databases: WDI, WGIs, and GEM. It includes usable and available observations related to 29 countries between the years 2006 to 2014. Due to availability, the sample includes a set of European, Latin American, and Asian countries. The sizes of informal economy in the sample countries are moderate. For the robustness check, after the main analysis, ±2.5% of the extreme outliers were removed from the observations.

We follow recommendations of Muller et al. (2005) to perform a mediated moderation analysis. In order to do that, we run several FE regression models. The mediator acts as a dependent variable in some of the regression models. Models 1-5 in Table 5 have New Business Density as their dependent variable. The dependent variable for models 6-8 is perceived opportunities.
### 4.3.3 Results and Conclusions

#### Table 5. Regression estimates of Article 3: FE Models for Mediated Moderation Analysis

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
<th>Model 8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(4.527)</td>
<td>(4.053)</td>
<td>(3.684)</td>
<td>(3.538)</td>
<td>(33.15)</td>
<td>(25.61)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of Governance</td>
<td>1.970</td>
<td>1.895</td>
<td>1.526</td>
<td>1.454</td>
<td>9.185</td>
<td>8.429</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.435)</td>
<td>(2.419)</td>
<td>(1.907)</td>
<td>(1.883)</td>
<td>(19.58)</td>
<td>(19.17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic Efficiency Change X Quality of Governance</td>
<td>11.56*</td>
<td>6.489</td>
<td>6.181</td>
<td>116.0*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(5.352)</td>
<td>(4.627)</td>
<td>(4.399)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Opportunities</td>
<td>0.0437**</td>
<td>0.0408**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0137)</td>
<td>(0.0136)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Perceived Opportunities X Quality of Governance</td>
<td>0.0191</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Constant and Controls a</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>R² (within)</td>
<td>0.150</td>
<td>0.179</td>
<td>0.211</td>
<td>0.297</td>
<td>0.304</td>
<td>0.189</td>
<td>0.194</td>
<td>0.248</td>
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<tr>
<td>Adjusted R² (within)</td>
<td>0.0640</td>
<td>0.0836</td>
<td>0.114</td>
<td>0.204</td>
<td>0.207</td>
<td>0.107</td>
<td>0.0999</td>
<td>0.155</td>
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<tr>
<td>ΔR² (within)</td>
<td>0.029†</td>
<td>0.032*</td>
<td>0.086***</td>
<td>0.007</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>F</td>
<td>3.472**</td>
<td>3.564**</td>
<td>2.877**</td>
<td>4.656***</td>
<td>6.697***</td>
<td>2185***</td>
<td>161.1***</td>
<td>34.40***</td>
</tr>
<tr>
<td>Cohen’s f² (within)</td>
<td>0.035</td>
<td>0.041</td>
<td>0.122</td>
<td>0.010</td>
<td></td>
<td></td>
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</tbody>
</table>

Standard errors clustered by country in parentheses.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

*The constant and control variables are included in the models but emitted due to space limit. Control variables include Population (log-transformed), per cap GDP (PPP), FDI, Openness (log-transformed), Fear of failure rate, Entrepreneurship as desired career choice, enrolment in secondary education, and year dummies.*

Number of observations: 164; Number of countries: 29
Table 5 supports the hypothesized positive mediated moderation by showing the four necessary conditions (Muller et al., 2005). First, in Model 3, the coefficient of the interaction of efficiency change and quality of governance is significantly positive ($\beta$=11.56; $p<0.05$). Second, coefficient of the same interaction is significantly positive ($\beta$=116.0; $p<0.05$) in Model 8, where the dependent variable is perceived opportunities. Third, the coefficient of perceived opportunities in Model 5 is significantly positive ($\beta$=0.0408; $p<0.01$). Finally, comparing to Model 3, in Model 5 the coefficient of the interaction between efficiency change and aggregate governance index is insignificant and smaller in value. By not being significant, the coefficient shows that the moderation is fully mediated. The mediated moderation means that high-quality regulative institutions and opportunities, measured by increases in economic efficiency, jointly enhance startup rates. However, once perceived opportunities are taken into consideration, the effect disappears. Instead, regulative institutions and a change in economic efficiency jointly affect perceived opportunities, and perceived opportunities, in turn, affect startup rates.

Relating to the results from Article 2, as the countries in the sample generally do not suffer from very large informal economies, we found that quality of governance makes the relationship between changes in economic efficiency and startup rates less negative and more positive. As such, quality of governance plays a positive role in these countries.

Our results highlight the importance of perceived opportunities and the way they influence the effects of regulative institutions on startup rates. High quality regulative institutions jointly with opportunities—that are a result of increases in economic efficiency—enhance startup rates. However, once perceived opportunities are taken into consideration, the effect disappears. Instead, regulative institutions and change in economic efficiency jointly affect perceived opportunities, and perceived opportunities, in turn, affect startup rates. This finding adds to the manuscript by studying how institutions, in this case regulative, influence opportunity discovery, and only then, opportunity exploitation.
5 DISCUSSION AND CONCLUSIONS

The main research objective in this thesis concerns the extent to which institutions affect opportunity exploitation at country level. Understanding more about the “black box” of institutions could help researchers and policymakers pursue their interest in improving the state of entrepreneurship and the economy (Naudé, 2010). Both institutions and entrepreneurship are widely utilized theoretical concepts and thus the research questions in this manuscript are limited into three specific ones. First, we examine how the control of corruption is related to the nascent entrepreneurship, and how government efficiency affects that relationship. Second, we investigate if and how, in countries with large informal economies, the development of regulative institutions influences the ratio of opportunity-to-necessity entrepreneurship. Finally, we aim to discover the role of regulative institutions in the process of transition of objectively existing opportunities at country level to perceived opportunities and finally to startups.

Scholars have widely discussed both entrepreneurship and institutions. Institutions are the rules of the game in society (North, 1990) and shape the context in which entrepreneurs act. Research on institutions has taken two different paths. Scholars in institutional economics study the effects of sociopolitical, governance-related, formal, and regulative forces (e.g. Ault & Spicer, 2014; Levie & Autio, 2011), while in other institutional research streams, researchers study cultural and sociology-based factors (e.g. Autio et al., 2013; Lilán & Fernandez-Serrano, 2014). Several scholars have recently recommended integrating the two types of institutions (Bruton et al., 2010; Cullen et al., 2014; Kim & Li, 2014).

Scholarly discussions of entrepreneurship have led to highlighting the importance of opportunities (Shane & Venkataraman, 2000). Opportunities can be studied at three different phases (Anokhin & Abarca, 2011; Davidsson, 2015; Dimov, 2011). First, they can be considered as objectively existing opportunities emerged due to changes in macro-level conditions of the market. Second, they can be conceptualized as the subjectively identification and discovery of the existing opportunities as new business ideas. Finally, they can be in realized form of actual new businesses.

We build upon these main theories of institutions and opportunities and argue for hypotheses about the role of institutional conditions of combinations of corruption in determining the level of entrepreneurship. We additionally hypothesize about the role of formal-informal institutional incongruence in decreasing productivity of entrepreneurship. Furthermore, we reason for the importance of opportunity perception and discovery when formal institutions moderate for the rate of startup.

We applied quantitative methods including FE regressions, moderation analysis, mediated moderation analysis, moderated non-linear analysis, and difference GMM to empirically test our hypotheses. The panel data used in the models are gathered from multiple publicly available data sources. Among them, one major database that has made it possible to perform panel-data analyses on entrepreneurial activities and macro-level institutional factors is GEM and specifically the data collected from its adult population surveys. The analyses led to few major findings.

First, we find that the relationship between corruption, government efficiency, and entrepreneurship is indeed complex. The relationship between control of corruption and nascent entrepreneurship is nonlinear, and if the level of government efficiency decreases, the non-linear relationship mentioned above would be stronger, and if the level increases, the non-linear relationship becomes less steep, and in extreme cases it
can become the of opposite convexity: first upward and then downward instead of usual first downward and then upward.

Second, we find that quality of governance moderates the relationship between size of the informal economy and ratio of opportunity-to-necessity entrepreneurship. That is, higher levels of quality of governance make the relationship between the size of informal economy and the rate of opportunity-to-necessity entrepreneurship to be less positive and more negative. Our results leave larger theoretical implications about the boundaries of formal regulation for entrepreneurship when informal business is a legitimate practice. While in many cases it is apparent that regulating informal cognitions that provide legitimacy to violate law and regulatory frameworks do indeed have positive consequences that develop countries and economies, the results here provide an alternative view and outline that such regulation, in institutionally incongruent conditions, can also have negative consequences.

Third, we find that although regulative institutions moderate the relationship between existing opportunities in form of changes in economic efficiency, the moderation becomes less sound if one takes into account the subjectively identified opportunities in form of perceived opportunities.

The included articles and the findings in them show that institutions are complex, and when more than one aspect is studied, the outcome can be interesting and sometimes surprising. The studies also show that opportunities, and the process through which they are discovered and exploited, play an important role in level and productivity of entrepreneurship. While researchers and policymakers are interested in enhancing economic development and entrepreneurship by designing right institutional conditions, it is important for them to consider how opportunities are discovered and exploited at country level.

5.1 Theoretical Contribution

The overall framework of the thesis has two parts: institutional arrangements and the process of entrepreneurship at country level. The overall contribution on the institutional side is to illustrate the complexities involved. Measuring the impacts of such complex institutional phenomena as informal economies, corruption, or quality of governance, is not straightforward. In fact, institutions are interrelated, and the effects of investments in altering one institution may depend on other institutions. For instance, the effects of governmental initiatives to improve regulations depend on the state of cognitive institutions, and the effects of improving government efficiency depend on the extent of control of corruption. Such efforts might support the rules of the game that contradict other norms accepted and followed by members of a society. The institutional incongruence caused by such a contradiction can lead to unintended results. Highlighting and studying the concept of institutional incongruence is one of the key contributions of the thesis.

On the entrepreneurial side, one contribution is the emphasis on the process of entrepreneurship at country level, and especially the role of opportunities. We show that one important factor determining the number of startups in a country is how and to what extent potential entrepreneurs discover and decide to exploit opportunities. The importance of opportunities is particularly highlighted where looking to promote opportunity entrepreneurship. Below, we explain detailed contributions related to the three articles of this thesis, and present several instances of related contributions in the following sections.
5.1.1 Nonlinearity of Effects of Corruption and the Grease the Wheels Hypothesis Combined

Previously, several scholars have found evidence of a negative and nonlinear impact of corruption on entrepreneurship (Aidis et al., 2012; Anokhin & Schulze, 2009; Dutta & Sobel, 2016). However, inspired by previous literature on the Grease the wheels hypothesis, we investigated whether the nonlinearity of the relationship can be moderated by government efficiency. In other words, we are making what is a rare attempt of its kind to combine assumptions on the moderating role of regulative institutions and the nonlinear relationship between corruption and entrepreneurship.

Whether corruption greases or sands the wheels of entrepreneurship has been a subject of scholarly discussion (Méon & Sekkat, 2005). Where several scholars argue for a greasing role for corruption in over-regulated institutional environments (Dreher & Gassebner, 2013), others assert that corruption and over-regulation are only second best solutions. The best would be to have less corruption and less over-regulation (Dutta & Sobel, 2016; Guriev, 2004). Inspired by Anokhin and Schulze (2009), who found a nonlinear relationship between corruption and startup rates, we first assumed the nonlinear relationship and then tested for the moderating role of government efficiency, hoping to shed light on the question of whether corruption greases or sands the wheels of entrepreneurship.

By combining assumptions on the nonlinearity of the effects of corruption on startup rates and the Grease the wheels hypothesis, we found a complex relationship between corruption and startup rates and the role of government efficiency, particularly that the nonlinear relationship between control of corruption and startup rates is moderated (convex to concave) by government efficiency. This adds to the ongoing discussion on the roles of corruption and regulative burdens in encouraging or discouraging entrepreneurship at country level.

5.1.2 Different Forms of Red Tape

The nonlinearity of the relationship between corruption and entrepreneurship, in addition to the moderating role of government efficiency, points to the fact that red tape emerges in different institutional conditions. It exists under both low and high levels of government efficiency. When governments are less efficient, due to a lack of legal transparency and quality legal frameworks, a form of red tape emerges. Under highly efficient governments, where law is transparent and perfectly executed, another form of red tape appears. This reveals a new perspective on red tape, dealing with different types of it, and the role of corruption in greasing the wheels of entrepreneurship.

The prior literature has addressed the issue of red tape and how it affects organizational functionality (e.g. Buchanan, 1975; Gore, 1993; Gupta, 2012; Guriev, 2004). Accordingly, red tape has been classified in different forms. For example, scholars have distinguished between “rule inception red tape” and “rule evolved red tape” to recognize that some red tape is initially dysfunctional, while other kinds are to begin with useful rules but become red tape over time (Bozeman, 1993). These classifications, however, overlook the nature of red tape at country level, and indeed cannot define what constitutes red tape at country level. Is there red tape if the regulative institutions are not developed well and not clear to anyone? Or, is there red tape when regulative institutions are very highly developed and all the rules are transparent and practiced strongly? The latter case has been discussed at length (cf. Gore, 1993). In the former, officials could take the advantage of the lack of clarity and dictate to entrepreneurs, merely in favor of personal gain. This
situation can be considered another form of red tape, where entrepreneurs face challenges regarding regulation under such underdeveloped regulative institutions.

In sum, we distinguish between red tape that forms because of underdeveloped regulative institutions and highly developed ones. This classification is useful in studying if and how corruption greases the wheels of entrepreneurship in institutional environments where red tape is present.

### 5.1.3 Impacts of Informal Economy on Economic Development

There is an ongoing discussion among economists as to whether informal economies are beneficial or harmful to economic development (Dell’Anno & Halicioglu, 2010; Schneider & Enste, 2000). Article 2 contributes by providing further support for the thesis that informal economies are not beneficial for economic development in the majority of countries. Specifically, we find that informal economies hamper economic development because they mostly discourage the preferred type of entrepreneurship, namely opportunity entrepreneurship. However, in a minority of countries, where the quality of regulations is very low, a large informal economy could in fact contribute to the share of opportunity entrepreneurship. Previous research has neglected the important role of entrepreneurship in how informal economies affect development. This article provides a new theoretical explanation as to how informal economies are detrimental to economic development through discouraging (or in a few cases encouraging, and thus beneficial to) the right type of entrepreneurship.

In addition to the aforementioned contribution to the economic development literature, the article also contributes to the informal entrepreneurship literature, since it looks at the phenomena of entrepreneurship and informality in a different way. The prior research on entrepreneurship and the informal economy studies entrepreneurs as they enter and operate in informal economies (Webb et al., 2013; Williams & Nadin, 2010). While not opposing this approach, our perspective, by comparison, expects the size of the informal economy to explain the share of opportunity entrepreneurship. This perspective could provide knowledge on how informal economies, as an institutional or country-level factor, influence startup rates and different types of opportunity and entrepreneurial activity. Thus, the approach provides a new perspective on entrepreneurship and the informal economy literature.

In sum, by studying how the informal economy affects types of entrepreneurship, we contribute in two ways. First, we provide support for argumentation that large informal economies in most countries do not strengthen economic development, because the informal economy mostly discourages opportunity entrepreneurship. Second, we adopt a different perspective on the phenomena of the informal economy and entrepreneurship. That is, we approach them by studying how the size of the informal economy determines types of entrepreneurship, instead of studying entrepreneurs who enter the informal economy.

### 5.1.4 Institutional Incongruence

Our findings in Article 2 suggest that with less developed regulative institutions, an increase in the size of the informal economy leads to a smaller decrease in the share of opportunity entrepreneurship. This finding contradicts the literature arguing that the development of regulative institutions is always beneficial. Rather, these results suggest the effects of regulations depend on the size of the informal economy. Several entrepreneurship scholars and policymakers believe regulative institutions play a
positive role in fostering formal opportunity entrepreneurship (Aparicio et al., 2016; Autio & Fu, 2015; Dau & Cuervo-Cazurra, 2014). We suggest that efforts to institutionalize regulations can actually be harmful to the most productive type of entrepreneurship, if the economy is to a large extent informal. Thus, a major counterintuitive implication of this study is the negative role of developed regulative institutions in certain institutional conditions.

The negative role of formalizing regulations in a large informal economy, additionally, required employing a concept that was previously used in institutional anomie theory, which was in turn developed in the fields of criminology and sociology (Durkheim, 1951; Merton, 1995; Messner & Rosenfeld, 1997; Orru, 1986). Although a few versions of the concept have been used before in the field of entrepreneurship and/or the informal economy (Cullen et al., 2014; Webb et al., 2009), we defined it in a way that makes it employable in a variety of contexts. When one aspect of institutions does not agree with another, an institutional incongruence emerges. Unlike previous definitions that were only relevant in specific contexts, this definition makes it possible to study the effects of contradictions in any set of institutional aspects on any phenomenon.

Thus, while studying the effects of formalizing regulations in a large informal economy, we contribute in two ways. First, we contradict previous beliefs that developing regulative institutions is always beneficial, by uncovering a situation where the institutions can hamper the right type of entrepreneurship. Second, we borrowed the concept of institutional incongruence from institutional anomie theory, and redefined and used it in a way that makes it more generally applicable.

5.1.5 Relationships Among Different Types of Opportunities at Country Level

The prior research has identified three forms of opportunity: those instituted in the market structure (external enablers), those present (new venture ideas), and those expressed in actions (opportunity confidence) (Davidsson, 2015; Dimov, 2011). However, few if any attempts have been made to test empirically any association among them. Article 3 contributes by establishing a form of association among the three types of opportunity at country level.

Further, Article 3 highlights the importance of the middle phase: subjectively identified opportunities, entrepreneurial ideas, and discovering opportunities, or at country level, the rate of perceived opportunities. Although the effects of perceived opportunities on startup rates have been measured and found to be positive (Arenius & Minniti, 2005), we show their importance differently by highlighting the hypothesis that regulative institutions would have no effect on startup rates, were it not for perceived opportunities.

Overall, Article 3 highlights the importance of opportunities in the process of entrepreneurship at country level. First, it shows that there can be a relationship among different stages of opportunity. Second, if perceived opportunities are accounted for, regulative institutions play a positive role in moderating for startup rates. Therefore, the emphasis falls on discovering opportunities, having startup ideas, or at country level, increasing the rate of perceived opportunities.

5.2 Policy Implications

Year after year, the G20 economies emphasize their dedication to promoting entrepreneurship as a strategy for growth (G20, 2014). They also see entrepreneurship
as a tool to contain unemployment (G20, 2015). Further, it can improve conditions in the nations by, for example, developing the digital economy, and thus trust, transparency, and personal data protection; by improving food security, sustainable agriculture, and rural growth; and, by assisting in the integration of young people and women in the labor market (G20, 2016, 2017).

Although the initial goal regarding promoting entrepreneurship is clear, there are at least two challenges. First, not all entrepreneurship results in the expected benefits. Different types of entrepreneurship have different values for economies' wellbeing and innovativeness (Baumol, 1996; Gries & Naudé, 2010; Wennekers et al., 2005). So, policymakers are not only concerned with encouraging entrepreneurship, but also the right types, the challenge being how to promote those types. When summarizing policies to enhance entrepreneurship, policymaking guidelines often neglect this (cf. UNCTAD, 2012). The second challenge arises from the fact that institutional environments are different in different economies. As a result, unified policy recommendations might be misleading. They should instead offer different solutions under different institutional environments. Researchers have put forward frameworks to categorize countries based on the development of their institutions, and studied how entrepreneurship works in different categories (e.g. Acs et al., 2008; Schwab & Sala-i-Martin, 2015). However, institutions can be more complicated with many different features. Any two developing or developed countries might not have the exact same institutional environments. Therefore, to distinguish which policies are best under different institutional environments, policymakers should be aware of the kind of institutions in which the policies are to be implemented. Policies that neglect effects on the right types of entrepreneurship and the institutions under which they are implemented may fail to reach the goals declared by G20 policymakers.

This thesis, in terms of providing policy implications, looks to address the two aforementioned challenges. First, it emphasizes policies to enhance the availability, discovery, and exploitation of opportunities, and the importance of opportunity entrepreneurship. Second, it investigates a number of institutional conditions and the role policies play in improving regulative institutions under those conditions. After introducing some practical general policy implications related to the two sides of “entrepreneurship” and “institutions”, we present in more detail specific implications related to the articles.

To further explain the general policy implication on the entrepreneurial side, policymakers should focus on encouraging the right type of entrepreneurship, i.e. opportunity entrepreneurship, to reach the goals expected from promoting entrepreneurship (Gries & Naudé, 2010; Sternberg & Wennekers, 2005). In order to do so, they should pay attention to opportunities aspect themselves, not only the number of startups. They should become familiar with the process of how opportunities arise at country level, how they are discovered, and how they are exploited by potential entrepreneurs; and, they should work to increase the potential to thrive in all three stages (Davidsson, 2015; Dimov, 2011; Eckhardt & Shane, 2003).

On the institutional side, the complexity and interrelatedness of a country’s institutional aspects means the implementation of policies set for different purposes can produce unexpected results. As an example, containing corruption in order to create a better environment for startups, in a situation where there is a high degree of red tape, may have unexpected consequences for entrepreneurship. In addition, attempts to develop regulative institutions in a large informal economy, since they lead to institutional incongruence, can negatively influence the quality of entrepreneurship. As shown in these examples, policymakers, when deciding to alter any aspect of institutions in order to achieve a goal, e.g. improve the state of entrepreneurship in a country, should take
other institutional factors into consideration and consider how interrelatedness among different aspects of institutions can affect the expected result.

In addressing the two challenges, we hope that policymakers can design better policies regarding entrepreneurship. We specifically recommend that guidelines to improve the state of entrepreneurship in different economies and global or regional organizations (including the UN, EU, West African Economic and Monetary Union, G20, etc.) should emphasize not only promoting entrepreneurship, but also, and especially, opportunity entrepreneurship. They should emphasize creating environments where opportunities emerge and are discovered and exploited easily. Additionally, they should remember that specific policies may have different results in different institutional settings. Thus, in providing policy recommendations, they should describe the institutional environments in which those policies are effective. As discussed, it should be noted that the notion of institutional environment is not tied to a country's level of development. Rather, institutions have many aspects to them and, thus, effort should be devoted to clarifying those under which the policies are beneficial or harmful to entrepreneurship.

5.2.1 Containing Corruption and Government Efficiency

The findings of Article 1 have implications for policies where corruption is an issue. Policymakers should consider whether a government exhibits overregulation, a lack of trust, or rigidity issues. If so, controlling corruption may have negative impacts on startup rates in the country. On the other hand, when policymakers plan to improve government efficiency, they should be aware of the level of corruption in the country in order to avoid damaging startups. In fact, policymakers should jointly consider controlling for corruption and developing government efficiency, as pursuing change for only one of these factors can lead to suboptimal outcomes for entrepreneurship.

While deciding on policies to contain corruption, policymakers should consider the effects of actors greasing the wheels (Dreher & Gassebner, 2013). Our findings suggest that small measures to contain corruption under inefficient governments damage startup rates. If policymakers are willing to tackle the level of corruption in a country they should exercise great determination, as it takes a great deal of effort to strengthen public trust (Anokhin & Schulze, 2009; Rose-Ackerman, 2001), and thus weaken the grease the wheel effects.

Policies that affect government efficiency, too, can be studied together with corruption and its grease the wheel effects. If an economy enjoys efficient governance, societal trust is already high in that country, so extensive measures to combat corruption would have little impact in reducing greasing the wheels effects. As a result, a drastic improvement in government efficiency leads corruption, to some extent, to grease the wheels of entrepreneurship.

5.2.2 Containing the Informal Economy

The results of Article 2 reveal that informal economies have a negative effect on opportunity entrepreneurship in most of the countries studied. Thus, we do not recommend large informal economies. Instead, governments should invest in decreasing the size of their informal economies, especially where the quality of governance and regulation are fairly high. This recommendation does not, however, apply to countries with a regulatory void (Puffer et al., 2010). In a minority of countries, with low-quality regulations, a large informal economy favors opportunity entrepreneurship.
We also found that developing regulative institutions in large informal economies further decreases the share of opportunity entrepreneurship. So, the question remains: How should countries (with a fair level of regulative quality) shrink their informal economies? Our theory offers a hint. Since the theory suggests that institutional incongruence between cognitive and regulative institutions causes further decline, we suggest avoiding the incongruence. That is, changes in the size of an informal economy should be enacted through changes in cognitive institutions. Instead of only forcing and encouraging entrepreneurs to formalize through regulations, governments should also invest in altering cognitive and normative institutions among social groups surrounding individual entrepreneurs. Non-governmental organizations (NGOs), for instance, can play a role in shaping cognitive shared understandings in informal economies until operating formally becomes the preferred option (Sutter, Webb, Kistruck, Ketchen Jr, & Ireland, 2017). In another example, school programs could begin to involve formal organizations and associations to practice group work, to help individuals become accustomed to working in formal organizations. Educational programs of that nature might involve projects in which different formal roles (e.g., president, vice president, bookkeeper, etc.) as well as formal tasks (e.g., presenting reports and communicating through formal contracts) are defined and practiced. Initiatives of this kind would mean cognitive rather than regulative institutions cause change in the size of the informal economy without generating institutional incongruence. Thus, the size of the informal economy can be reduced so that the share of opportunity entrepreneurship increases, without causing institutional incongruence that has a negative impact.

5.2.3 Opportunity Discovery

Another policy implication from this thesis, related but not limited to Article 3, is about the importance of discovering opportunities and the rate of perceived opportunities. Policymakers should be aware that entrepreneurship at country level improves once more potential entrepreneurs discover opportunities, exploit them, and thus add to the number of opportunity entrepreneurial ventures. Therefore, policies should aim to increase not only startup rates in the first place, but also the rate of perceived opportunities. Improving the quality of entrepreneurship, i.e. startup rate and share of opportunity entrepreneurship, would thus be more effective.

Specifically, the findings of Article 3 suggest that although – as shown in the prior research (Aparicio et al., 2016; Manolova et al., 2008; Stenholm et al., 2013) – institutions and their regulative aspect are important to enhancing entrepreneurship at country level, the role of regulative institutions in enhancing opportunity discovery has been underestimated. This finding calls for further in-depth examination of regulations and policies that improve the rate of perceived opportunities, if the aim is to enhance entrepreneurship at country level.

The rate of perceived opportunities can be increased by targeting all three elements of opportunity discovery (Tang et al., 2012). In other words, policymakers can design to ease the processes of scanning and searching for opportunities, associating and connecting information, and first- rather than third-person judgment of opportunities (McMullen & Shepherd, 2006). Policies related to the three include e.g. enhancing entrepreneurial education for greater alertness in seeking out entrepreneurial ideas, improving market transparency to make association and connection easier, and making entrepreneurship less risky and costly so opportunities are judged exploitable by the entrepreneurs themselves, i.e. as first-person opportunities.
5.3 Limitations

As discussed in section 1.1, the availability of the GEM database has made it possible to apply a panel-analysis approach in institutional studies of entrepreneurship. GEM, by providing an internationally comparable database, has created enormous opportunity for studying entrepreneurial activities at the country level (Álvarez, Urbano, & Amorós, 2014). The studies that utilize GEM are however naturally limited to its limitations. As discussed in section 3.1, the measures collected through APSs of GEM are tested for reliability. For example, redoing the surveys have not led to different values, and the values correlate correctly to macro-economic trends. The measures are, additionally, valid in most cases. One issue, nevertheless, exists with the measures of opportunity and necessity entrepreneurship. In developing countries, for example, both opportunity and necessity entrepreneurship are higher (Acs, 2006; Reynolds, 2017). This might be due to entrepreneurs in developing countries being more likely to falsely report or identify themselves as opportunity entrepreneurs. That means that the measurement invariance of the measures can be challenged. Additionally, face validity of the measures can be questioned as the word ‘necessity’ could mean differently to entrepreneurship scholars, to entrepreneurs in developed countries, and to entrepreneurs in developing countries. Acs (2006) notes that using a ratio of opportunity-to-necessity entrepreneurship, instead of the separate measures of opportunity and necessity entrepreneurship, could be a remedy for this issue. Accordingly, despite the limitation, several entrepreneurship scholars have examined the ratio (e.g. Acs & Amorós, 2008; Thompson et al., 2010; Williams & Youssef, 2014). Although we acknowledge the limitations, since the focus of this thesis is on institutional conditions that could influence opportunity identification and pursuit, we find the ratio of opportunity-to-necessity entrepreneurship to be an appropriate measure for our study.

Another related limitation of this thesis concerns the country-level analyses that employs secondary data, and thus the time-invariant systematic measurement errors. WDI, WGI, GCR, and GEM are all subject to this type of error. That means that the data could be challenged in terms of its comparability for different countries. Nevertheless, it should be noted that time-invariant systematic measurement errors are controlled for by having country-level fixed effects.

Furthermore, several of the variables in the thesis were challenging to measure. In particular, obtaining data on informal economies is inherently difficult. Currently, indirect approaches based on macroeconomic data are the only means available to estimate the size of informal economies in a multi-country panel. However, these approaches, including MIMIC, are not without their limitations (cf. Feige & Urban, 2008; Putniņš & Sauka, 2015; Schneider & Buehn, 2013). The MIMIC approach may overestimate the size of the informal economy by, for instance, including legally purchased material for that economy (Hassan & Schneider, 2016). In Article 2, fixed effects estimation adds robustness to address some of these limitations, and triangulation with other data sources, specifically the World Bank Enterprise Survey (WBES), raised no significant concerns.

Another limitation is that measuring cognitive institutions is not entirely possible (Deephouse & Suchman, 2008; Roberts, 1994). We took the size of the informal economy as a proxy for how expected and accepted informal business is in a country, and also followed the extant literature in assuming that informal businesses reflect cognitive institutions surrounding entrepreneurs (Baum & Powell, 1995; Hannan & Carroll, 1995).

As a country-level study, this thesis fail to spot the processes through which institutions affect how individual entrepreneurs discover and exploit opportunities. Meso-level studies that cover both country-level institutional factors and entrepreneurship at its
industry, firm, or individual levels could shed light on the details of such processes (De Castro, Khavul, & Bruton, 2014; Kim et al., 2016).

A further limitation is that when we examined regulative institutions, we often did so in a broad sense by measuring governance quality. An alternative would be to measure the effects of precise policies. Chen (2012), for instance, lists several policies to tackle informality, including simplifying registration procedures, introducing clear bankruptcy rules, making social security accessible through a formal system, introducing a minimum wage, etc. The entrepreneurship-related consequences of each of these policies, as well as many other possible policies, could be worthy of research.

A final limitation concerns the focus on opportunities, and thereby the ratio of opportunity-to-necessity entrepreneurship. As discussed earlier in this section, to gauge productivity of entrepreneurship, due to our interest in opportunities, we study the ratio of opportunity-to-necessity entrepreneurship. Research has revealed other types of beneficial entrepreneurship, such as high impact (Stenholm et al., 2013), high growth potential (Wong et al., 2005), export oriented (De Clercq et al., 2008), and “real” entrepreneurship (Wennekers & Thurik, 1999). Therefore, this particular focus is another limitation of this study.

5.4 Future Directions

The suggested contributions and limitations discussed above hint at several issues that could be the subject of future studies, a few of which we categorize as follows.

5.4.1 More Research on the Main Topics

The main topics examined in this thesis included entrepreneurship and institutional settings. These are very broad subjects of which we tackled just a few instances. Future research could address, in addition, the following questions.

- How do institutional environments affect specific types of entrepreneurship, including born global startups?
- How do other institutional settings, such as those with a high concentration of cognitive institutions regarding individualism, together with a lack of political stability, affect entrepreneurship and its different types?

5.4.2 Other Topics in Institutional Incongruence and Cognitive and Regulative Institutions

We emphasized how cognitive and regulative institutions can promote different values, and how such institutional incongruence could lead to unexpected results in terms of entrepreneurship. However, in this thesis we were concerned with only one or two instances and our focus was on entrepreneurship. Future research could study other instances, too, and measure the effects on variables other than entrepreneurship. For example:

- In a country where cognitive institutions accept and expect power distance, regulative institutions that encourage less power distance, say, by introducing high progressive taxes, could precipitate another form of institutional incongruence. What are the effects of this type of institutional incongruence on entrepreneurship?
- How do regulative institutions at country level influence entrepreneurship, if the cognitive institutions within social groups surrounding entrepreneurs exercise a high degree of trust, high level of hierarchy, or a high degree of self-regard?
- What is the impact of the development of regulations in a country with a large informal economy on that country’s economic growth?

5.4.3 Other Levels of Analysis

Analysis in this thesis was set at country level. That requires making assumptions about lower levels, such as the meso level of cognitive institutions in which entrepreneurs enact businesses. The country level fails to capture the procedure through which individual entrepreneurs in a country make decisions. The following suggests a number of topics in which future research could study the matter at lower levels of analysis.

- In a country where red tape is endemic, are the entrepreneurs who decide to use “speed money” or other corrupt practices to bypass bureaucratic procedures in starting and running the business motivated by necessity or by opportunity?
- In a large informal economy, what are the personal traits of entrepreneurs who fit into their social groups by practicing informal businesses, and what are the personal traits of those who decide only to follow the regulations?
- What is the impact of the informal economy, measured by expectation and acceptance of conducting informal business among entrepreneurs, customers, partners, and suppliers, on the motivations of individual entrepreneurs?
- What procedures do individual entrepreneurs enact to generate business ideas in a country with low quality governance?

5.4.4 Detailed Policies

In discussing regulative institutions in this thesis, we examined the concept in a broad sense by measuring the quality of governance. We could rather measure the effects of precise policies. In that regard, we suggest some avenues for future research.

- Would a degree of corruption favor entrepreneurship, were social security to become accessible through a formal system?
- In a large informal economy, would it help opportunity entrepreneurs if policymakers introduce a minimum wage?
- Does allocating and increasing public funds for higher education favor opportunity discovery by individuals?

5.4.5 More on Opportunities

As in the case of regulative institutions, opportunities could also be studied in detail. Here are a few examples of appropriate topics.

- What policies encourage entrepreneurs to scan, associate, and judge situations in order to find entrepreneurial opportunities?
- Does stricter control of corruption lead to a higher level of available opportunities at country level?
- Would cognitive institutions of conducting informal businesses lead to a higher probability that individuals judge opportunities as first-person?
5.4.6 **Other Types of Opportunities and Entrepreneurship**

Although the research on entrepreneurship and opportunities are still rather in their early stages, there are already different theories that distinguishes between different types of opportunities and entrepreneurship. Our approach, theoretically and empirically, fails to cover many of those types, an issue that could be subject of future research. The following include example research questions.

- How do institutions help availability, identification, and pursuit of innovative versus arbitrage opportunities?
- What are the institutional antecedents of high impact, high growth potential, export-oriented entrepreneurship?
- How do combinations of different conceptualizations of opportunities affect economic growth?

5.5 **Conclusion**

As the general interest in entrepreneurship grows, researchers and policymakers become ever keener to find ways to promote it. Deriving suitable policies is not, however, an easy task. Policy consequences differ under different country-level institutional conditions (Stenholm et al., 2013). In addition, not all types of entrepreneurship are beneficial for the national economy (Baumol, 1996). Institutions and their role in encouraging or discouraging entrepreneurship, especially the preferred types for economic development, are topics of great interest. Therefore, in this thesis, we investigated the role of institutions in determining the rate at which entrepreneurs discover and exploit opportunities. The articles demonstrate that institutions do indeed affect the rate of entrepreneurship, which in turn can impact economic development. The articles also showed that institutional arrangements can take many different forms, each of which has different consequences for opportunity exploitation at country level. Furthermore, entrepreneurship and especially the opportunity-driven type, manifests in a process of opportunity discovery and exploitation at country level, while different instances of institutional setting affect that process.

Although several scholars have studied the role of institutions in entrepreneurship (e.g. Gries & Naudé, 2010; Manolova et al., 2008; Stenholm et al., 2013), this thesis fills two specific gaps. First, our articles examined under-investigated institutional settings, in order to stimulate future research, that exhibited contradicting consequences for entrepreneurship. This furthered our understanding, recognizing several theoretical concepts such as institutional incongruence. Additionally, we conclude that different aspects of institutions should not be considered and studied in isolation. Policymakers and researchers should consider the possible interplay among different aspects of institutions. Second, instead of studying direct impacts on startup rates, we examined how opportunities are discovered and exploited at country level. This is important because opportunity discovery is a major step in the entrepreneurship process (Shane & Venkataraman, 2000), and we learned more about economic development through entrepreneurship, following the research stating that opportunity entrepreneurship is the preferred type of entrepreneurship for that purpose. Thus, we conclude that we cannot ignore how policies may affect the opportunity discovery phase, if we are interested in understanding the impacts of policies on entrepreneurship in general, and especially those that lead to economic development.
REFERENCES


Government efficiency and corruption: A country-level study with implications for entrepreneurship

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ABSTRACT

If and how the efficiency of governments plays a role in determining relationships between corruption and entrepreneurship has not been examined at length. The empirical findings on control of corruption are inconclusive, and our knowledge regarding the moderation of efficient or less-efficient governments is rather limited. Using a multisource panel dataset of 59 countries, we find that any conclusion suggesting that corruption is universally good or bad for entrepreneurship may risk being overstated because the degree to which governments are efficient moderates the nonlinear effects of control of corruption on entrepreneurship.

1. Introduction

Corruption, defined as abuse of public power for private gain, is often viewed as a negative phenomenon (Warren, 2004), but can have a complex impact on the economy (e.g. Méndez and Sepúlveda, 2006). Similarly, studies on entrepreneurship suggest that corruption can have nonlinear, insignificant, or moderated impacts at the country level (Aidis et al., 2012; Anokhin and Schulze, 2009; Dreher and Gassebner, 2013). Corruption under different contexts can have varying effects on entrepreneurship. One factor that alters the effects of corruption is the way in which businesses are regulated (Tonoyan et al., 2010). Red tape, over-regulation, and rigidity could redefine how corruption impacts entrepreneurship as corruption under such conditions can grease the wheels of entrepreneurship (Dreher and Gassebner, 2013).

Put differently, the effects of corruption on entrepreneurship are complex and can have nonlinear and both positive and negative effects depending on the context. To further stimulate the ongoing discussion, we examine the nonlinear relationship between corruption and nascent entrepreneurship with a focus on how it is moderated through government efficiency. Government efficiency refers to the absence of over-regulation, ambiguity, and wastefulness. Although nonlinearity in the relationship has been studied before (Anokhin and Schulze, 2009), we investigate how such nonlinearity is shaped by different levels of government efficiency. Our findings have implications for determining how much effort policy makers should dedicate to combating corruption under different levels of government efficiency while fostering entrepreneurship.

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2. Corruption and government efficiency

2.1. Control of corruption

Corruption refers to the abuse of public power for private gain (Rodriguez et al., 2005), and control of corruption refers to the extent to which it is contained. Various researchers have studied the effects of corruption on different economic factors (e.g., Mauro, 1995; Mo, 2001; Méndez and Sepúlveda, 2006) and more recently on entrepreneurship. The results concerning entrepreneurship have however been mixed. For example, Dutta and Sobel (2016) and Anokhin and Schulze (2009) found negative effects of corruption while other studies have found no direct country-level effects (Aidis et al., 2012). On the other hand, Dreher and Gassebner (2013) and Belitski et al. (2016) found positively moderated effects. In addition to complex nature of the relationship, differences in methodologies used (especially regarding whether cross-sectional or panel data are used or whether the measure of entrepreneurship used only captures official entrepreneurship) have arguably also contributed to mixed results.

2.2. Government efficiency

Government efficiency refers to efficiency of government in terms of regulation burdens, government wastefulness, regulation transparency, and efficiency of legal frameworks (Schwab and Sala-i-Martín, 2015). Scholars such as Lee and Whitford (2009) and Portes and Haller (2010) consider government efficiency as government performance (when resources are not wasted) and non-burdensome of regulations (when there is no over-regulation). Accordingly, we define government efficiency as the extent to which governments do not waste resources or place burdensome and ambiguous regulations on institutions, organizations, and individuals in a country (Schwab and Sala-i-Martín, 2015). Government efficiency and corruption refer to different phenomena, as corruption is understood as an abuse of public positioning for private gain (Rodriguez et al., 2005). This distinction is in line with what is known as the “grease the wheels” hypothesis. It suggests that corruption can be beneficial when regulations burden businesses, when there is over-regulation and inflexibility, when governments waste resources, and when regulations are not transparent to businesses. In other words, in studying the grease (or sand) the wheels hypothesis (e.g., Ménon and Sekkat, 2005), scholars clearly distinguish issues of bribery and other corrupt practices from issues such as over-regulation, red tape, and inflexibility.

2.3. Corruption, government efficiency, and entrepreneurship

The findings of Anokhin and Schulze (2009) suggest that corruption and entrepreneurship may have a convex (also known as concave upward) relationship. Other authors such as Dreher and Gassebner (2013) discuss how corruption can grease the wheels of entrepreneurship (i.e., in countries with inefficient governments, corrupt practices such as “speed money” benefit businesses) (Mauro, 1995). Thus, under inefficient governance with over-regulation, initial efforts to combat corruption can harm entrepreneurial efforts. However, as Rothstein and Uslaner (2005) note, when governments continuously combat corruption, they establish trust in a society which in turn benefit entrepreneurship. Consequently, under inefficient governments, the relationship between control of corruption and entrepreneurship is first downward and then upward (i.e., convex).

As governments become more efficient, effects of the grease the wheels hypothesis and trust decrease. First, since regulations are more transparent, less burdensome, and less excessive, entrepreneurs do not need to bribe officials to get their businesses started. Second, as societal trust is higher in countries with efficient governments, pushing for higher control of corruption has a less positive effect. However, when governments become highly efficient, some degree of rigidity and inflexibility (a type of red tape) emerges because of the transparent and unquestionable nature of regulations. In such high-trust societies, some corruption can once again grease the wheels of entrepreneurship. Taken together, as government efficiency increases, the relationship between control of corruption and entrepreneurship grows less convex, and in extreme cases, it can become concave.

H1: Government efficiency negatively moderates the convexity of the relationship between control of corruption and entrepreneurship.

3. Data and method

3.1. Data

We performed the empirical analysis using a multisource 339 country-year dataset of 59 countries for 2008–2015. Information on entrepreneurship was collected from the Global Entrepreneurship Monitor (GEM) (Acs et al., 2004). In addition to data on two control variables, data on government efficiency was obtained from the Global Competitiveness Report (GCR) (Schwab and Sala-i-Martín, 2015). For control of corruption, we used Kaufmann et al. (2011) measure, which is used in the World Governance Indicators (WGs). Finally, the rest of the control variables were collected from the World Development Indicators (WDIs) (World Bank, 2016). The resulting panel dataset was strongly unbalanced with several lengthy gaps; therefore, we used observations belonging to sub-panels with at least three consecutive years of data for a country.

3.2. Dependent variable

Following Arenius and Minniti (2005), we found the nascent entrepreneurship rate measure of the GEM to be a suitable
dependent variable. The nascent entrepreneurship rate is the percentage of “individuals, between the ages of 18 and 64 years, who have taken some action toward creating a new business in the past year” (Acs et al., 2004, p. 16) in a country. Hence, it is not limited to measuring formal entrepreneurship.

3.3. Independent variable

Our independent variable captures the extent to which corruption, i.e., “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.” (Kaufmann et al., 2011, p. 4), is controlled. We followed the approach of Anokhin and Schulze (2009) and used control of corruption of the WGI.

3.4. Moderator variable

In its institutions section, the GCR includes a measure of government efficiency that includes five sub-indexes relating to regulation burdens, government wastefulness, regulation transparency, and legal framework efficiency in changing regulations and settling disputes. Consistent with previous research, we used GCR measures, namely government efficiency, to study corruption (Ulman, 2013).

3.5. Control variables

In line with prior studies, we controlled for several factors. First, we controlled for the sheer size of an economy measured by population (log-transformed). In line with Thai and Turkina (2014), we examined supply and demand side factors. On the supply side, we controlled for per capita GDP (PPP) (2010 USD) and unemployment rates. On the demand side, we controlled for environment innovativeness and financial market development. We further controlled for FDI (as a percentage of GDP; log-transformed) and openness (trade as a percentage of GDP). Year dummies were also applied. With the exception of data on innovative environments and financial market development, which were collected from GCR, control variables were obtained from the WDI.

3.6. Method of analysis

The fixed effects (i.e., within) estimator is suited for the analysis of this panel, and it controls for endogeneity arising from time-invariant unobserved heterogeneity. We tested for moderating effects of nonlinear relationships (cf. Anokhin and Schulze, 2009; Méndez and Sepúlveda, 2006) by including the interaction between control of corruption squared and government efficiency. Independent, moderator, and control variables were lagged for one year and then centered.

4. Results

Table 1 shows the descriptive statistics and correlation matrix. Regression estimates are summarized in Table 2. Finally, Fig. 1 illustrates predicted values of the dependent variable based on interaction effects.

The high interclass correlations shown in Table 1 highlight the stationary nature of many of our variables at the country level. However, the within correlations are moderate. Furthermore, variable-specific and average within VIF statistics suggest that multicollinearity is not a significant concern for the within estimator.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Descriptive Statistics</th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>1. Nascent Entrepreneurship Rate (%)</td>
<td>6.23</td>
<td>4.35</td>
</tr>
<tr>
<td>2. Control of corruption</td>
<td>0.62</td>
<td>1.03</td>
</tr>
<tr>
<td>3. Government Efficiency</td>
<td>3.80</td>
<td>0.81</td>
</tr>
<tr>
<td>4. Population (millions)</td>
<td>3.15</td>
<td>1.54</td>
</tr>
<tr>
<td>5. Financial Market Development</td>
<td>4.50</td>
<td>0.69</td>
</tr>
<tr>
<td>6. Innovative Environment</td>
<td>3.92</td>
<td>0.95</td>
</tr>
<tr>
<td>7. GDP (PPP) per capita (th USD)</td>
<td>27.46</td>
<td>16.41</td>
</tr>
<tr>
<td>8. Unemployment rate (%)</td>
<td>8.66</td>
<td>5.68</td>
</tr>
<tr>
<td>9. FDI (%)</td>
<td>1.33</td>
<td>0.99</td>
</tr>
<tr>
<td>10. Openness (%)</td>
<td>90.29</td>
<td>58.44</td>
</tr>
</tbody>
</table>

N = 339 country years for 59 countries. Variables 2–10 are lagged by one year.

**a:** $\pm \log(|x| + 1)$: Positive unless x is negative.

**b:** Within Pearson correlations. Absolute values of 0.11 or greater are significant at the p < 0.05 level.
The results provide support for Hypothesis 1, as Model 4 shows a negatively significant coefficient for the joint interaction term ($\beta = -0.877, p < 0.05$). Jointly, the coefficients in Model 4 imply that the convexity of the relationship between control of corruption and entrepreneurship varies depending on how efficient governments are. As a robustness check, we removed the extreme ± 2.5% of residuals, which resulted in a further decrease in the p-value for the interaction term. Fig. 1 further illustrates the relationship for different levels of government efficiency and control of corruption. Due to the moderating effect, the difference in predicted nascent entrepreneurship rates between low and high (± 1 standard deviations) rates of government efficiency is recognizable. The difference becomes more pronounced once we extend the range of government efficiency to its minimum and maximum values. Although Table 2 shows only a modest improvement in model fit when the final interaction term is added ($\Delta R^2 \text{(within)} = 0.011; p < 0.05$), the visualization of the predicted probabilities suggests that the joint effects may result in relatively strong changes in the Nascent Entrepreneurship Rate.

### Table 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control of corruption</td>
<td>−1.503</td>
<td>−1.525</td>
<td>−0.657</td>
<td></td>
</tr>
<tr>
<td>(1.097)</td>
<td>(1.151)</td>
<td>(1.107)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control of corruption Squared</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.708)</td>
<td>(0.701)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government Efficiency</td>
<td>1.178</td>
<td>1.276†</td>
<td>1.932**</td>
<td></td>
</tr>
<tr>
<td>(0.712)</td>
<td>(0.719)</td>
<td>(0.699)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control of corruption X Efficiency</td>
<td>−0.638</td>
<td>−0.456</td>
<td>−0.456</td>
<td>−0.877†</td>
</tr>
<tr>
<td>X Government Efficiency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.733)</td>
<td>(0.741)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control of corruption Squared X Efficiency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.428)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population¹</td>
<td>6.144</td>
<td>4.572</td>
<td>2.516</td>
<td>2.860</td>
</tr>
<tr>
<td>(9.220)</td>
<td>(9.592)</td>
<td>(9.600)</td>
<td>(9.610)</td>
<td></td>
</tr>
<tr>
<td>Financial Market Development</td>
<td>−0.152</td>
<td>−0.377</td>
<td>−0.479</td>
<td>−0.569</td>
</tr>
<tr>
<td>(0.533)</td>
<td>(0.557)</td>
<td>(0.567)</td>
<td>(0.544)</td>
<td></td>
</tr>
<tr>
<td>Innovative Environment</td>
<td>0.382</td>
<td>−0.363</td>
<td>−0.478</td>
<td>−0.590</td>
</tr>
<tr>
<td>(0.914)</td>
<td>(1.046)</td>
<td>(1.059)</td>
<td>(1.037)</td>
<td></td>
</tr>
<tr>
<td>Per capita GDP (PPP)</td>
<td>0.293†</td>
<td>0.314†</td>
<td>0.324</td>
<td>0.341</td>
</tr>
<tr>
<td>(0.156)</td>
<td>(0.138)</td>
<td>(0.152)</td>
<td>(0.147)</td>
<td></td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>0.107</td>
<td>0.116†</td>
<td>0.129</td>
<td>0.145</td>
</tr>
<tr>
<td>(0.0661)</td>
<td>(0.0618)</td>
<td>(0.0639)</td>
<td>(0.0623)</td>
<td></td>
</tr>
<tr>
<td>FDI¹</td>
<td>0.0220</td>
<td>0.0155</td>
<td>0.0299</td>
<td>0.0631</td>
</tr>
<tr>
<td>(0.0712)</td>
<td>(0.0764)</td>
<td>(0.0698)</td>
<td>(0.0679)</td>
<td></td>
</tr>
<tr>
<td>Openness</td>
<td>0.0409</td>
<td>0.0374†</td>
<td>0.0372</td>
<td>0.0442†</td>
</tr>
<tr>
<td>(0.0261)</td>
<td>(0.0247)</td>
<td>(0.0242)</td>
<td>(0.0233)</td>
<td></td>
</tr>
<tr>
<td>Year Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>R² (within)</td>
<td>0.127</td>
<td>0.143</td>
<td>0.155</td>
<td>0.166</td>
</tr>
<tr>
<td>Adjusted (within) R²</td>
<td>0.090</td>
<td>0.100</td>
<td>0.108</td>
<td>0.117</td>
</tr>
<tr>
<td>R² (between)</td>
<td>0.087</td>
<td>0.078</td>
<td>0.093</td>
<td>0.090</td>
</tr>
<tr>
<td>R² (overall)</td>
<td>0.084</td>
<td>0.079</td>
<td>0.109</td>
<td>0.107†</td>
</tr>
<tr>
<td>ΔR² (within)</td>
<td>0.016†</td>
<td>0.012</td>
<td>0.011</td>
<td></td>
</tr>
<tr>
<td>Cohen's f² (within)</td>
<td>0.019</td>
<td>0.014</td>
<td>0.013</td>
<td></td>
</tr>
<tr>
<td>Average VIF (within)</td>
<td>2.71</td>
<td>2.68</td>
<td>2.60</td>
<td>2.64</td>
</tr>
</tbody>
</table>

N = 339 country years; 59 countries. Constant included in all models. Independent variables lagged by one year. Standard errors clustered by country in parentheses.

* * * \( p < 0.001 \).

¹: ± log(|x|+1): Positive unless x is negative.

† \( p < 0.1 \).

* \( p < 0.05 \).

**: \( p < 0.01 \).

The results provide support for Hypothesis 1, as Model 4 shows a negatively significant coefficient for the joint interaction term ($\beta = -0.877, p < 0.05$). Jointly, the coefficients in Model 4 imply that the convexity of the relationship between control of corruption and entrepreneurship varies depending on how efficient governments are. As a robustness check, we removed the extreme ± 2.5% of residuals, which resulted in a further decrease in the p-value for the interaction term.

Fig. 1 further illustrates the relationship for different levels of government efficiency and control of corruption. Due to the moderating effect, the difference in predicted nascent entrepreneurship rates between low and high (± 1 standard deviations) rates of government efficiency is recognizable. The difference becomes more pronounced once we extend the range of government efficiency to its minimum and maximum values. Although Table 2 shows only a modest improvement in model fit when the final interaction term is added ($\Delta R^2 \text{(within)} = 0.011; p < 0.05$), the visualization of the predicted probabilities suggests that the joint effects may result in relatively strong changes in the Nascent Entrepreneurship Rate.

### 5. Discussion and conclusion

From the debate regarding the positive or negative impact of corruption on entrepreneurship (Dreher and Gassebner, 2013; Dutta and Sobel, 2016), we provide empirical evidence for the moderating role of government efficiency in the nonlinear relationship between control of corruption and entrepreneurship. Several scholars have argued that corruption has a negative impact on entrepreneurship (Aidis et al., 2012; Dutta and Sobel, 2016). Among them, Anokhin and Schulze (2009) also found evidence of a nonlinear convex (upward concave) relationship between control of corruption and entrepreneurship. Specifically, as control of corruption becomes stricter, its positive effect on entrepreneurship increases. However, inspired by previous literature on the “grease the wheels” hypothesis, we investigated whether the convexity of the relationship is moderated by government efficiency.

Our findings suggest that under less efficient governance, the relationship between control of corruption and entrepreneurship is...
convex (concave upward) (Anokhin and Schulze, 2009)—that is, first downward and then upward. It first slopes downward because when inefficient governments are in power, entrepreneurs can use corrupt practices to bypass highly regulated, wasteful, and ambiguous regulative arrangements. Corruption, in this case, “greases the wheels” of entrepreneurship (Dreher and Gassebner, 2013). However, if governments persist in controlling corruption, societal trust emerges (Rose-Ackerman, 2001), which in turn favors entrepreneurship. The convexity of the relationship weakens as governments become more efficient because there is less need for corruption to grease the wheels, and the level of trust is higher in the first place. The relationship can become concave-shaped (but decreasing) in extreme cases of highly efficient governance because such governments carry a degree of inflexibility, which brings back the need for the greasing role of corruption.

The results of this research imply that corruption is not universally good or bad for entrepreneurship. Both the effectiveness of efforts to control corruption and overall government efficiency determine how corruption affects entrepreneurship. However, we also acknowledge prior research arguing that corruption can harm the economy in general through other means, for example, by increasing unproductive or destructive entrepreneurship (Baumol, 1996) or by decreasing growth-oriented entrepreneurship (Aidis and Mickiewicz, 2006). As a result, an alternative approach to greasing the wheels of entrepreneurship—one with low corruption and minimal “red tape”—is beneficial for the economy as a whole (i.e., not just for entrepreneurship). Similarly, several scholars have argued that corruption and over-regulation are second best to less corruption and fewer over-regulations (Dutta and Sobel, 2016; Guriev, 2004). At the same time, government that is too efficient may generate a degree of inflexibility. That is, red tape exists under both over-regulated, ambiguous, inefficient governance and highly efficient but somewhat rigid governance (Guriev, 2004). In both cases, corruption can grease the wheels. This implies that ideal governance should effectively keep corruption under control while balancing between being efficient (i.e., transparent and not excessively regulated) and being flexible (i.e., avoiding an excessive “one size fits all” approach). To examine this topic further, future research could focus on different measurements and types of red tape and their roles in the “greasing the wheels” hypothesis. For example, how businesses respond to corruption in efficient but inflexible governmental institutions as a measure of red tape might be different from a measure based on how they respond to corruption in the presence of red tape from ambiguous, over-regulated governmental institutions. Examining different types of red tape and the roles they play in the “greasing the wheels” hypothesis could take discussions on corruption and entrepreneurship to a new level.

Our research findings also have implications for policies that fight corruption. When creating such policies, policymakers should consider whether their government has over-regulation, trust, or rigidity issues. In particular, policymakers should focus on both controlling corruption and developing government efficiency as pursuing changes in only one of these areas can lead to suboptimal outcomes for entrepreneurship. Furthermore, policymakers should be careful when pursuing higher government efficiency, ultimately ensuring it does not lead to excessive inflexibility, which would reduce productive forms of entrepreneurship.

Fig. 1. Model predictions with 95% confidence intervals.
References


A Country-level Institutional Perspective on Opportunity-to-Necessity Entrepreneurship: The Effects of Informal Economy and Regulative Efforts

Abstract

Using a combination of formal and informal institutional arguments as well as panel data from 60 countries, we outline an alternative view of the informal economy and the effects of regulative institutions on entrepreneurship. We find and discuss evidence that the size of the informal economy is mostly negatively associated with the ratio of opportunity to necessity entrepreneurship and that in the presence of a large informal economy, governmental efforts to improve quality of governance can be counterproductive. Our results suggest that policy interventions aimed at changing institutions to practicing formal entrepreneurship should be implemented with caution to avoid inducing or prolonging institutional incongruence.

1. Executive Summary

The informal economy constitutes a considerable percentage of business activities around the world, but despite its significance research has paid it little attention (Bruton, Ireland, & Ketchen, 2012). Particularly in the entrepreneurship literature, there have been limited efforts to examine the effects of institutional conditions on entrepreneurship in the presence of a large informal economy. As governments in countries with large informal economies attempt to develop their regulative institutions to constrain informal business activities, it is important to understand the potential effects of such actions on entrepreneurship. Particularly, a better understanding of how changes in the informal economy and formal regulation jointly influence the quality of entrepreneurship in terms of the ratio of opportunity to necessity entrepreneurship is needed. A higher ratio suggest that opportunity entrepreneurship, the type that could lead to structural transformation and economic growth (Gries & Naudé, 2010), is relatively more prevalent compared to necessity entrepreneurship, which entails no such benefits.

We focus on the size of the informal economy and the tightening of regulation in terms of the quality of governance. In a cross-country analysis, we find that the size of the informal economy, representing the cognitive and normative institutions of informal business practice, is negatively associated with the ratio of opportunity to necessity entrepreneurship in most cases. Moreover, we build upon the notion of institutional incongruence (Cullen, Johnson, & Parboteeah, 2014; Webb, Tihanyi, Ireland, & Sirmon, 2009) and further find support for our claim that improving the quality of governance lowers the ratio of opportunity to necessity
entrepreneurship when cognitive and normative institutions accept informal business activities. This challenges the literature that argues for developing regulative institutions for entrepreneurship (e.g., Aparicio, Urbano, & Audretsch, 2016). Rather, we find support for an alternative view suggesting that the effects of improving regulative institutions on entrepreneurship depend on the state of cognitive and normative institutions in the country (Kim & Li, 2014).

Overall, we extend previous research when we conclude that to harness the potential of entrepreneurship as a driving force of economic development, governments should not only focus on developing the quality of regulative institutions but also target the cognitive and normative institutions of the individuals operating in larger informal economies. Through such policy, governments could shrink the informal economy while not damaging the quality of entrepreneurship or, more precisely, the ratio of opportunity to necessity entrepreneurship. We reason that by maintaining a high ratio, countries can achieve technological change and structural transformation and, in turn, economic growth.

2. Introduction

Does the informal economy of a country influence the type or quality of entrepreneurship in the country? Can regulation of the informal economy backfire? Because opportunity entrepreneurship—when entrepreneurs already have income but are involved in business creation because they find business opportunities that can improve their current situations—is a key construct for understanding a country’s ability to increase its level of development (Acs, Desai, & Hessels, 2008; Wennekers, Van Wennekers, Thurik, & Reynolds, 2005), a consideration of such influence is particularly relevant. The ratio of opportunity to necessity entrepreneurship points to institutions representing drivers that encourage individuals into opportunity rather than necessity entrepreneurship. A high ratio of opportunity to necessity entrepreneurship reflects an embrace of technological change and structural transformation (Acs & Varga, 2005; Gries & Naudé, 2010) through which economic development could be achieved (Anokhin & Wincent, 2012). Because of this linkage to productive and transformative entrepreneurship, the ratio is often subject to close examination in macrolevel entrepreneurship studies (Acs & Amorós, 2008; Thompson, Jones-Evans, & Kwong, 2010; Williams & Youssef, 2014).
Institutions are the rules of the game in society (North, 1990) and shape the context in which entrepreneurs act. The institutional settings in a country determine the factors that promote opportunity or necessity as reasons to start a business. Research on institutions has taken two different paths. Scholars in institutional economics study the effects of sociopolitical, governance-related, formal, and regulative forces (e.g., Aparicio et al., 2016; Ault & Spicer, 2014; Levie & Autio, 2011), while in other institutional research streams, researchers study cultural and sociology-based factors (e.g., Khavul et al., 2009; Liñán & Fernandez-Serrano, 2014; Tan, 2002). Entrepreneurship researchers accordingly have studied two types of institutions, including formal regulative institutions and informal ones based upon historical traditions, cultures, and norms (Amorós, Ciravecna, Mandakovic, & Stenholm, 2017; Autio, Pathak, & Wennberg, 2013). Several scholars have recently recommended integrating the two types of institutions (Bruton, Ahlstrom, & Li, 2010; Kim & Li, 2014b; Stephan et al., 2015). Following these recommendations, we find that the combined roles of regulatory implementation and the cognitive institutions represented in a large informal economy have not been jointly examined to explain the ratio of opportunity to necessity entrepreneurship.

While we attempt to shed light on the role of the informal economy, which involves economic activities that occur outside of formal but within informal institutional boundaries (Webb, Bruton, Tihanyi, & Ireland, 2013), we primarily seek to complement earlier research on the effects of the quality of governance and the potential downsides of improving it. Regulative institutions capture how “authority in a country is exercised” (Kaufmann, Kraay, & Mastruzzi, 2011, p. 4), and the quality of governance is the degree to which the state is able and willing to effectively establish authority (cf. Ault & Spicer, 2014; Kaufmann et al., 2011). We open a discussion of how the implementation of such governance may conflict with the informal rules among people acting in the informal economy. A large portion of prior research has concluded that the implementation of high-quality governance adds to certainty and encourages entrepreneurship (Aparicio et al., 2016; Dau & Cuervo-Cazurra, 2014; Valdez & Richardson, 2013). However, another emerging stream of entrepreneurship literature (Dreher & Gassebner, 2013; Kim & Li, 2014b) argues for the negative role of high-quality regulations when they are inconsistent with the existing cognitive and normative
institutions. This calls for further research on the implementation of high-quality regulations in different institutional settings, such as that of a large informal economy. In this paper, by theorizing that the effect of imposing high-quality governance in the presence of a large informal economy on the ratio of opportunity to necessity entrepreneurship is negative, we challenge the conventional perspective that would advocate exercising regulations to mitigate informal practices.

We follow institutional anomie theory (Durkheim, 1951; Merton, 1995; Messner & Rosenfeld, 1997; Orru, 1986) and entrepreneurship scholars such as Cullen, Johnson, and Parboteeah (2014) to combine formal and informal institutions and to develop the notion of institutional incongruence. We argue that the regulative institutions at the macrolevel and the cognitive and normative institutions related to social groups that surround individuals are often inconsistent in countries with large informal economies. We believe our approach contributes to establishing a dialogue on the tensions among institutions that are imposed by sociopolitical factors, such as the quality of governance, and those that are cognitive and normative and related to social relationships (Aldrich & Fiol, 1994).

Additionally, our paper pioneers the study of how the size of the informal economy at the country level is related to the ratio of opportunity to necessity entrepreneurship. Our perspective provides institutional arguments at the country level and argues for a negative role of the size of the informal economy on the ratio of opportunity to necessity entrepreneurship. We argue that a large informal economy hinders access to resources that are key constituents of opportunities. Additionally, a large informal economy represents a culture of informal employment that frequently offers low income that is not satisfactory to meet employees’ basic needs. Thus, the institutional conditions emerging from a large informal economy favor necessity entrepreneurship over opportunity entrepreneurship.

We test our hypotheses using a multisource country-level panel dataset and by applying fixed effects and difference Generalized Method of Moments (GMM) estimators (Arellano & Bond, 1991; Arellano & Bover, 1995). We find full support for the contention that in the presence of a large informal economy, governmental efforts to develop quality of governance negatively affect the ratio of opportunity to necessity entrepreneurship. Our empirical results furthermore suggest that in most cases, depending on the quality of governance in the
country, a large informal economy is harmful for the ratio of opportunity to necessity entrepreneurship. We discuss the theoretical implications of these findings and outline possible avenues for future research.

3. Theory and Hypotheses

3.1. An Institutional Perspective on the Informal Economy and Type of Entrepreneurship

Institutions, as North (1990, p. 3) defines them, are “the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction.” Institutional scholars have for a long time distinguished between institutions that are imposed by sociopolitical factors (e.g., regulations) and the cognitive and normative ones that are representative of internalized understandings of the world and are based upon historical culture, traditions, and what are considered to be appropriate behaviors (Aldrich & Fiol, 1994; Scott, 1995). The rules of institutions thus arise either from explicit sociopolitical and governmental regulations aiming at constraining and incentivizing individual or organizational actions or from implicit guiding principles of how to behave and what is appropriate within social relationships (Powell & DiMaggio, 1991; Roberts, 2008; Roland, 2004; Stephan et al., 2015). The former are formal and constitute regulative institutions, and the latter are informal and form cognitive and normative institutions (Scott, 1995). Accordingly, the entrepreneurship literature has evolved into two streams of research on institutions. Those that follow institutional economics focus on formal regulative institutions (e.g., Amorós, Ciravegna, Mandakovic, & Stenholm, 2017; Autio & Fu, 2015; Levie & Autio, 2011), while the other stream examines the roles of cultural and sociology-based factors as well as cognitive and normative values on the state of entrepreneurship (e.g., Autio, Pathak, & Wennberg, 2013; Liñán & Fernandez-Serrano, 2014; Tan, 2002). In recent years, researchers have proposed the possibility and necessity of acknowledging both formal regulations and informal institutions in studying entrepreneurship (Bruton et al., 2010; Cullen et al., 2014; Kim & Li, 2014b; Kim, Wennberg, & Croidieu, 2016; Stephan et al., 2015).

Our focus is on the institutions that are closely associated with a large informal economy. Even though one may intuitively think that a large informal economy is merely defined by its regulative institutions, or lack of them, this is not the case. As noted by Kim et
al. (2016), regulative institutions concern the macrolevel and the overall governance structure of a country, while cognitive and normative institutions that promote informality are related to the actual practices in the social groups that surround individual entrepreneurs (suppliers, customers, partners, subcontractors, etc.). A large informal economy represents the cognitive and normative institutions, and these may be offset by regulation. An informal business involves activities that are “unregistered but derive income from the production of legal goods and services.” (Bruton et al., 2012, p. 2) At the country level, a large informal economy means a large portion of businesses fall within this description and thus that the cognitive and normative institutions in the country accept informal business activities. Therefore, consistent with Webb et al. (2013), we concentrate upon the size of the informal economy as a measure of the extent of economic activities that occur outside of formal but within informal institutional boundaries. This implies that a large segment of actors inside the informal economy undertake actions that they themselves consider legitimate. However, because the actions are outside the formal economic system, they are also illegal (Webb et al., 2009). Thus, a large informal economy implies that, to some extent, a society acts upon norms, values, and beliefs of informality that are legitimate according to the cognitive and normative rules of the game within the social groups surrounding entrepreneurs. A large informal economy is indicative of a society in which the majority of actors accept and expect running informal businesses and thus creates and maintains informal rules of the game that encourage such practices.

On the subject of entrepreneurship, the literature distinguishes between two of its types: opportunity and necessity (e.g., Amorós, Ciravegna, Mandakovic, & Stenholm, 2017; Block & Sandner, 2009; Williams, 2009). Opportunity entrepreneurs have options to work otherwise but become involved in business creation because they find business opportunities that could increase their current incomes (Sautet, 2013; Wennekers, Van Wennekers, Thurik, & Reynolds, 2005), whereas necessity entrepreneurship refers to starting a business in the absence of other ways to make a living (Bosma & Levie, 2009). At the individual level, the boundaries between opportunity and necessity entrepreneurs are blurry. Individual entrepreneurs often have a mixture of reasons why they start their business, which could include both an availability of opportunities and factors related to challenging circumstances
in the entrepreneurs’ lives, as well as their prospects in wage employment. While discussing the dichotomy of whether informal entrepreneurs are opportunity- or necessity-driven, Williams (2009) concludes that informal entrepreneurs often have both opportunity and necessity motives in different proportions.

Individuals’ entrepreneurial motivations ultimately reflect upon larger aggregate levels of analysis. In particular, studying the ratio of opportunity to necessity entrepreneurship in a country reveals information about the broader mix of underlying entrepreneurial drivers and thus is more informative than solely examining the prevalence of entrepreneurship or a single type of it. The ratio also captures economic development through technological change and structural transformation (Acs & Varga, 2005; Gries & Naudé, 2010) irrespective of the total rate of entrepreneurship in a country, which can vary due to the level of structural development. A high opportunity-to-necessity ratio implies a stronger prevalence of “pull” factors under the institutional settings, that is, individuals more often perceive that their entrepreneurial endeavors are motivated by the pursuit of entrepreneurial opportunities. A low ratio, on the other hand, points to the prevalence of institutional conditions that “push” individuals out of wage employment and into entrepreneurship in the absence of better alternatives to make a reasonable living.

Institutional conditions shape the balance of the intertwined push and pull factors through influencing both the opportunities at the country level and the opportunity costs of starting new businesses (Amorós et al., 2017; Levie & Autio, 2011). More available high-quality opportunities and higher levels of opportunity identification and pursuit strengthen the pull factors, which favors opportunity entrepreneurship. In contrast, if the opportunity costs of entrepreneurship are low in a country, and especially if they are below what would satisfy a person’s basic needs, the stronger the push factors, and the more favorable the conditions for necessity entrepreneurship.

To this background, the size of the informal economy is likely to influence the ratio of opportunity to necessity entrepreneurship. When resources are scarce, it is more challenging for prospective entrepreneurs to identify how resources could be combined in new and creative ways to identify and pursue opportunities (Ardichvili, Cardozo, & Ray, 2003; Wiklund & Shepherd, 2003). The institutional conditions related to the informal economy
generally restrict access to knowledge-based and formal financial resources and therefore aggravate this problem. A formal economy, on the other hand, is an enabler of these resources. Expert human resources and knowledge-based resources are often embedded within networks that are formed around formal institutions, such as universities and formal corporations (cf. Arenius & De Clercq, 2005; O’Shea, Allen, Chevalier, & Roche, 2005; Wiklund & Shepherd, 2003). Beyond human capital, the institutions that entrepreneurs encounter in a large informal economy provide less access to formal financial resources and resources that require formal contracts (Feige, 1990; Webb et al., 2013). Altogether, these resource constraints can ultimately accumulate to reduce the availability of feasible high-quality opportunities at the country level (cf. Anokhin et al., 2011; Wiklund & Shepherd, 2003).

The institutional conditions of a large informal economy additionally lead to lower opportunity costs for starting businesses. Because the working conditions in informal employment are often poor and the wages may not cover the basic costs of living, the opportunity costs to entrepreneurship, i.e., the potential income from informal employment, can even be so low that they do not even cover basic needs (Amorós et al., 2017; Levie & Autio, 2011). As a result, the institutional conditions favor necessity entrepreneurship by its very definition. Since a large informal economy, as discussed, also hampers opportunity identification and pursuit, it results in a lower ratio of opportunity to necessity entrepreneurship.

Taken together, the institutional conditions in a large informal economy limit access to resources needed to identify and pursue opportunities of a high quality. Additionally, as the working conditions in a large informal economy are poor, the opportunity costs of entrepreneurship are low. Therefore, a country with a large informal economy exhibits a lower opportunity-to-necessity ratio. These arguments lead to our first hypothesis:

**Hypothesis 1:** The larger the informal economy, the lower the ratio of opportunity to necessity entrepreneurship.
3.2. Quality of Governance in a Large Informal Economy and Types of Entrepreneurship

Regulative institutions are institutions related to formal frameworks of political and legal ground rules (Bruton et al., 2010; Peng, 2003; Roberts, 2008). They capture how “authority in a country is exercised” (Kaufmann et al., 2011, p. 4). Formal institutions are strong when the political governance structure is strictly imposed and weak when rules are not followed and effectively monitored. A common approach to study formal institutions is to assess the quality of governance (e.g., Amorós & Stenholm, 2014; Cabrales & Hauk, 2011; Farla, De Crombrugghe, & Verspagen, 2016; Wang, 2013). We define the quality of governance (cf. Charron, Dijkstra, & Lapuente, 2014; Langbein & Knack, 2010) as the degree to which the state is able and willing to effectively establish authority (cf. Amorós et al., 2017; Ault & Spicer, 2014, p. 1819; Kaufmann et al., 2011). The quality of governance can be further broken down into elements such as rule of law, voice and accountability, control of corruption, and government effectiveness (Kaufmann et al., 2011). Researchers often study a bundle of the elements since they all measure a single factor: the ability and willingness of the state to establish effective formal rules of the game. Strengthening the quality of governance forces or at least encourages entrepreneurs to formalize their business activities. A strong rule of law, for example, encourages businesses to enter the formal economy because doing so ensures that they receive certain protections related to contracts and property rights (Dabla-Norris, Gradstein, & Inchauste, 2008; Johnson, Kaufmann, & Zoido-Lobaton, 1998). As another example, controlling corruption forces entrepreneurs to move toward formal activities because public agents would be less likely to take advantage of their positions for private gain (Belitski, Chowdhury, & Desai, 2016; Mohamadi, Peltonen, & Wincent, 2017). As a final example, political stability and absence of violence signal that a state is able to establish formal rules of the game, including keeping the monopoly over the use of violence (Ault & Spicer, 2014). As businesses acknowledge the power of the state in establishing the formal rules, they are more likely to be aware of the consequences of engaging in informal business activities, which include being shut down or incurring penalties.
A recent stream of entrepreneurship research (e.g., Cullen et al., 2014; Kim et al., 2016; Stephan et al., 2015) emphasizes integrating institutional economics and the study of cultural and sociology-based factors and taking into account both regulative and informal institutions. While building upon this stream, we find certain circumstances where the regulative aspects of institutions are at odds with their cognitive and normative aspects. We acknowledge the theory of institutional anomie in the fields of sociology and criminology (Durkheim, 1951; Merton, 1995; Messner & Rosenfeld, 1997; Orru, 1986) as well as the works of entrepreneurship scholars such as Cullen et al. (2014) and Webb et al. (2009) and define such a situation as institutional incongruence. In drawing upon the theory of institutional anomie in entrepreneurship, Cullen et al. (2014) note that studying the combined effects of formal and informal institutions reveals situations where there is incongruence between informal institutions that motivate certain goals and formal institutional conditions that inhibit reaching those goals. For example—and this is relevant to our study—regulative institutions might encourage formalization, while cognitive and normative institutions expect unregistered businesses. We refer to this instance as formal-informal institutional incongruence\(^1\). As institutions can change, albeit sometimes very slowly (Roland, 2004), formal-informal institutional incongruence is not a permanent state of affairs, and it can dissipate if the formal and informal institutions eventually converge.

Formal-informal institutional incongruence can emerge when governments implement a higher quality of governance to weaken the informal rules of the game and to reduce the size of the informal economy, which occupies a significant proportion of the economy. An incongruent institutional condition such as this hinders opportunity identification and pursuit. Entrepreneurs associate and connect information about the rules of the game to pursue opportunities (Tang, Kaemar, & Busenitz, 2012). In an incongruent environment, while connecting and associating information, entrepreneurs struggle to find opportunities because they must simultaneously match both the informal understandings they share with their social

\(^1\) There also exists another type of formal-informal institutional incongruence. In these rare cases, informal institutions discourage practicing informal businesses, but the quality of governance is so low that it encourages entry into the informal economy. This situation nonetheless also results in an instance of institutional incongruence.
groups and the formal rules in the country. In other words, entrepreneurs struggle in choosing between following informal rules or formal regulations\(^2\). Both of these choices are risky and costly. The former puts the entrepreneurs at risk of being fined or shut down by the authorities, while the latter makes it inefficient and costly for them to do business with their informal social groups. As such, the ambiguity in the formal-informal incongruence causes less opportunity identification and discourages entrepreneurs from pursuing opportunities and thus leads to a decline in opportunity identification and pursuit. Although some studies have argued for developing regulations due to the clarity it brings (e.g., Aparicio et al., 2016; Baumol, Litan, & Schramm, 2007; Dau & Cuervo-Cazurra, 2014), we follow a small portion of the studies (e.g., Kim & Li, 2014b; Portes & Haller, 2010) and question the benefits of developing macrolevel regulative institutions for entrepreneurship, especially under informal cognitive and normative institutions. We claim that in the presence of a large informal economy, ambiguity is rather a result of developing the quality of governance. When the state invests in the quality of governance, it pushes entrepreneurs to formalize their business activities. However, informal institutions respond slowly to changing conditions due to their inherent nature, and that leads to confusion and ambiguity that reduce opportunity identification and pursuit.

In addition to the reduced opportunity identification and pursuit, the opportunity costs of entrepreneurship are also reduced under incongruent institutions in such a manner that predominantly favors necessity entrepreneurship. Particularly, the increasing ability and willingness of the state to formalize employment in a country creates additional obstacles for informal employers to employ workers. Thus, as the opportunities for earning a sufficient income to cover basic needs in the informal sector were already weak for many, the introduction of new formal rules worsens the situation even further. Therefore, more

\(^2\) In the case of formal-informal institutional incongruence discussed in footnote 1, we expect that entrepreneurs would similarly face challenges in opportunity identification and pursuit because of contradicting institutional conditions. In such a case, the primary challenge for entrepreneurs would be how identify and pursue opportunities in the formal economy, in the presence of weak and ineffective governance structures, for which informal institutions do not offer a legitimate alternative. In such a situation, developing higher quality of governance would be the preferred option to resolve the institutional incongruence. Theoretically, growing the informal economy would also resolve the incongruence, however, among its many drawbacks, we hypothesized in section 3.1 that a larger informal economy is harmful to the ratio of opportunity to necessity entrepreneurship.
necessity entrepreneurship can be expected, at least in the short term. This opportunity cost mechanism is similar to that in our first hypothesis but amplified by the formal-informal institutional incongruence: Necessity entrepreneurship becomes more attractive to individuals who seek to meet their basic needs, while entrepreneurial opportunities are difficult to identify and pursue for reaching more ambitious goals. In addition, the institutional processes that tighten informal labor markets (efforts to improve the quality of governance) are different than those that would create new compensatory job opportunities (extending the scope of the formal economy at the expense of the informal economy). Thus, the opportunity cost mechanism prevails, unless the formal and informal institutions eventually become better aligned.

Taken together, improving the quality of governance in a large informal economy adds to the formal-informal institutional incongruence. That, in turn, results in a decline in the ratio of opportunity to necessity entrepreneurship at the aggregate level because it adds to the ambiguity of how entrepreneurs identify and pursue opportunities. Furthermore, it reduces job prospects in the traditional informal economy, resulting in reduced opportunity costs of starting one’s own business. Under the circumstances, entrepreneurs are then more likely to be primarily motivated by necessity. Therefore, the development of governance quality moderates the negative relationship between the size of the informal economy and the opportunity-to-necessity ratio. This reasoning constitutes our second hypothesis:

**Hypothesis 2:** The development of governance quality moderates the relationship between the size of the informal economy and the ratio of opportunity to necessity entrepreneurship: the more developed the quality of governance, the stronger the negative relationship between the size of the informal economy and the ratio of opportunity to necessity entrepreneurship.

4. Research Methods

4.1. Data and Sample

We use a multisource country-level panel dataset to examine the research hypotheses. The key database for our main variables of interest—opportunity and necessity entrepreneurship—is the Global Entrepreneurship Monitor (GEM). Begun in 1999, the GEM
is a global project that runs annual surveys on entrepreneurship in more than 100 countries and regions (Acs, Arenius, Hay, & Minniti, 2004).

Following prior research (Amorós & Stenholm, 2014; Cabrales & Hauk, 2011; Farla et al., 2016; Wang, 2013), we measure the quality of governance using Worldwide Governance Indicators (WGIs). The database emerged as a project for the World Bank in 1996 and spans more than 200 countries (Kaufmann et al., 2011). We use the World Bank’s World Development Indicators (WDIs) as measures of macroeconomic conditions.

Measuring the size of the informal economy in a country is inherently difficult because, by definition, it includes activities that are not formally recorded. A multitude of approaches have been proposed and refined over several decades of research, each with different strengths and weaknesses (cf. Schneider & Buehn, 2018). We adopt the shadow economy estimation approach by Schneider and colleagues (1997, 2002, 2010, 2016) as a proxy for the size of the informal economy. Their approach has been widely adopted in prior research on the size of the informal economy (Andrews, Sánchez, & Johansson, 2011; Bovi & Dell’Anno, 2010; Dreher, Kotsogiannis, & McCorriston, 2009; Enste, 2010; Miller & Kim, 2016) and is based on estimating a latent variable in a multiple-indicator, multiple-cause (MIMIC) model (Hassan & Schneider, 2016). The estimation procedure relies on estimating relative temporal changes in the shadow economy and then extrapolating the size of the shadow economy by calibrating the raw index based on a fixed point of reference. The main strengths of the approach include its high country-year coverage, which increases overlap with the GEM, WGI, and WDI datasets, and its design using the within-country variation as its starting point, which reflects the requirements of estimators that control for country fixed effects. On the other hand, the approach has been particularly criticized for its sensitivity to the selection of calibration values and its broad scope, which may lead to inflated between-country differences (Feige, 2016; Schneider, 2016).

We also examined alternative survey data for the MIMIC dataset: the World Bank Enterprise Survey (WBES) contains one of the largest panel datasets investigating the size of the informal economy (IFC, 2017, pp. 53–58). Unfortunately, this dataset has only modest
overlap with the GEM and WDI datasets. However, comparing the overlapping WBES and MIMIC data does not raise concerns about the applicability of the MIMIC data for the purposes of this study. Consequently, by combining the GEM, MIMIC, WGI, and WDI datasets and requiring two or more observations per country for fixed-effects estimators, we obtain a dataset of 373 country-year observations from 60 countries (2005–2014). The data are limited for earlier years by the availability of relevant GEM data and by the availability of informal economy size data for the later years. A list of the country-years used in the analyses is presented in Table 6 in the appendix.

4.2. Measures

4.2.1. Dependent Variable

The phenomenon of interest in this study is the composition of entrepreneurship—necessity versus opportunity—on the country level. The GEM defines opportunity entrepreneurship as the percentage of individuals in a country involved in entrepreneurial activities who (1) claim to be driven by opportunity as opposed to finding no other option for work and (2) indicate that the main driver for being involved in this opportunity is being independent or increasing their income rather than simply maintaining their income (Singer, Amorós, & Moska, 2014, p. 24). Necessity entrepreneurship, in comparison, is defined as “the percentage of individuals involved in early-stage entrepreneurial activity … who claim to be driven by necessity (having no better choice for work) as opposed to opportunity” ([ibid, p. 24]). The dependent variable in this study is the opportunity entrepreneurship divided by necessity.

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3 Our dataset would, at best, be limited to only 26 country-years from 13 mostly developing countries if we were to replace the MIMIC dataset with WBES data in our fixed-effects time series analyses.

4 The WBES data contain country-year data on the percentage of firms competing against unregistered or informal firms. To compare this data with MIMIC values regarding their use in fixed-effects regression, we first identified country-years in the combined dataset for which WBES data were also available and kept countries that had more than one observation, as required by the within transformation (i.e., for both variables, we subtracted the country-level mean values). We subsequently found a strong within-correlation of 0.75 (N = 18) between the MIMIC values and the WBES data.

5 We further scrutinized our results by applying stricter country-level data availability criteria and obtained qualitatively similar results in all model estimates if we retain only countries with five or more observations in the data set. The main fixed-effects estimates (Model 3) are further robust to requiring a fully balanced panel, which is available for 14 countries, resulting in 140 country-years of data, and corresponds to a 62% reduction in the number of observations from the original data set.
entrepreneurship on the country level. We apply a log transformation for distributional purposes⁶.

4.2.2. Independent Variable

We use the panel data provided by Hassan and Schneider (2016) to capture the size of the informal economy in different countries over time. We adopt a measure based on a MIMIC model that uses tax burden, regulatory burden, unemployment rate (first differenced), and economic freedom (first differenced) as causes (inputs) and GDP growth and currency held by the public (first differenced) as indicators (outcomes)⁷ (Table 3 in Hassan and Schneider [2016, pp. 6–8]). This estimation approach belongs to a broader family of techniques that indirectly estimate the size of an informal economy based on the relationships of adjacent and measurable economic phenomena (see Schneider & Buehn (2018) for a review).

4.2.3. Moderating Variable

To study the effects of institutional incongruence, we need a measure for the quality of governance. The WGIs include six indexes: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. These aggregate indicators are created from several hundred subindexes adopted from different databases. The WGI data are based on interviews that reflect how public, private, and nongovernment organization (NGO) experts perceive governance. In this study, we use an aggregate measure of all WGI indexes (i.e., their sum, \( \alpha = 0.97 \)) as the moderating variable.

4.2.4. Control Variables

Our choice of time-varying control variables is motivated by the existing country-level entrepreneurship literature while considering the MIMIC-based operationalization of the informal economy⁸.

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⁶ This dramatically improves the model fit. The normality of the residual distribution is also improved.
⁷ This estimation variant choice does not include the self-employment rate as a cause in the estimation model, which increases the availability of data. However, Hassan and Schneider’s (2016) estimates of the size of the informal economy do not vary dramatically as a result.
⁸ The use of the MIMIC-based measure implies that if we add each of its components as control variables, the unique variation of the size of the informal economy measure would decrease. On the other hand, two key components of the MIMIC model, the unemployment rate and GDP growth, are common control variables in country-level entrepreneurship research. Upon closer inspection, controlling for unemployment is not a source
We control for per capita GDP (in 2010 USD, thousands; log-transformed) to account for the country’s level of development, which prior research suggests is associated with the nature and type of entrepreneurship (e.g., Amorós et al., 2017) and institutional conditions (e.g., Acemoglu, Johnson, & Robinson, 2001). To capture other general economic and labor market conditions, we control for GDP growth (PPP), the unemployment rate (log-transformed) and inflation (log-transformed) (e.g., Kim & Li, 2014b, 2014a). Openness (foreign trade as a percentage of GDP) and foreign direct investments (FDI) (as a percentage of GDP; log-transformed) control for information flows and additional resources (Anokhin & Wincent, 2012; Kim & Li, 2014a). We also include the official exchange rate (relative changes; log-transformed) to capture the effects of currency fluctuations (Kim & Li, 2014a). Furthermore, we control for the potential size of the domestic market through its population (log-transformed). While often very slow-moving, a larger home market may provide greater economies of scale (cf. Ault & Spicer, 2014), and may shape the nature of entrepreneurial opportunities and institutional conditions. Especially, larger countries may be inherently more difficult to govern than smaller nation states. The aforementioned variables were all obtained from the World Bank’s WDI database.

We also control for the general level of entrepreneurship using the total early-stage entrepreneurial activity (TEA) from GEM (log-transformed). The TEA is operationalized as the percentage of adults aged 18–64 setting up a business or owning–managing a young firm (fewer than 42 months old) (Reynolds et al., 2005), and enables controlling for unobserved institutional and other national conditions that might also be associated with the distribution of entrepreneurial motives. Furthermore, year dummies are applied throughout.

4.3. Analysis Techniques

We rely primarily on fixed-effects regression to test our hypotheses, which are robust to time-invariant unobserved heterogeneity. Among the applicable panel analysis techniques, this

of concern, since the MIMIC specification uses its first difference, and not its level. In addition, unlike the MIMIC-model specification, we adopt the purchasing power parity variant of GDP growth as a control. As an additional check, removing both of these variables from the control variables of our fixed-effects regressions specification does not meaningfully alter the results. This is also the case, if we only include year dummies as control variables. Detailed regression charts are available from the authors.

A Wald test of zero between-effects in Model 3 (p=0.0103) suggests that the assumptions of a random-effects specification would be violated (Wooldridge, 2010, p. 333).
approach maximizes usable data, but it relies on the strict exogeneity assumption for unbiased identification (e.g., Wooldridge, 2010), meaning that it is not a panacea against biases from omitted variables that have within-country variation. However, we attempt to meet the strict exogeneity assumption through our selection of control variables. The independent and moderating variables are mean-centered, and all regressors are lagged by one year throughout. Additionally, we perform robustness tests concerning outliers and alternative dependent variables—namely, perceived opportunities and separate models with necessity and opportunity entrepreneurship as dependent variables.

To increase the robustness, we also employ a difference GMM estimator (Arellano & Bond, 1991). In addition to controlling for time-invariant unobserved heterogeneity, this allows for the use of lagged dependent variables, which may also serve as proxies for various forms of time-variant unobservables. Moreover, in the absence of applicable external instrumental variables, the estimator can utilize lagged regressor values to create internal instruments for the lagged dependent variable and other variables in the model that may be endogenous. However, the number of countries in the data (60) places limitations on the models’ complexity due to instrument proliferation. Hence, we use only the lagged dependent variable and year dummies in addition to the main regression variables in our GMM models (e.g., Acemoglu et al., 2008). We further scrutinize the models by varying the time lags used for the internal instruments (Roodman, 2009a). We apply the forward orthogonal deviations (FOD) transformation instead of first differences to improve data availability due to gaps in the data (Arellano & Bover, 1995). The Windmeijer (2005) finite sample correction is applied to two-step standard error estimates. The independent and moderator variables and their multiplicative interaction term are treated as endogenous, the lagged dependent variable is treated as predetermined, and the time dummies are treated as exogenous (cf. Roodman, 2009b). We also run comparable fixed-effects estimates on the data available for GMM estimation with and without control variables. We carried out our model estimation using Stata SE/14.2 and the xtreg and xtabond2 (Roodman, 2009b, p. 2) commands.

We prefer the difference GMM estimator over the system GMM estimator because the former does not assume that changes in the instrumenting variables are uncorrelated with the fixed effect, i.e., that units are not too far from steady states. We take this conservative approach because the global financial crisis overlaps with our study period.
5. Results

Table 1 provides the descriptive statistics, and Table 2 contains the within-country and zero-order Pearson correlations. Table 2 shows that the log of the opportunity-to-necessity ratio is negatively correlated with the size of the informal economy and unemployment and positively correlated with the quality of governance index and per capita GDP. After removing the country fixed effects by performing the within transformation, these cross-sectional relationships persist qualitatively, and the magnitude of the correlations is generally reduced. This suggests that multicollinearity is not a problem in our analyses.

Table 3 summarizes our primary fixed-effects model estimates for testing the hypotheses. The estimates for Model 2 show a significant negative relationship between the size of the informal economy and the logged opportunity-to-necessity ratio (Model 2: $\beta=-0.0187$, p<0.05). This result provides support for Hypothesis 1. Model 3 tests Hypothesis 2. The coefficient for the interaction term of the quality of governance and the size of the informal economy is significantly negative (Model 3: $\beta=-0.00525$, p<0.01). Thus, Hypothesis 2 also receives support. Figure 1 illustrates the nature of this relationship with the (nontransformed) opportunity-to-necessity values on the y axis as implied by the estimated model coefficients; when the quality of governance is high (+1 SD), moving from a smaller informal economy to a larger one, the opportunity-to-necessity ratio drops dramatically. The drop is much smaller when the governance index is low (-1 SD). In other words, when the quality of governance is high, for a unit increase in the size of the informal economy, the opportunity-to-necessity ratio decreases more than it does in the case of a low quality of governance.

As a robustness check, Table 4 presents difference GMM estimates using lagged regressor values as internal instruments for the lagged dependent variable and other variables in the model that may be endogenous due to unobserved time-variant confounders. We apply two-year lags to instrument for endogenous variables (the informal economy, quality of governance, and their interaction term) and a one-year lag to instrument for the lagged dependent variable (e.g., Heid, Langer, & Larch, 2012; Roodman, 2009b) in Models 6 and 7. For GMM Models 4 and 5, we also use instruments from an additional year lag in an attempt to improve the estimation efficiency. AR tests suggest that Models 4-7 are correctly
specified. Furthermore, Hansen’s J statistics are within acceptable limits (Roodman, 2009a). Violations of difference GMM assumptions are not detected in any model.

In these extended tests, neither Model 4 nor 6 provides clear support for H1. However, Models 5 and 7 continue to show a significant negative relationship between the interaction of the quality of governance and the size of the informal economy and the log of the ratio of opportunity to necessity entrepreneurship (Model 5: $\beta=-0.00550$, p<0.05; Model 7: $\beta=-0.00608$, p<0.05), which broadens the support for Hypothesis 2. We conducted several additional tests to explore occasions of inconsistent GMM support for H1, which enabled us to draw important conclusions about the relationships in the data. Fixed-effects estimates with the same observations as in the GMM models are presented in Table 4 (Models 8–11) to examine the impact of differences in the samples. Despite being only weakly significant, the estimates for the informal economy’s direct effect are still negative in the majority of models. Furthermore, the qualitative similarities between Models 8-9 and Models 10-11 suggest that removing control variables – a necessary cost to find viable GMM model specifications – does not cause relevant qualitative differences in the fixed-effects estimates. Next, we examined the marginal effect of the size of the informal economy as a function of the moderator variable in Figure 2. This reveals that at low levels of the quality of governance, the estimate for the marginal effect of the size of the informal economy turns positive, though only at a low level of statistical significance. The estimated slopes imply that for some countries, the opportunity-to-necessity ratio is higher if the informal economy is larger.

---

11 The FOD transformation used in the difference GMM estimates (Models 4-7) makes use of the last value in the panel to transform away the fixed effect but does not use the last value directly for coefficient estimates. However, only the latter observations are used to report the N in the model, which causes a difference of 60 observations compared to Models 8-11.

12 According to the FE estimates (Model 3), there are 25 country-years that meet this requirement; RUS(8), IRN(6), ECU(3), PAK(2), NGA(2), DZA(2) and AGO(2). According to difference GMM estimates, there are 53 country-years: RUS(7), CHN(6), COL(6), IRN(5), BIH(5), ARG(4), PER(4), THA(3), ECU(3), UGA(2), GTM(2), PAK(1), NGA(1), DZA(1), AGO(1), DOM(1) and SRB(1). Please refer to Table 6 regarding all country-years used in the estimation.
Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Country-Year a</th>
<th>Max</th>
<th>Country-Year a</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Opportunity-to-Necessity Ratio</td>
<td>3.335</td>
<td>3.305</td>
<td>0.345</td>
<td>BIH-2012</td>
<td>22.890</td>
<td>NOR-2006</td>
</tr>
<tr>
<td>2 Size of Informal Economy</td>
<td>27.060</td>
<td>12.710</td>
<td>8.290</td>
<td>USA-2013</td>
<td>73.330</td>
<td>GTM-2010</td>
</tr>
<tr>
<td>3 Quality of Governance</td>
<td>3.943</td>
<td>5.003</td>
<td>-7.340</td>
<td>IRN-2010</td>
<td>11.910</td>
<td>FIN-2005</td>
</tr>
<tr>
<td>4 Population (millions)</td>
<td>78.770</td>
<td>212.000</td>
<td>0.292</td>
<td>ISL-2005</td>
<td>1,357.000</td>
<td>CHN-2014</td>
</tr>
<tr>
<td>5 Per capita GDP (th. USD)</td>
<td>26.360</td>
<td>20.960</td>
<td>0.598</td>
<td>UGA-2010</td>
<td>91.590</td>
<td>NOR-2007</td>
</tr>
<tr>
<td>6 GDP (PPP) Growth</td>
<td>0.0260</td>
<td>0.0372</td>
<td>-0.143</td>
<td>LVA-2009</td>
<td>0.127</td>
<td>CHN-2007</td>
</tr>
<tr>
<td>7 Official Exchange Rate b</td>
<td>-0.000155</td>
<td>0.0822</td>
<td>-0.171</td>
<td>BRA-2005</td>
<td>0.512</td>
<td>IRN-2013</td>
</tr>
<tr>
<td>9 TEA</td>
<td>9.890</td>
<td>6.526</td>
<td>1.480</td>
<td>HUN-2005</td>
<td>40.080</td>
<td>NGA-2013</td>
</tr>
<tr>
<td>10 Openness</td>
<td>82.940</td>
<td>53.180</td>
<td>22.110</td>
<td>BRA-2009</td>
<td>422.300</td>
<td>SGP-2006</td>
</tr>
<tr>
<td>12 Unemployment rate</td>
<td>8.445</td>
<td>5.216</td>
<td>0.700</td>
<td>THA-2012</td>
<td>28.100</td>
<td>BIH-2012</td>
</tr>
</tbody>
</table>

Notes: Number of observations = 373; Number of countries: 60; Descriptive statistics are reported for untransformed variables.  
ISO alpha-3 (3166-1) codes used to refer to specific countries for the minimum and maximum observations for each variable; Relative change.
Table 2: Correlation Matrix and intra-class correlations (ICC) \(^a\)

<table>
<thead>
<tr>
<th>Variables</th>
<th>ICC</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Opportunity-to-Necessity Ratio (^b)</td>
<td>0.76</td>
<td>-0.25</td>
<td>0.25</td>
<td>-0.01</td>
<td>0.24</td>
<td>0.25</td>
<td>-0.04</td>
<td>0.08</td>
<td>-0.03</td>
<td>-0.21</td>
<td>0.18</td>
<td>-0.38</td>
<td></td>
</tr>
<tr>
<td>2 Size of Informal Economy</td>
<td>0.96</td>
<td>-0.39</td>
<td>-0.34</td>
<td>0.21</td>
<td>0.04</td>
<td>-0.51</td>
<td>0.23</td>
<td>-0.16</td>
<td>0.10</td>
<td>-0.10</td>
<td>-0.15</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>3 Quality of Governance</td>
<td>0.99</td>
<td>0.67</td>
<td>-0.61</td>
<td>-0.06</td>
<td>0.18</td>
<td>0.32</td>
<td>-0.22</td>
<td>0.03</td>
<td>-0.01</td>
<td>-0.24</td>
<td>0.16</td>
<td>-0.39</td>
<td></td>
</tr>
<tr>
<td>4 Population (millions) (^b)</td>
<td>1.00</td>
<td>-0.32</td>
<td>-0.04</td>
<td>-0.36</td>
<td>0.46</td>
<td>-0.19</td>
<td>0.20</td>
<td>0.06</td>
<td>0.20</td>
<td>-0.05</td>
<td>-0.02</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>5 Per capita GDP (th. USD) (^b)</td>
<td>1.00</td>
<td>0.67</td>
<td>-0.62</td>
<td>0.89</td>
<td>-0.24</td>
<td>0.01</td>
<td>0.04</td>
<td>0.23</td>
<td>0.27</td>
<td>-0.09</td>
<td>0.08</td>
<td>-0.45</td>
<td></td>
</tr>
<tr>
<td>6 GDP (PPP) Growth</td>
<td>0.21</td>
<td>-0.05</td>
<td>0.04</td>
<td>-0.18</td>
<td>0.12</td>
<td>-0.27</td>
<td>-0.48</td>
<td>0.16</td>
<td>-0.13</td>
<td>0.08</td>
<td>0.29</td>
<td>-0.28</td>
<td></td>
</tr>
<tr>
<td>7 Official Exchange Rate (^b)</td>
<td>0.02</td>
<td>-0.13</td>
<td>0.07</td>
<td>-0.17</td>
<td>-0.01</td>
<td>-0.15</td>
<td>-0.35</td>
<td>-0.03</td>
<td>0.12</td>
<td>0.04</td>
<td>-0.20</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>8 Inflation (Customer Price) (^b)</td>
<td>0.61</td>
<td>-0.30</td>
<td>0.35</td>
<td>-0.54</td>
<td>0.03</td>
<td>-0.53</td>
<td>0.21</td>
<td>0.20</td>
<td>0.04</td>
<td>0.02</td>
<td>0.12</td>
<td>-0.32</td>
<td></td>
</tr>
<tr>
<td>9 TEA (^b)</td>
<td>0.83</td>
<td>-0.27</td>
<td>0.37</td>
<td>-0.49</td>
<td>0.08</td>
<td>-0.58</td>
<td>0.21</td>
<td>0.13</td>
<td>0.40</td>
<td>0.22</td>
<td>-0.09</td>
<td>-0.01</td>
<td></td>
</tr>
<tr>
<td>10 Openness</td>
<td>0.98</td>
<td>0.23</td>
<td>-0.16</td>
<td>0.31</td>
<td>-0.48</td>
<td>0.21</td>
<td>0.03</td>
<td>-0.04</td>
<td>-0.12</td>
<td>-0.15</td>
<td>0.03</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>11 FDI (^b)</td>
<td>0.35</td>
<td>0.14</td>
<td>0.00</td>
<td>0.11</td>
<td>-0.15</td>
<td>0.02</td>
<td>0.27</td>
<td>-0.17</td>
<td>0.08</td>
<td>0.06</td>
<td>0.30</td>
<td>-0.20</td>
<td></td>
</tr>
<tr>
<td>12 Unemployment rate (^b)</td>
<td>0.83</td>
<td>-0.47</td>
<td>-0.01</td>
<td>-0.16</td>
<td>-0.13</td>
<td>-0.16</td>
<td>-0.18</td>
<td>0.12</td>
<td>0.07</td>
<td>-0.08</td>
<td>-0.13</td>
<td>-0.11</td>
<td></td>
</tr>
</tbody>
</table>

Notes: The lower triangle contains zero-order Pearson correlations and the upper triangle (italicized) correlations are within-country.

\(^a\) ICCs computed with Stata’s ‘loneway’ command; \(^b\) Log transformations applied, \(\pm \log(|x|+1):\) positive unless \(x\) is negative; \(^c\) Relative change.
### Table 3: Fixed Effects Estimates with the Opportunity-to-Necessity Ratio (logged) as Dependent

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1</strong> Size of Informal Economy</td>
<td>-0.0187*</td>
<td>-0.0412***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00789)</td>
<td>(0.0104)</td>
<td></td>
</tr>
<tr>
<td>Quality of Governance</td>
<td>-0.0123</td>
<td>0.0109</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0512)</td>
<td>(0.0485)</td>
<td></td>
</tr>
<tr>
<td><strong>H2</strong> Size of Informal Economy x Quality of Governance</td>
<td></td>
<td>-0.00525**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.00159)</td>
<td></td>
</tr>
<tr>
<td>Population (^{a})</td>
<td>-0.318</td>
<td>-0.518</td>
<td>-0.379</td>
</tr>
<tr>
<td></td>
<td>(1.113)</td>
<td>(1.0780)</td>
<td>(1.0430)</td>
</tr>
<tr>
<td>Per Capita GDP (^{a})</td>
<td>0.781*</td>
<td>0.756*</td>
<td>0.650(\dagger)</td>
</tr>
<tr>
<td></td>
<td>(0.353)</td>
<td>(0.364)</td>
<td>(0.357)</td>
</tr>
<tr>
<td>GDP (PPP) Growth</td>
<td>1.290(\dagger)</td>
<td>0.668</td>
<td>0.374</td>
</tr>
<tr>
<td></td>
<td>(0.659)</td>
<td>(0.721)</td>
<td>(0.768)</td>
</tr>
<tr>
<td>Official Exchange Rate (Relative Change) (^{a})</td>
<td>0.506*</td>
<td>0.547**</td>
<td>0.619**</td>
</tr>
<tr>
<td></td>
<td>(0.207)</td>
<td>(0.199)</td>
<td>(0.202)</td>
</tr>
<tr>
<td>Inflation Rate (Customer Price) (^{a})</td>
<td>-0.0302</td>
<td>-0.0392</td>
<td>-0.0372</td>
</tr>
<tr>
<td></td>
<td>(0.0355)</td>
<td>(0.0348)</td>
<td>(0.0315)</td>
</tr>
<tr>
<td>TEA (^{a})</td>
<td>-0.0264</td>
<td>-0.0253</td>
<td>-0.0360</td>
</tr>
<tr>
<td></td>
<td>(0.0921)</td>
<td>(0.0880)</td>
<td>(0.0861)</td>
</tr>
<tr>
<td>Openness</td>
<td>-0.00379</td>
<td>-0.00525(\dagger)</td>
<td>-0.00645(\dagger)</td>
</tr>
<tr>
<td></td>
<td>(0.00292)</td>
<td>(0.00318)</td>
<td>(0.00331)</td>
</tr>
<tr>
<td>FDI (^{a})</td>
<td>0.0319</td>
<td>0.0364</td>
<td>0.0296</td>
</tr>
<tr>
<td></td>
<td>(0.0267)</td>
<td>(0.0270)</td>
<td>(0.0256)</td>
</tr>
<tr>
<td>Unemployment Rate (^{a})</td>
<td>-0.347*</td>
<td>-0.331*</td>
<td>-0.238</td>
</tr>
<tr>
<td></td>
<td>(0.150)</td>
<td>(0.144)</td>
<td>(0.147)</td>
</tr>
<tr>
<td>Year Dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Constant</td>
<td>1.179***</td>
<td>1.183***</td>
<td>1.00900***</td>
</tr>
<tr>
<td></td>
<td>(0.0520)</td>
<td>(0.0507)</td>
<td>(0.0612)</td>
</tr>
</tbody>
</table>

| Number of Observations                                       | 373           | 373           | 373           |
| Countries                                                    | 60            | 60            | 60            |
| R-Squared (within)                                           | 0.240         | 0.257         | 0.286         |
| Adjusted R-Squared (within)                                  | 0.202         | 0.215         | 0.244         |

Standard errors clustered by country in parentheses. Constant included in all models.

*** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1; two-tailed t-tests.

\(^{a}\) log-transformed: \(\pm \log(|x|+1)\); positive unless \(x\) is negative.
Figure 1: Interaction effect of Size of Informal Economy and Quality of Governance based on fixed-effects estimates (Table 3, Model 3) with 95% confidence intervals.

Figure 2: Marginal effect of the Size of Informal Economy on the log-transformed opportunity-to-necessity ratio as a function of Quality of Governance with 95% confidence intervals. Left: Based on fixed effects estimation (Table 3, Model 3) Right: Based on difference GMM estimation (Table 4, Model 5).
Table 4: Difference GMM Estimates with the Opportunity-to-Necessity Ratio (Log-Transformed) as Dependent Variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Difference-GMM</th>
<th>Difference-GMM</th>
<th>FE without controls</th>
<th>FE with controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 4</td>
<td>Model 5</td>
<td>Model 6</td>
<td>Model 7</td>
</tr>
<tr>
<td>Lagged Opportunity-to-Necessity Ratio</td>
<td>0.332*</td>
<td>0.144</td>
<td>0.303</td>
<td>0.212</td>
</tr>
<tr>
<td></td>
<td>(0.149)</td>
<td>(0.134)</td>
<td>(0.211)</td>
<td>(0.149)</td>
</tr>
<tr>
<td>H1 Size of Informal Economy</td>
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<td>-0.0300*</td>
<td>0.0826†</td>
<td>-0.00452</td>
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<tr>
<td></td>
<td>(0.0162)</td>
<td>(0.0141)</td>
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<td>(0.0366)</td>
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<tr>
<td>Quality of Governance</td>
<td>0.140</td>
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<td>0.0898</td>
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<tr>
<td></td>
<td>(0.0971)</td>
<td>(0.0798)</td>
<td>(0.181)</td>
<td>(0.130)</td>
</tr>
<tr>
<td>H2 Size of Informal Economy x Quality of Governance</td>
<td>-0.00550*</td>
<td>-0.00608*</td>
<td>-0.00628**</td>
<td>-0.00404*</td>
</tr>
<tr>
<td></td>
<td>(0.00224)</td>
<td>(0.00294)</td>
<td>(0.00199)</td>
<td>(0.00154)</td>
</tr>
<tr>
<td>Year dummies</td>
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<td>Yes</td>
<td>Yes</td>
</tr>
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<td>Additional controls</td>
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<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Constant</td>
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<td>1.017***</td>
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<tr>
<td></td>
<td>(0.0451)</td>
<td>(0.0869)</td>
<td>(0.0690)</td>
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<tr>
<td>F-statistic</td>
<td>3.0960**</td>
<td>4.489***</td>
<td>2.247*</td>
<td>6.0820***</td>
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<tr>
<td>Hansen J-test (p-value)</td>
<td>[0.393]</td>
<td>[0.892]</td>
<td>[0.226]</td>
<td>[0.0752]</td>
</tr>
<tr>
<td>Number of instruments</td>
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<td>71</td>
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<td>40</td>
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<tr>
<td>Arellano-Bond AR(1) (p-value)</td>
<td>[0.00212]</td>
<td>[0.00570]</td>
<td>[0.0193]</td>
<td>[0.00275]</td>
</tr>
<tr>
<td>Arellano-Bond AR(2) (p-value)</td>
<td>[0.403]</td>
<td>[0.830]</td>
<td>[0.487]</td>
<td>[0.614]</td>
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<tr>
<td>Arellano-Bond AR(3) (p-value)</td>
<td>[0.205]</td>
<td>[0.124]</td>
<td></td>
<td></td>
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</tbody>
</table>

Two-step Windmeijer-corrected standard errors in parentheses in GMM models. Standard errors clustered by country in parentheses in FE models.

*** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1; two-tailed t-tests. log-transformed: ±log(|x|+1); positive unless x is negative.
The relationship between the size of the informal economy and the dependent variable turns negative and statistically significant at values higher than approximately one standard deviation below the mean of the moderator according to the main FE model (Model 3) and around the mean according to the difference GMM estimates (Model 5)\textsuperscript{13}. Therefore, we conclude that H1 is in any case partially supported and that the nature of the partial support is, after all, rather consistent.

Table 5 in the Appendix summarizes additional post hoc robustness checks. First, after removing the cases with the extreme ±2.5% residuals in the primary models, we find similar results supporting the hypotheses in Models 12 and 13. Furthermore, we use perceived opportunities from the GEM as an alternative dependent variable in Models 14 and 15 and again obtain qualitatively similar results compared to the fixed-effects estimates in Table 3. We also examine opportunity and necessity entrepreneurship as separate dependent variables to probe how these components drive the effects observed when combined into one index. Despite the expected lower levels of statistical significance, we obtain results that are consistent with our theorizing\textsuperscript{14}.

6. Discussion

6.1. Implications for Theory and the Literature

Institutional economics concern institutions that involve explicit, sociopolitical and governmental regulations aiming at constraining and incentivizing organizational actions. Another stream of institutional research focuses on implicit cognitive and normative institutions that emerge from internalized understandings of the world and are based upon historical culture, traditions, and behavioral norms (North, 1990; Powell & DiMaggio, 1991;}

\textsuperscript{13}The functional form of the marginal effect of the informal economy in the reduced instruments GMM model (Model 7) is qualitatively similar to that of Model 5, albeit with broader confidence intervals and an intersection point closer to the mean.

\textsuperscript{14}Specifically, we observe that the effects on necessity entrepreneurship (logged) mirror our theorizing (Model 19), but those of opportunity entrepreneurship only do so at a low level of statistical significance (Model 17), because the interaction term is in the predicted direction only at the p=0.107 level (one-tailed test). Yet, the model fits suggest that jointly considering opportunity and necessity entrepreneurship in the form of their (logged) ratio provides a better empirical explanation than its numerator or denominator alone. Specifically, we systematically observe higher improvements in model fits (adjusted within R-squared) when we (i) change the dependent variable from necessity entrepreneurship (logged) to the opportunity-to-necessity ratio (logged) and (ii) when we compare the opportunity-to-necessity ratio (logged) and necessity entrepreneurship (logged) models with respect to improvements in the model fits when moving from respective control models to full interaction effect models. Additional details are available from the authors.
Roberts, 2008; Scott, 1995). The entrepreneurship literature accordingly has focused on the effects of either formal regulations (e.g., Autio & Fu, 2015) or cultural factors (e.g., Liñán & Fernandez-Serrano, 2014). In recent years, however, several researchers have called for studying the combined effects of both formal and informal institutions on entrepreneurship (e.g., Kim & Li, 2014).

In this paper, we studied how informal institutions associated with a large informal economy negatively impact the ratio of opportunity to necessity entrepreneurship. Second, we studied the negative effects of improving regulative institutions in presence of a large informal economy on the ratio. This was motivated by prior research, which suggests that a higher opportunity to necessity entrepreneurship ratio stimulates innovation, structural transformation, and economic development (Gries & Naudé, 2010).

In essence, we first argued that it is harder to identify opportunities in a large informal economy due to restrictions on resources and that this negatively influences the opportunity-to-necessity ratio. Due to a lack of formal networks that provide knowledge-based resources, such as those formed around universities and innovative corporations (cf. Arenius & De Clercq, 2005; O’shea et al., 2005), a large informal economy restricts access to high-quality human resources at the aggregate level. Additionally, acquiring formal financial resources is harder when the businesses are not formal (Webb et al., 2013). We further theorized that a large informal economy exhibits lower opportunity costs for entrepreneurship. That is, employment as the alternative to entrepreneurship does not provide sufficient income to cover for the basic needs of a significant portion of the population. The implicit rules of the game often motivate informal employers not to offer high incomes and proper working conditions. Institutional factors that restrict opportunity identification and pursuit and decrease the opportunity costs of entrepreneurship, we hypothesized, lead to a lower opportunity-to-necessity ratio.

Using panel data of 60 countries, we found partial yet consistent support for this first hypothesis. Specifically, fixed effects and GMM estimation revealed evidence that the size of the informal economy is negatively associated with the opportunity-to-necessity ratio for countries with moderate- or high-quality governance. For countries with low-quality governance (see footnote 13), it appears that the informal economy may act to fill the void
of formal institutions by providing satisfactory but lower-quality resources, such as informal business networks, to fuel opportunity identification and pursuit (Puffer, McCarthy, & Boisot, 2010). Nonetheless, our results suggest that one needs to take into account the quality of governance to determine if the informal economy is harmful or beneficial to the ratio of opportunity to necessity entrepreneurship in a country. This was what we did in the next part of our paper.

Our second hypothesis challenges the view that developing regulative institutions provides clarity and is always beneficial for opportunity identification and pursuit (Aparicio et al., 2016; Baumol et al., 2007; Dau & Cuervo-Cazurra, 2014). In line with research such as that by Kim and Li (2014), we argue that the benefits of improving the quality of governance rely on the state of cognitive and normative institutions. We studied the combined effects of formal and informal institutions and acknowledged scholars such as Cullen et al. (2014) to theorize a situation where regulative institutions restrict what is encouraged by informal institutions. We argued that this formal-informal institutional incongruence, primarily brought about by seeking to improve the quality of governance in presence of a large informal economy, is detrimental. The introduced formal rules of the game are not consistent with the informal ones, and therefore entrepreneurs find it challenging to connect and associate information in order to identify opportunities (Tang et al., 2012). It would be costly and risky to pursue opportunities because following either the formal or informal rules of the game comes at a cost. In addition, increasing the quality of governance in a large informal economy further decreases the opportunity cost of entrepreneurship. That is, the availability of alternatives to entrepreneurship, i.e., employment, declines further. That is because the increasing ability and willingness of the state to formalize employment adds to obstacles for informal employers to employ workers. Thus, the opportunities for earning sufficient income to cover one's basic needs in the informal sector decreases further by the introduction of new formal rules. To meet their basic needs, individuals turn to necessity entrepreneurship, while entrepreneurial opportunities are difficult to identify and pursue. Thus, the opportunity cost mechanism prevails in the short term until the formal and informal institutions eventually converge. Accordingly, our results
using both the main FE models and difference GMM provide full support for the claim that formal-informal institutional incongruence leads to a lower opportunity-to-necessity ratio.

We believe that the above results constitute a platform for generating new discussions about the role of regulation and regulating informal economies beyond what has been the case in previous research. Similar to scholars such as Bruton et al. (2010), Kim and Li (2014), and Stephan et al. (2015), we believe that implementing formal regulative institutions for entrepreneurship should be studied together with informal institutions. In this paper, we build upon this approach and studied how the informal institutions related to a large informal economy could influence entrepreneurship, rather than merely looking at the problem from the perspective of institutional economics. We particularly theorized that institutional conditions could explain the ratio of opportunity to necessity entrepreneurship. We argued that institutional conditions could affect the ratio on two bases: they affect opportunity identification and pursuit as well as the opportunity cost of entrepreneurship. Our results leave larger theoretical implications about the boundaries of formal regulation for entrepreneurship when informal business is a legitimate practice. While in many cases it is apparent that regulating informal cognitions that provide legitimacy to violate law and regulatory frameworks do indeed have positive consequences that develop countries and economies (Aparicio et al., 2016; Dau & Cuervo-Cazurra, 2014; Valdez & Richardson, 2013), the results here provide an alternative view and outline that such regulation can also have negative consequences. Our theory was based upon formal and regulative institutions, as manifested by the quality of governance that measures the ability and willingness of the state to effectively establish formal rules of the game (cf. Ault & Spicer, 2014; Charron et al., 2014). Scholars such as Portes and Haller (2010) and Dreher and Gassebne (2013) have raised concerns of negative side effects of improving regulative institutions. Specifically, Kim and Li (2014) proposed that regulative institutions do not always promote supportive conditions that foster business creation; rather, there might be cognitive and normative institutions under which regulations can be counterproductive. Our study extends this set of ideas on the negative side effects of strong regulative institutions through pointing out their downsides on the ratio of opportunity to necessity entrepreneurship in the presence of large informal economies. We furthermore built upon this set of ideas by further developing the
notion of institutional incongruence (Cullen et al., 2014). We concluded that implementing high-quality governance could be detrimental if it does not conform to the informal rules of the game. This is a significant problem because the regulative institutions at the macrolevel and the cognitive and normative institutions related to the social groups that surround individuals are systematically inconsistent in countries with large informal economies. While not depicted in previous studies, our theoretical framework implies institutional mechanisms by which improved regulative institutions in a large informal economy that cognitively legitimize the informal sector could negatively affect the ratio of opportunity to necessity entrepreneurship, which has important implications for economic development.

6.2. Implications for Policy and Practice

The results of our study reveal that in many cases, the size of the informal economy is negatively associated with the ratio of opportunity to necessity entrepreneurship. Nonetheless, in those cases where the quality of governance is low, this may not apply. This implies that the size of the informal economy alone is not a sufficient factor for determining whether the outcomes for the type composition of entrepreneurship are beneficial or harmful. Rather, policymakers should also consider the quality of governance. Thus, to increase the ratio of opportunity to necessity entrepreneurship, policymakers should take into account the quality of governance as well as the informal business culture while deciding on appropriate policy actions.

We also found that improving the quality of governance in the presence of a large informal economy decreases the ratio of opportunity to necessity entrepreneurship. Thus, the question remains: if countries aim to decrease the size of their informal economy, how can they minimize the negative consequences in practice? Our theory and empirical analyses suggest that institutional incongruence causes a relative decline in the ratio of opportunity to necessity entrepreneurship because it adds ambiguity, suggesting that the duration of institutional incongruence should be minimized to reduce its harmful effects on entrepreneurship. In the long-term, cognitive and normative institutions could change to follow the formal rules of the game, but in the short term, the institutional incongruence damages entrepreneurship if the policy is only to improve the quality of governance. Instead, in addition to targeting formal institutions, changes in the size of the informal economy
should be pursued through targeting the cognitive and normative institutions of the individuals operating in larger informal economies, especially those cognitive and normative institutions rooted in entrepreneurs’ social groups (Kim et al., 2016). Although we are pioneering the empirical evidence for it, we are not alone in advancing such a claim. Sutter et al. (2017), for instance, assert that NGOs can play a role in shaping cognitive shared understandings in a large informal economy until operating formally becomes the preferred option. Through work such as this, cognitive and normative institutions, rather than only regulative institutions, can drive change in the size of the informal economy without generating high institutional incongruence. In this way, the size of the informal economy might be reduced without much negative impact on the ratio of opportunity to necessity entrepreneurship.

6.3. Study Limitations and Future Research

Although we believe we present a robust case for causality, due to our inability to identify applicable external instrumental variables, the robustness of our evidence for the causality of the interaction effect (both for and against) rests strongly on internal instruments, which are known to have limitations (Roodman, 2009a). Furthermore, using time lags is unlikely to provide a strong remedy for simultaneity concerns in our fixed-effects models. As such, even though we believe we present convincing results about causality, we believe that future research should investigate these limitations.

Furthermore, the entrepreneurship-related measures of the GEM also have limitations. One notable limitation is the lower degree of comparability of the entrepreneurship measures between developed and developing countries (Acs, 2006). In developing countries, for example, Acs (2006) notes that entrepreneurs are more likely to falsely report or identify themselves as opportunity entrepreneurs. Nevertheless, it should be noted that we controlled for time-invariant systematic measurement errors by having country-level fixed effects. This helps reduce concerns about these measurements.

15 While this method is common in the literature (e.g., Meek, Pacheco, & York, 2010; Sarkar, Rufin, & Haughton, 2018; Urbano & Aparicio, 2016), it relies on a strict exogeneity assumption for identification. Furthermore, despite common claims to the contrary, it has been recently underscored that lagging variables does not provide an effective remedy for endogeneity concerns emerging from simultaneity (e.g., Bellemare et al., 2017). Therefore, the sources of the limitations we underscore here are not unique to this study but are common to a broader research stream on entrepreneurship at the country level.
Moreover, obtaining data on the size of the informal economy is inherently difficult. Currently, indirect approaches based on macroeconomic data are the only means available to estimate the size of the informal economy in a multicountry panel with sufficient overlap with GEM data. These approaches, including MIMIC, are not without their limitations (cf. Schneider & Buehn, 2018; Feige & Urban, 2008; Putniņš & Sauka, 2015). Nevertheless, as we noted, fixed-effects estimation provides robustness to some of these limitations, and triangulation with other data sources did not raise significant concerns.

In addition, even though measuring cognitive and normative institutions is not entirely possible (Deephouse & Suchman, 2008; Roberts, 2008), we assumed that the size of the informal economy is a proxy of how expected and accepted informal business is in a country and followed the existing literature in assuming that informal businesses reflect the cognitive and normative institutions surrounding entrepreneurs (Baum & Powell, 1995; Hannan & Carroll, 1995). While in this paper, we assume the size of an informal economy to be a manifestation of cognitive and normative institutions, future research could examine how other measures of informal institutions in a large informal economy shape the ratio of opportunity to necessity entrepreneurship. Furthermore, informal business practices are institutionalized within social groups surrounding individual entrepreneurs within an informal economy, which makes them slow to change. Yet, any profound progress in reducing the size of the informal economy requires the deinstitutionalization (cf. Oliver, 1992) of such practices, which is a topic that remains poorly understood.

We examined the effects of the development of regulative institutions in a broad sense. Chen (2012) lists several policies for tackling the informal sector, including simplifying registration procedures, introducing clear bankruptcy rules, creating a formal system to provide social security, and introducing a minimum wage. The entrepreneurship-related consequences of each of these policies, among others, in a large informal economy could be a topic of future research.

Institutional incongruence could also be a foundation for future research in the field of entrepreneurship. Scholars can empirically test other instances of institutional incongruence and investigate their consequences. In other words, it can be examined how any aspect of cognitive or normative institutions contradicts another aspect of regulative institutions to
create opposing values and how such incongruence leads to different outcomes. For instance, in a country where cognitive and normative institutions accept and expect power distance, regulative institutions that encourage less power distance—say, by introducing high progressive taxes—could lead to another form of institutional incongruence. Such incongruence could lead to different country-level outcomes on entrepreneurship. This example, among the other possible forms of institutional incongruence in the field of entrepreneurship, can be another topic of future research.

Finally, future research could continue reconciling the perspectives of formal and informal institutions. Cognitive and normative institutions, which are embodied in the relationships among social groups surrounding entrepreneurs (Aldrich & Fiol, 1994; Kim et al., 2016), have different aspects, including, for example, the extent of trust (Kim & Li, 2014b), extent of hierarchy, extent of self-regard, and extent of informal economic activities. As we argued in this paper, whether the development of macrolevel regulations positively affects entrepreneurship depends on cognitive and normative institutional settings emerging from social groups. In that regard, future research could consider cognitive and normative institutions to explain the mechanisms through which macrolevel regulation affects entrepreneurship.

6.4. Conclusion
The size of the informal economy and regulations are related to both formal and informal institutions and are complex and intertwined. Therefore, pursuing change in any of them requires great care. This study indicates that governmental efforts to improve the quality of governance must take into account the cognitive and normative institutions related to the size of the informal economy. Such efforts might support rules of the game that contradict rules that are accepted and followed by individuals. While improving the quality of governance in the presence of a large informal economy, this contradiction leads to a further decline in the ratio of opportunity to necessity entrepreneurship, as this paper has demonstrated. We conclude that researchers and policymakers should be aware of the unintended results of regulations on entrepreneurship and consider reducing the institutional incongruence using alternative approaches, such as supporting values of formality in the social groups surrounding entrepreneurs.
References


Appendix

Table 5: Additional Robustness Checks, Fixed-effects Estimates

<table>
<thead>
<tr>
<th>Variable</th>
<th>DV: Opp-to-Nec Ratio ±2.5% Outliers Removed</th>
<th>DV: Perceived Opportunities</th>
<th>DV: Opportunity Entrepreneurship a</th>
<th>DV: Necessity Entrepreneurship a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 12</td>
<td>Model 13</td>
<td>Model 14</td>
<td>Model 15</td>
</tr>
<tr>
<td>H1 Size of Informal Economy</td>
<td>-0.0216** (0.00769)</td>
<td>-0.0423*** (0.0114)</td>
<td>-0.778** (0.284)</td>
<td>-1.554*** (0.300)</td>
</tr>
<tr>
<td>Quality of Governance</td>
<td>-0.00450 (0.0509)</td>
<td>0.00977 (0.0489)</td>
<td>0.648 (1.820)</td>
<td>1.443 (1.687)</td>
</tr>
<tr>
<td>H2 Size of Informal Economy x Quality of Governance</td>
<td>-0.00494** (0.00166)</td>
<td>-0.180** (0.0602)</td>
<td>-0.00198 (0.00157)</td>
<td>0.00416* (0.00174)</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Number of Observations</td>
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<td>60</td>
</tr>
<tr>
<td>R-Squared (within)</td>
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<td>0.323</td>
<td>0.271</td>
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</tr>
<tr>
<td>Adjusted R-Squared (within)</td>
<td>0.255</td>
<td>0.280</td>
<td>0.229</td>
<td>0.269</td>
</tr>
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</table>

Standard errors clustered by country in parentheses. Constant included in all models.

a Log transformations applied; ±log(|x|+1): positive unless x is negative.

***p < 0.001, **p < 0.01, *p < 0.05, †p < 0.1; two-tailed t-tests.
Table 6: Country-Years Used in Estimation

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<td>ISO alpha-3 (3166-1) codes used to denote countries. X = used in both difference GMM (Models 1-3) and fixed effects estimation; x = additionally used in fixed effects estimation (Models 4-7); 0 = not used in analyses. Years correspond to the year of the dependent variable. Estimation with GMM also uses (1) the last data point of each panel for eliminating fixed effects and (2) at least one-year lagged observations for instruments, which we do not report in the table.</td>
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How Perceived Opportunities Influence the Way Institutions Affect Startup Rates

Abstract

Our knowledge about the role of perceived opportunities at country level in how institutions affect entrepreneurship has remained limited. Assuming changes in economic efficiency as type of opportunities instituted in market structure, we are interested to study their impacts on startup rates. Considering the moderating role of institutions, we use a panel data of 29 countries between years 2006 to 2014 to perform a mediated moderation analysis and find an important role for perceived opportunities, which implies that researchers and policymakers should consider how institutions affect rate of perceived opportunities.

1. Introduction

Previous studies have shown the importance of institutions for entrepreneurship (Bruton, Ahlstrom, & Li, 2010; Urbano & Alvarez, 2014; Webb, Bruton, Tihanyi, & Ireland, 2013). Institutional factors create the environment in which entrepreneurial opportunities and activities can be defined, generated, and also limited (Manolova, Eunni, & Gyoshev, 2008; Stenholm, Acs, & Wuebker, 2013).

Despite the knowledge about the importance of institutions for startup rates, it is often neglected that entrepreneurship consists of a process that includes opportunity discovery. Entrepreneurs, at some stage before starting their business, come up with an idea (Short, Ketchen Jr, Shook, & Ireland, 2010). They first have the seeds of the idea, and then, though time, they might develop the idea to a clear grasp of the market, product conception, strategies, how to start the venture, etc. (Dimov, 2011). This phase is an important stage in entrepreneurship and several entrepreneurship scholars have studied role of this stage of opportunities at individual level whether may it be called the stage of perceiving, identifying, discovering, or creating opportunities (Alvarez & Barney, 2007; Ardichvili, Cardozo, & Ray, 2003; Gaglio & Katz, 2001). Yet when the concern is startup rates and institutions at country
level, role of rate of perceived opportunities has received less attention. This is a significant shortcoming since, as theorized and empirically tested in this article, rate of perceived opportunity at country level influences how institutions affect startup rates. Filling this gap adds to our understanding of the process through which institutions affect startup rates and provides practical implications.

Thus, the objective of this paper is to study the role of perceived opportunities in determining how institutions in an economy that provides opportunities for increasing its efficiency promote startup rates. Our aim is to investigate the process through which a change in economic efficiency affect startup rates. Specifically, our focus is to examine the role of rate of perceived opportunities at country level as well as quality of institutions.

This approach contributes to entrepreneurship literature by highlighting the importance of perceiving opportunities in determining how institutions affect startup rates and calling attention for future research on how to encourage rate of perceived opportunities. It provides insights for policymaking purposes by recommending development of institutions that promote perceiving opportunities. The paper additionally presents an empirical examination of the relationships among different phases of opportunities.

2. Opportunities and Institutions

2.1. Entrepreneurial Opportunities

Entrepreneurial opportunities has been a center of attention to entrepreneurship scholars as early as and even before the publication of the article by Shane and Venkataraman (2000). Authors such as Davidsson (2015) and Dimov (2011) summarize the findings of previous authors on opportunities. They distinguish three phases of opportunities: opportunities as instituted in market structure (external enablers), opportunities as happening (new venture
ideas), and opportunities as expressed in actions (opportunity confidence). The first phase implies that opportunities arise from changes in economic and market structure, such as technological change. Changes in economic efficiency belong to this group and can be a source of opportunity at country level (Anokhin & Wincent, 2014). A change in efficiency means that economic arrangements alter such that it makes it possible to produce more output using less input. Such changes can create opportunities for potential entrepreneurs as they can take advantage of new possibilities. The second phase suggests that opportunities, at some points, exists in entrepreneurs imaginations (Short et al., 2010); they are merely ideas about existence of an opportunity to start a business, and through time, they can be developed to become a more accurate plan of starting a venture. When entrepreneurs perceive opportunities to start new businesses, they experience this phase of opportunities. In the last phase, entrepreneurs are confident enough actually to take actions to exploit the opportunity. Startup rates indicate intensity of this phase of opportunities at country level.

2.2. Regulative Institutions

Institutions are the rules of the game in a society and economy (North, 1990, p. 3). Scott (1995)' framework for institutions involves an important pillar called regulative institutions. Government is a main definer of institution as it can rewards favored practices and punish violations of regulations (Bresser & Millonig, 2003). Quality of governance and regulative institutions play an important role in entrepreneurship (Acs, Desai, & Hessels, 2008). Specially, institutions can be a determinant of how entrepreneurs use knowledge to discover and understand opportunities (Erikson & Korsgaard, 2016).
2.3. The Hypothesized Model

Different phases of opportunities are related. As more opportunities are created because of changes in the economy and market structure—in this article because of a change in economic efficiency, more potential entrepreneurs could perceive opportunities. In a similar way, as more individuals perceive opportunities to start businesses, startup rates can increase. Nevertheless, an increase in economic efficiency does not necessarily lead to higher startup rates. If regulative institutions are not developed to support an environment suitable to help perceiving opportunities and practicing entrepreneurship, the increase in economic efficiency might not increase startup rates (Kshetri & Dholakia, 2011). Thus, we argue, regulative institutions positively moderate the relationship between changes in economic efficiency and startup rates.

H1: Development of regulative institutions positively moderates the relationship between changes in economic efficiency and startup rates.

Additionally, this moderating role can be less influential once perceived opportunities is considered. First, regulative institutions positively moderate how efficiency change influence perceived opportunities because potential entrepreneurs can more easily connect and associate with information under a clear and developed institutions (Tang, Kacmar, & Busenitz, 2012). Moreover, as they find it less risky and less costly under developed institutions, they judge the opportunities as first person opportunities—opportunities that can be pursued by themselves—rather than third person opportunities—those that might be pursued by others but not entrepreneurs themselves (McMullen & Shepherd, 2006). Second, once opportunities are already perceived, they more smoothly turn into real businesses, and thus the moderating role of regulative institutions becomes less sound.
H2: Perceived opportunities mediate the moderating role of regulative institutions in the relationship between changes in economic efficiency and startup rates.

Figure 1: The hypothesized model

3. Data and Method

3.1. Data and Sample
Our dataset comprises of three databases: World Development Indicators (WDIs), Worldwide Governance Indicators (WGIs), and Global Entrepreneurship Monitor (GEM). The dataset includes those available observations related to 29 countries between years 2006 to 2014 that can be used in fixed effect regression analysis. Due to availability, the sample includes a set of European, Latin American, and Asian countries.

3.2. Measures
We aim to examine the impacts of different factors on startup rates in different countries. Specifically, we are interested in those opportunities towards which, surely, actions have been taken. For that purpose, we find the item of New Business Density from WDIs a good measure to act as dependent variable. It measures new business registrations per 1000 people of 15 to 64 years old.
The independent variable in this study is changes in economic efficiency. A change in economic efficiency means same amount of total labor and capital in a country can produce different levels of GDP. To calculate such changes, we follow Anokhin, Wincent, and Autio (2011)’s method. They apply Data Envelopment Analysis (DEA) to calculate opportunities at country level. We use inverted efficiency changes out of DEA as a measure of increased opportunities for improving economic efficiency.

Perceived opportunities from GEM serves as the mediating variable. Perceived opportunities is defined as percentage of population between ages “18-64 who see good opportunities to start a firm in the area where they live” (Bosma & Levie, 2009, p. 61). The moderating variable, regulative institutions, is measured by aggregate governance indicators of WGIs. Regulative institutions manifest themselves in governance qualities, therefore, governance indicators are appropriate measures of regulative institutions (Amorós & Stenholm, 2014). Governance indicators of WGIs include six different indexes of voice and accountability, political stability, governance effectiveness, regulatory quality, rule of law, and control of corruption. Since these indexes are closely related, an aggregate measure of the indicators may be used (Kaufmann, Kraay, & Mastruzzi, 2009; Langbein & Knack, 2010). As such, we choose sum of the six governance indicators as a measure for development of regulative institutions.

We control for several macroeconomic and entrepreneurial factors. First, we control for size of the economy by population (log-transformed). We also control for overall economic conditions by including per capita GDP (PPP). Then we control for business environment by openness (trade as a percentage of GDP; log-transformed) and FDI (as a percentage of GDP). We, also, take into account factors that can influence entrepreneurship
and opportunities including fear of failure rate and entrepreneurship as desired career. Education is also controlled for (enrolment to secondary level). Finally, we applied year dummies. Except for the two entrepreneurship related factors that are borrowed from GEM, data on other control variables are collected from WDIs.

3.3. Methods of analysis

We follow recommendations of Muller, Judd, and Yzerbyt (2005) to perform a mediated moderation analysis. In order to do that, we run several fixed effect (within) regression models. The mediator acts as a dependent variable in some of the regression models. Models 1-5 have New Business Density as their dependent variable. The dependent variable for models 6-8 is perceived opportunities. All variables, but the dependent variables, are centered in order to make moderating analysis possible. We, furthermore, lagged the independent, moderating, and control variables for two years and the mediating variable for one year (Kenny, 2015; Kraemer, Wilson, Fairburn, & Agras, 2002).

4. Results

Table 1 presents descriptive statistics and (within) correlation matrix. Table 2 summarizes regression estimates. Figures 2 and 3 illustrate linear predictions of those interaction terms that help understanding the hypotheses.

Control variables are omitted in Table 2. Among them, the coefficients of FDI (in models 1-5) and Openness (in models 4-5) are positive and modestly (p<0.5 or p<0.10) significant in the models with New Business Density as dependent variable. In models 6 and 8, the coefficient of per cap GDP (PPP) is positive and modestly significant.

Table 2 supports the hypothesized mediated moderation by showing the four necessary conditions (Muller et al., 2005). First, in Model 3, the coefficient of the interaction of
efficiency change and aggregate governance index is significantly positive ($\beta=11.56; p<0.05$). Second, coefficient of the same interaction is significantly positive ($\beta=116.0; p<0.05$) in Model 8, where the dependent variable is perceived opportunities. Third, the coefficient of perceived opportunities in Model 5 is significantly positive ($\beta=0.0408; p<0.01$). Finally, comparing to Model 3, in Model 5 the coefficient of the interaction between efficiency change and aggregate governance index is insignificant and smaller in value. By not being significant, the coefficient shows that the moderation is fully mediated.

The surprising result is the negative significant direct impact of changes in economic efficiency on startup rates. However, after removing ±2.5% outliers from the observations, there was no such direct impacts. Removing the outliers acted as a post-hoc validating test, after which all H1 related p-values decreased and the forth condition remained held.
Table 1: Descriptive Statistics and Correlation Matrix (within)

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<td>2 Economic Efficiency Change</td>
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<td>3 Perceived Opportunities (%)</td>
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<td>4 Aggregate Governance Index</td>
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<td>5 Population a (millions)</td>
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<td>6 Per cap GDP (PPP)</td>
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<td>7 FDI (%)</td>
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<td>8 Openness a (%)</td>
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<td>9 Fear of Failure Rate</td>
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<td>10 Entrepreneurship as Desirable Career</td>
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<td>11 Enrolment in Secondary Education (millions)</td>
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a Log-transformed
b Untransformed variables
c Within transformed variables
Number of observations: 164; Number of countries: 29
Table 2: FE Regression Models

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</tr>
<tr>
<td>F</td>
<td>3.472**</td>
<td>3.564**</td>
<td>2.877**</td>
<td>4.656***</td>
<td>6.697***</td>
<td>2185***</td>
<td>161.1***</td>
<td>34.40***</td>
</tr>
<tr>
<td>Cohen’s f² (within)</td>
<td>0.035</td>
<td>0.041</td>
<td>0.122</td>
<td>0.010</td>
<td>0.006</td>
<td>0.072</td>
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</tbody>
</table>

Standard errors clustered by country in parentheses.

*** p<0.001, ** p<0.01, * p<0.05, † p<0.1

a The constant and control variables are included in the models but omitted due to space limit. Control variables include Population (log-transformed), per cap GDP (PPP), FDI, Openness (log-transformed), Fear of failure rate, Entrepreneurship as desired career choice, enrolment in secondary education, and year dummies

Number of observations: 164; Number of countries: 29
Figure 2: Margins plot of Model 8

Figure 3: Margins plot of Models 3 and 5
Figures 2 and 3 further illustrate the moderation and mediated moderation effects. Figure 2 shows how interaction between efficiency change and aggregate governance index affects perceived opportunities (Model 8). Figure 3 summarizes the impact of the interaction in Models 3 and 5 where the dependent variable is new business density. Comparing the two plots in figure 3 provides evidence for how the moderation is mediated in a way that the interaction in Model 5 is not significant.

5. Discussion and conclusion

Aim of this study was to examine role of perceiving opportunities at country level while studying how institutions affect startup rates. We studied how perceived opportunities mediate the moderating role of regulative institutions in the relationship between countries’ efficiency change and startup rates.

Scholars such as Dimov (2011) and Davidsson (2015) classify opportunities into three groups. In this study, we presumed there exists a relationship among instances of the three types of opportunities. A change in economic efficiency is an instance of opportunities as external enablers (Anokhin & Wincent, 2014). Perceived opportunities are a measure of ideas (Short et al., 2010). Finally, startup rates are a measure of opportunities as expressed in action. Prior research has shown the importance of regulative institutions in the process of entrepreneurship (Bruton et al., 2010). Regulative institutions can encourage or discourage entrepreneurship. They can also affect how opportunities are perceived since under high quality regulative institutions, entrepreneurs can connect the dots of information and also can judge opportunities as first person opportunities rather than third person ones (McMullen & Shepherd, 2006; Tang et al., 2012).
Our findings document that perceived opportunities fully mediate the moderating role of quality of governance in the relationship between changes in economic efficiency and startup rates. Additionally, although the results, surprisingly, show a negative direct relationship between changes in economic efficiency and startup rates, in accordance with prior research (Kshetri & Dholakia, 2011), we found that regulative institutions positively moderate the relationship. This result might be due to the fact that most countries included in our analysis are at developing stage. One should note that the surprising result disappears once the residual outliers are taken out from observations. Future research could further investigate this finding.

Our results highlight the importance of perceived opportunities and the way they influence the effects of regulative institutions on startup rates. High quality regulative institutions jointly with opportunities—that are a result of changes in economic efficiency—enhance startup rates. However, once perceived opportunities are taken into consideration, the effect disappears. Instead, regulative institutions and changes in economic efficiency jointly affect perceived opportunities, and perceived opportunities, in turn, affect startup rates.

Although the role of regulative institutions in entrepreneurship has been previously studied, the relationship among three phases of opportunities and the importance if the middle phase, i.e. perceiving opportunities, had not received enough attention. We found that perceived opportunities mediate the moderating role of regulative institutions. This finding shows how crucial it is for future research to focus on perceiving opportunities and its antecedents at country level. How different specific institutional settings affect perceived opportunities, for example, can be a subject of future research. The finding has implications
for policy makers too by suggesting that regulative institutions do not directly affect startups, but the process happens through perceiving opportunities at country level. Regulators, thus, should pay attention to this stage and, by providing right regulative institutional environment, encourage potential entrepreneurs to perceive opportunities.

References


Entrepreneurial Opportunity Exploitation under Different Institutional Settings

The popularity of entrepreneurship as a practice is matched by scholars’ increasing attention to the phenomenon. In the management literature, entrepreneurship has become a field in its own right. Several scholars have argued that the right types of entrepreneurship, such as opportunity entrepreneurship, are an important driver of economic development and growth through employment, innovation, and structural transformation. Thus, it is unsurprising that finding ways to encourage entrepreneurship, especially the preferred types, is of interest to researchers and policymakers alike. In order to do so, they need to understand why the incidence of entrepreneurship is different from one country to another, and in that respect, country-level factors are determining the rate of entrepreneurship. These factors create the environment in which entrepreneurial opportunities and activities can be defined, generated, and also limited. Surprisingly, however, our understanding of the ways in which these national and institutional environments are fertile or fatal for entrepreneurship is limited, and study results on the benefits of various aspects of institutions to entrepreneurship continue to be debated.

The overall objective of this thesis and the cases presented herein is to investigate how institutions and institutional factors affect opportunity exploitation at country level. We acknowledge that both institutional settings and the process of opportunity exploitation are complex phenomena. To address the research objective, this thesis builds on two co-authored research articles and one sole-authored.

The methodological approach of the current work is nomothetic and quantitative. Moderation analysis at country level is the main approach applied in all the articles. As a result, we examined regression models that include interaction terms. In the articles, we perform fixed effect regression analyses. To be able to do the analyses, we utilize data from Adult Population Surveys of Global Entrepreneurship Monitor (GEM). Previously a challenge in studying country-level entrepreneurship, institutions, and policymaking has been the lack of data. In recent years, the rise of GEM as harmonized and internationally comparable database on entrepreneurial activities has created the opportunity more effectively to conduct research in those areas. This thesis fills two specific gaps. First, our articles examined under-investigated institutional settings, in order to stimulate future research. This furthered our understanding, recognizing several theoretical concepts such as institutional incongruence. Additionally, we conclude that different aspects of institutions should not be considered and studied in isolation. Second, instead of studying direct impacts on startup rates, we examined how opportunities are discovered and exploited at country level. This is important because opportunity discovery is a major step in the entrepreneurship process, and we learned more about economic development through entrepreneurship, following the research stating that opportunity entrepreneurship is the preferred type of entrepreneurship for that purpose.