

Institutions and entrepreneurship: the mediating role of corruption

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Abstract

Purpose – The purpose of this paper is to examine the mediating role of corruption in the relationship between entrepreneurship and institutional quality in a sample of 90 countries from all around the world.

Design/methodology/approach – The data were collected from the Global Entrepreneurship Monitor, which developed a model where Corruption Perception Index as a proxy for corruption mediates the relationship between the variable rule of law as a proxy for institutional quality and opportunity entrepreneurship as a proxy for productive entrepreneurship. Correlation, Baron and Kenny approach (causal steps approach) and PROCESS Macro (normal test theory) developed by Hayes were used to find out the direct and indirect effects of institutional quality between corruption and entrepreneurship.

Findings – The bootstrap mediation results indicated that institutional quality was a significant predictor of corruption and corruption was a significant predictor of entrepreneurship. These findings support the mediation hypothesis. In addition, findings showed that there is a negative relation between corruption and productive entrepreneurship and a positive relation between institutional quality and productive entrepreneurship.

Research limitations/implications – The current study only considered the single proxy for institutional quality, i.e. rule of law; therefore, some other proxies for institutional quality such as government effectiveness and doing business can be used for future studies. Moreover, the proposed model does not control for the country differences like GDP or development stages of countries.

Practical implications – The findings of this study indicate that the total association between institutional quality and entrepreneurship is not only direct but also that rule of law contributes to levels of entrepreneurship through reduced levels of corruption. As a result, countries with higher levels of rule of law tended to experience corruption at lower levels, which in turn contributed to the emergence of increased levels of entrepreneurship. Furthermore, these results may be beneficial for organizations fighting against corruption, because entrepreneurial activity can be add to the group of economical drivers constrained by corruption. It is also beneficial for policy makers who focus on promoting entrepreneurship, since one way to increase entrepreneurial activity is to lower the existing corruption level.

Originality/value – The results indicated that the direct effect of institutional quality on the entrepreneurship remained significant when controlling for corruption, thus suggesting partial mediation. In other words, corruption only mediates part of the effect of institutional quality on entrepreneurship, that is, the intervention (institutional quality) has some residual direct effect even after the mediator (corruption) was introduced into the model.

Keywords Institutional quality, Entrepreneurship, Corruption, Mediation effect

Paper type Research paper

1. Introduction

The significance of entrepreneurship has been recognized all around the world and has become a primary focus for researchers and policy makers (Thurik, 2009). Entrepreneurial opportunities and activities differ significantly across societies. These differences are an important factor in the varying levels of wealth and prosperity across societies and nations (see van Praag and Versloot, 2007). One explanation for these differences in entrepreneurship focuses on the institutional context in which individuals act (Boettke and Coyne, 2009).

However, economic and entrepreneurial activities are falling short of expectations in some developing countries that have all the premises needed for steady growth (Munemo, 2011). This can be partially explained by the dysfunctionality of official institutions and inefficiency of resources used. Corruption is seen as one of the main causes for these issues, which prevents countries from reaching efficiency and setting up a proper institutional system. Borrowing from several studies (Mo, 2001; Philp, 2002; Helmke and Levitsky, 2004; Huffer, 2005; Rodriguez *et al.*, 2006), we can define corruption as a set of unwritten and illegal norms and rules that regulate interaction between public



servants and the general public and are enforced through informal channels outside of the officially sanctioned ones.

A growing body of research revealed negative effects of corruption on a variety of economic indicators including investment and foreign direct investment (Habib and Zurawicki, 2002; Mauro, 1995; Tanzi and Davoodi, 1998), productivity (Lambsdorff, 2003; Rivera-Batiz, 2002), the borrowing cost for governments and firms (Ciocchini *et al.*, 2003), income and wealth equality (Jong-Sung and Khagram, 2005), human capital development (Rose-Ackerman, 1999, 2004, 2008), exports (Zelekha and Sharabi, 2012), per capita GDP and economic growth (Kaufmann *et al.*, 2009; Kaufmann and Kraay, 2003; Mauro, 1995).

Prior empirical studies have addressed the relationship between institutional quality and corruption (Broadman and Recanatini, 2001; Aidt, 2009; Tonoyan *et al.*, 2010). However, some of contributions have addressed only the nature and extent of the relationship between entrepreneurship and corruption. While most of the concerned publications have shown that higher levels of corruption limit the expansion of entrepreneurship (see Murphy *et al.*, 1993; Baumol, 1990; Desai *et al.*, 2010; Sanders and Weitzel, 2010), some have shown the opposite effect according to the “grease the wheels” hypothesis (see Huntington, 1968; Leff, 1964; Leys, 1965). Moreover, several studies have been considering the existence of a *U-shaped* relationship between the two sets of variables (Álvarez and Urbano, 2011). In their study, Álvarez and Urbano (2011) examine the influence of environmental factors on entrepreneurship; the results show that factors like political instability, corruption control, and role models affect entrepreneurship. In fact, there is a *U-shaped* relationship between political stability, which is mainly affected by corruption, and entrepreneurship. Nevertheless, most of these results show that institutional quality turns out to be an important part in understanding the relation between corruption and productive entrepreneurship. This fact leads to the idea that corruption violates the quality of institutions and negatively affects productive entrepreneurship.

Consequently, analyzing the above studies, we can notice that the results are mixed. Most of the studies used direct relationships to confirm the impact of institutional quality on entrepreneurship. Some of them have proved the significant impact of institutional quality on entrepreneurship (Baumol, 1990; Kreft and Sobel, 2005; Nyström, 2008; Parker, 2009; Wiseman and Young, 2013), while others have shown insignificant impact of institutional quality on entrepreneurship in a direct relationship (Hartog *et al.*, 2010). The insignificant direct relationship of the variables and the importance of institutional quality-corruption entrepreneurship nexus push us to think about the indirect and mediating relationship, which is the main goal of the current study. In addition, while prior research focused primarily to determine if there is a relationship between any pair of these three variables, the primary concern of the current study is to fill the gap and examine the relation among these three variables through incorporating indirect relationships of corruption between institutional quality and entrepreneurship. Thus, in this study, mediation bootstrap analysis is performed to test whether corruption mediates the relationship between institutional quality and productive entrepreneurship.

The remaining of the paper study has been divided into seven sections. Section 2 discusses the literature of entrepreneurship and its relevance to corruption and institutional quality, while the third one introduces the empirical method applied and the data used. Section 4 focuses on research methodology. The remaining sections are devoted to the practical implication, conclusion and limitations of this paper.

2. Literature review

2.1 *Entrepreneurship and corruption*

Several theoretical explanations for the relationship between corruption and entrepreneurship exist (Avnimelech *et al.*, 2014; Baumol, 1990; Boudreaux, 2014;

Desai *et al.*, 2003; Driouchi and Gamar, 2016; Ovaska and Sobel, 2005; Farzana *et al.*, 2014; Ihugba *et al.*, 2013; Ngunjiri, 2010; Palifka and Bonnie, 2006; Poprawe, 2015; Tonoyan, 2005). The literature suggests that the pursuit of entrepreneurial opportunities depends on the proportion of the created value that entrepreneurs are able to capture, meaning that the more they can capture, the more they can reinvest in the company growth. Ngunjiri (2010) claims that many projects have been aborted because of corruption. Entrepreneurship is an important component for economic growth. However, entrepreneurship is subject to many factors like the cultural and social ones affected by corruption. This creates a negative impact on entrepreneurship. Nevertheless, in the case of corruption, entrepreneurs face uncertainty from those engaged in their value chain. In addition, with the improper enforcement of law, it becomes risky to rely on official contracts. Because of that, individuals who have the capabilities and willingness to become entrepreneurs may value these opportunity costs in favor of another less risky option such as wage-work (Anokhin and Schulze, 2009). Driouchi and Gamar (2016) investigate the links between Global Entrepreneurship Development Index (GEDI) and Corruption Perception Index (CPI) using data on world countries included in the GEDI. Results show consistently the positive effect of corruption[1] (CPI grade is reversed, means that lower values imply higher level of corruption) on GEDI and thus the positive relationship between entrepreneurship and corruption. Poprawe (2015) studies the effect corruption has on the tourism sector. The results showed that it negatively affects this sector and thus the whole economy. The study uses data from 100 countries over 16 years and revealed that as the CPI increases (decrease in corruption), there is an increase in the tourism inflow by approximately 2 to 7 percent. This implies that the reduction of corruption leads to an increase of entrepreneurship in the tourism sector. Dreher and Gassebner (2013) use data from 43 countries (highly regulated economies) to test the impact of corruption on entrepreneurship. It showed that corruption has a positive impact on entrepreneurship and eases the creation of enterprises.

Khan and Toufique (1995) argued that corruption does have positive effects on entrepreneurship. Taslim (1994) also argued that corruption actually increased entrepreneurship since entrepreneurs have often sought out corrupt transactions as cost-reducing strategies. Moreover, Nathaniel Leff (1964) launched an inquiry into the possibility that corruption may be a positive phenomenon under some circumstances.

Palifka and Bonnie (2006) links the economic growth to entrepreneurship prosperity. Entrepreneurship is subject to many social, psychological and economic factors that may be affected by corruption. The governmental institutions are affected by corruption in terms of judiciary system or taxes, which discourage entrepreneurial initiatives and investment. This clearly explains that corruption has a negative effect on entrepreneurship. Tonoyan (2005) claims that in an emerging economy, trust has a positive impact on corruption and increases the entrepreneurial initiatives and their involvement in corruption activities. When the generalized trust is low, entrepreneurs develop particularized trust that involves them in corruption activities.

Corruption also creates certain constraints for innovation and investment activity. It happens due to the imperfection of financial markets, the selection of less efficient projects by bribed officials and intentional delays (Mahagaonkar, 2008). Because of these issues, increasing transaction costs limit the scope and scale of trade and thus impede productivity (Anokhin and Schulze, 2009). As innovations and investments are inseparable parts of entrepreneurship, these corollaries may play a destructive role for entrepreneurship and everything that it later affects.

2.2 Institutional quality and corruption

One of the intersection points of corruption and entrepreneurship are legal institutions. Formal institutions are the regularities that shape the life of individuals. They are a formally

accepted set of regularities and certain rules that are implemented to define the legal setup of a specific country. The literature is scarce on the investigation of corruption and institutional quality. Nevertheless, some recent studies have evaluated the effect of formal institutions' constraints on corruption, while other studies have focused on the relation between transaction costs and the enforcement of deals that involve bribery (Tonoyan *et al.*, 2010). The overall results of such investigations have shown that the initial quality of institutions is important for determining corruption, and that better quality of formal institutions reduces the level of corrupt activities. However, other findings show that the relation between legal institutions and corruption is ambiguous (Dreher *et al.*, 2009). In this study, we can therefore conclude that the high quality of institutions is an effective tool for fighting against corruption; nevertheless, it is still hard to understand the relationship between both.

Other findings (Broadman and Recanatini, 2001) show that a well-organized market system with transparent laws and rules, a properly functioning accountability system and a fair environment for rivalry reduce the incentives for corrupt activities. They also suggest that without a transparent financial system, barriers to entry and exit of a company (competitor) to an industry have tightened business environment for the real sector, what eventually increases incentives for bribery. It is therefore concluded that corruption violates the functioning of legal institutions, and in order to reduce incentives for illegal actions, policy makers have to create effective reforms that encourage the proper functioning of legal institutions (Broadman and Recanatini, 2001). This again supports the idea that the quality of institutions has to be boosted up in order to decrease corruption. By combining the above-stated view with the information from the previous section (i.e. eventually corruption violates institutional quality that are essential for government improvements), the idea was established that corruption violates the quality of legal institutions and therefore can be eradicated by increasing their quality. This implies that there could be double-way causality, meaning that the higher quality of institutions negatively affects the level of corruption, whereas the higher level of corruption negatively affects the quality of institutions. Therefore, the first hypothesis is as follows:

- H1. There is a negative association between the level of corruption and productive entrepreneurial activity.

2.3 Institutional quality and entrepreneurship

The contribution of William Baumol, who first published his theory of "productive and unproductive entrepreneurship" in 1990, is significant because it fundamentally shifts the focus of academic inquiry toward the role of institutional quality in affecting entrepreneurship.

As stated by Douglass North (1995), "the agent of change is the individual entrepreneur responding to the incentives embodied in the institutional framework" (p. 83). Thus, the institutions themselves influence the level and type of entrepreneurship in a given place and time.

Because of this note, there is an extensive literature examining the relationship between institutional quality and entrepreneurship (Baumol, 1990; Bjørnskov and Foss, 2008; Kreft and Sobel, 2005; Nyström, 2008; Parker, 2009; Sobel, 2008; Sobel *et al.*, 2007; Wiseman and Young, 2013). These papers use measures of economic freedom as a proxy for institutional quality. According to Parker (2009), it is found that protected property rights make entrepreneurship in general more attractive and as a result foster innovations. Abiding by the legal system encourages planning, co-ordination and acquisition of resources. In some countries, there are no institutions that are responsible for supervising free rivalry and maintaining property rights and that can guarantee just resolution of official disputes. In this case, entrepreneurs who eventually decide to take risk might

redirect their entrepreneurial spirit and effort to rent-seeking activities. By doing that, entrepreneurs can obtain private benefits at the expense of other individuals and will eventually affect the overall social prosperity (Parker, 2009).

By evaluating Baumol's (1990) research, it is found that the quality of institutions is strongly correlated with the overall entrepreneurial productivity, and it supports the idea that the quality of institutions contributes to income and wealth through productive entrepreneurship. According to Baumol (1990), in order for the state to grow richer, more productive rather than unproductive entrepreneurship is needed for the economy. In this case, there is a parallel between productive entrepreneurship and opportunity entrepreneurship because they have similar characteristics. A way to promote productive entrepreneurship is to improve the framework and quality of institutions (Sobel, 2008). One more important finding suggests that because of the violated institutional system, growth aspirations of entrepreneurs are constrained due to low level of power of the law. As a result, it becomes a threatening factor for becoming an entrepreneur (Estrin *et al.*, 2013). Moreover, Sambharya and Musteen (2014) imply that the cognitive factors like culture are important factors that influence the entrepreneurial activity. Thus, based on the above literature, we came up with the following hypothesis:

- H2. There is a positive association between the quality of institutions and productive entrepreneurial activity.

2.4 Institutional quality, entrepreneurship and corruption

Some of the authors have investigated the links between institutional quality, entrepreneurship and corruption. Avnimelech *et al.* (2014) examine the link between corruption and productive entrepreneurship and the participation of the institutional characteristics of a country. The results indicate that countries with high level of corruption have low levels of productivity and that the negative impact of corruption is more significant in the developed countries and depends on the country's economic characteristics. In his paper, Dheer (2016) uses data from 42 countries to investigate the factors affecting the total entrepreneurial activity (TEA). The author asserts that cultural and institutional factors like corruption and education factors affect the entrepreneurship initiatives over the countries. Anokhin and Schulze (2009) encourage the efforts of countries to control and reduce corruption. The authors use data from 64 countries to investigate the link between corruption, innovation and entrepreneurship. The increase in the reliability on enforcement of the laws guarantees a fair market and trade rules and a strict coordination of the economy. The results show that a better control of corruption participates in the increase of innovation and entrepreneurship. Vidović (2014/2015) implies that the state has a major role in promoting entrepreneurship. The enforcement of good institutional laws to prevent corruption is important to increase the level of trust, which facilitates the economic growth. The paper asserts that a better control of corruption will drive innovation and entrepreneurship growth. Wiseman (2015) measures the link between institutional qualities measured using corruption, shadow economy size and entrepreneurship. The results imply that corruption affects the shadow economy size, creating a negative relationship with entrepreneurship. The results indicate that there is evidence that corruption negatively affects the development of entrepreneurship. Szyliowicz and Wadhwani (2007) used a panel data from 175 countries to study the link between entrepreneurship, corruption and the institutional environment. The authors estimate that this relationship is complicated as it is positive. The authors claim that corruption positively affects entrepreneurship as it allows access to some markets that have been blocked and are difficult to access for entrepreneurs. Festus *et al.* (2014) study the relationship between entrepreneurship, corruption and the challenges that enterprises face in Nigeria. Corruption is the main factor that inhibited the

creation of enterprises in the rural or urban areas of Nigeria. Corruption has many forms and uses the institutional infrastructure. The paper claims that entrepreneurship is a major indicator of development. The results showed that entrepreneurship is subject to many factors affected by corruption that negatively decreases the entrepreneurial initiatives.

In this study, it was clearly seen that institutional quality plays an important role in shaping both corruption and entrepreneurship. However, the relation between corruption and institutional quality and entrepreneurship and institutional quality is very complex. In spite of the fact that there is some evidence that entrepreneurship can affect institutional quality in certain cases, it is generally the other way around. Institutional quality creates the environment for entrepreneurs and shapes the rules of the game, whereas entrepreneurs adapt to these rules, and it can slightly affect them back. In turn, corruption is not one of the rules set by institutional quality. It is rather a self-appearing phenomenon that represents social perceptions of the law and eventually violates the initial functioning and legitimacy of an already existing institutional quality.

As this study has concluded, corruption violates the functioning of institutional quality, while low quality of institutions has a negative effect on entrepreneurship. This means that in the relationship between institutional quality and entrepreneurship, corruption appears to be in between. Therefore, the third hypothesis proposed as follows:

H3. Corruption mediates the relation between institutional quality and entrepreneurship.

3. Research model

Figure 1 presents the proposed research model for the current study with the main objective, i.e. in order to test mediation effect, this paper uses bootstrapping method (Preacher and Hayes, 2004; Preacher *et al.*, 2007). Figure 1 captures the relationship between all variables in the proposed research model.

3.1 Bootstrapping method

Bootstrapping is becoming the most popular and powerful method of testing mediations because this technique detects the skew in the sampling distribution of the mediated effect. As recommended in the literature (MacKinnon *et al.*, 2004; Shrout and Bolger, 2002), a bootstrap procedure is incorporated in the current study's computations to account for the small sample size and non-normal data distribution. In addition, the Sobel test for mediation analysis is very conservative (MacKinnon *et al.*, 1995), and so it has very low power. The main reason for the test being conservative is that the sampling distribution of ab is

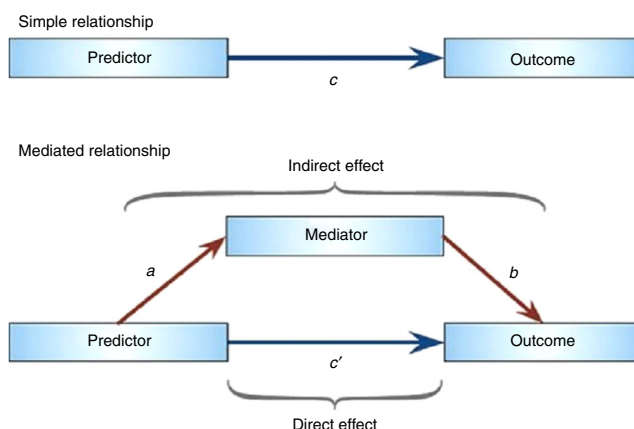


Figure 1.
Diagram of a basic
mediation model

highly skewed. If ab is positive, there is positive skew with many small estimates of ab and few very large ones. Because the Sobel test uses a normal approximation, which presumes a symmetric distribution, it falsely presumes symmetry, which leads to a conservative test.

In order to test mediation effect, this paper uses bootstrapping method (Preacher and Hayes, 2004; Preacher *et al.*, 2007). Bootstrapping involves repeatedly randomly sampling observations with replacement from the data set to compute the desired statistic in each resample. The idea in mediation analysis[2] is that some of the effect of the independent variable, the predictor, is transmitted to the dependent variable, the outcome, through the mediator variable. In addition, some of the effect of the predictor passes directly to the outcome. The portion of the effect of the predictor that passes through the mediator is the indirect effect.

4. Research methodology

4.1 Population and sample

The database used in the current paper is freely accessible online from anywhere and by anybody in the world. In addition, the data were in an Excel sheet format and easily can be reformed to SPSS format and suitable for analysis. We use survey data for entrepreneurship collected by Global Entrepreneurship Monitor (GEM)[3]. GEM is a research program that started in 1998 and that annually collects cross-national harmonized data on entrepreneurship. GEM surveys offer several advantages for our work. First, it reports harmonized data on entrepreneurship across many countries. This is very important since we can use the inclusion of all countries to test the hypothesis in this paper; moreover, there are many different definitions of entrepreneurship both within and across countries, and it is critical to be able to make consistent comparisons (Blanchflower, 2004; Evans and Jovanovic, 1989; Hurst and Lusardi, 2004; Gentry and Hubbard, 2000). To have a balanced panel of data, we had limited the data used to years that are covered in all data sets; we have ended up with the data consisting of 90 countries (see Table I) from all around the world and have tracked information from 2009 until 2014. The data set was obtained from multiple sources like the GEM, World Bank and Transparency International.

4.2 Measurements and scale

In the current study, opportunity entrepreneurship as the dependent variable decided to take a share of total early stage entrepreneurial activity[4] (TEA). It is essential to investigate the different types of entrepreneurship because different entrepreneurial motives have different

Table I.
Countries used in
the analysis

Algeria	Chile	Germany	Kosovo	Pakistan	Spain
Angola	China	Ghana	Latvia	Panama	Suriname
Argentina	Colombia	Greece	Lebanon	Peru	Sweden
Australia	Costa Rica	Guatemala	Libya	Philippines	Switzerland
Austria	Croatia	Hungary	Lithuania	Poland	Taiwan, China
Barbados	Czech Republic	India	Luxembourg	Portugal	Thailand
Belgium	Denmark	Indonesia	Macedonia, FYR	Puerto Rico	Trinidad and Tobago
Bolivia	Ecuador	Iran, Islamic Rep.	Malawi	Qatar	Tunisia
Bosnia and Herzegovina	Egypt, Arab Rep.	Ireland	Malaysia	Romania	Turkey
Botswana	El Salvador	Israel	Mexico	Russian Federation	Uganda
Brazil	Estonia	Italy	Morocco	Senegal	United Kingdom
Bulgaria	Ethiopia	Jamaica	Namibia	Singapore	United States
Burkina Faso	Finland	Japan	The Netherlands	Slovak Republic	Uruguay
Cameroon	France	Kazakhstan	Nigeria	Slovenia	Vietnam
Canada	Georgia	Korea, Rep.	Norway	South Africa	Zambia

effect on economic growth. Opportunity entrepreneurship and necessity[5] entrepreneurship differ not only in their origin but also in results and aggregate effects. Wong *et al.* (2005) suggest that only opportunity entrepreneurship contributes to economic growth. Opportunity entrepreneurship can be measured as a share of total entrepreneurship; in this case, it is not important anymore which estimate to use (such as self-employment rate or business establishment rate) because even if we take the share of all self-employed and managed to distinguish between opportunity and necessity, it would be enough for satisfying the aim to concentrate on productive entrepreneurs who affect economic growth. Entrepreneurship data were taken from the GEM database from 2009 to 2014.

The paper uses the CPI[6] as a proxy for corruption, because of its broad availability and as it captures corruption in the public sector rather than in private or political. The key stimulus to the dominant approach to measuring corruption has been Transparency International's Corruption Perceptions Index (CPI). First released in 1995 and published annually since then, the CPI has become established as the most widely cited indicator of levels of corruption across the world. However, corruption data were taken from Transparency International for the period of 2009-2014.

The variable rule of law[7] was taken as the only proxy for institutional quality as it is argued to be the best indicator for institutional quality (Hartog *et al.*, 2010). The rule of law estimate ranges from -2.5 , when the perception is low, to 2.5 , when the perception is high. These data were acquired from the World Bank database from 2009 to 2014.

5. Results and discussion

Multiple regression and mediation analysis were conducted to assess each component of the proposed mediation model, using PROCESS Macro[8] (Hayes, 2013) and SPSS 23.

In the first step, it was found that institutional quality was positively associated with entrepreneurship (total effect) ($b = 17.5$, $t = 58.87$, $p < 0.001$). In the second step, it was found that institutional quality was negatively related to corruption ($b = -19.69$, $t = -63.59$, $p < 0.001$). Finally, in the third step, results indicated that the increasing in corruption was negatively associated with entrepreneurship ($b = -0.337$, $t = -3.91$, $p < 0.001$).

Figure 2 illustrates that all the paths are statistically significant. In addition, following MacKinnon *et al.*, 2004, and Preacher and Hayes, 2004, the hypothesized mediation model could be confirmed and further mediation was tested using the bootstrapping method using bias-corrected confidence estimates. In the present study, the 95% confidence interval of the indirect effects was obtained with 5,000 bootstrap resamples (Preacher and Hayes, 2008). Results of the mediation analysis (see Tables II and III) confirmed the mediating role of corruption in the relation between institutional quality and the entrepreneurship ($b = 6.64$; CI = 3.306-9.897).

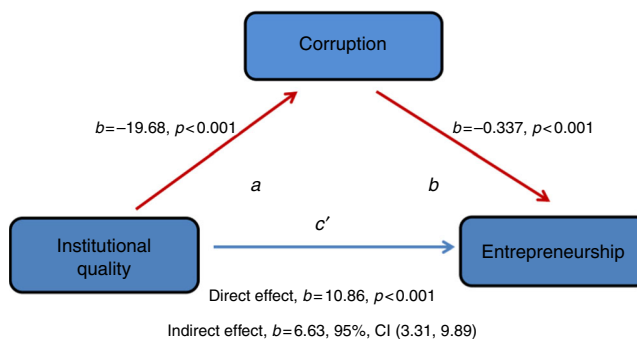


Figure 2.
Model of institutional
quality as a predictor
of entrepreneurship,
mediated by
corruption

In addition, results indicated that the direct effect of institutional quality on the entrepreneurship remained significant ($b = 10.86$, $t = 6.11$, $p < 0.001$) when controlling for corruption, thus suggesting partial mediation. In other words, corruption only mediates part of the effect of institutional quality on entrepreneurship, that is, the intervention (institutional quality) has some residual direct effect even after the mediator (corruption) is introduced into the model.

From the bootstrap percentile confidence interval shown in Table II, the entire path is 95% of the bootstrap estimates, not including 0. This confidence interval leads to the conclusion that the indirect effects of institutional quality (rule of law) on entrepreneurship are significantly different from 0.

Table IV shows the output for the zero order, partial and part (semipartial) correlation of institutional quality and entrepreneurship controlling for corruption. The partial correlation between institutional quality and entrepreneurship is 0.283, which is less than the correlation when the effect of corruption is not controlled for ($r = 0.437$). In terms of variance, the value of R^2 for the partial correlation is 0.08, which means that institutional quality now shares only 8 percent of the variance in entrepreneurship (compared to 19.1 percent when corruption was not controlled for). Running this analysis has shown us that institutional quality alone does explain some of the variation in entrepreneurship, but there is a complex relationship between institutional quality, corruption and entrepreneurship that might otherwise have been ignored.

Semipartial correlations (also called part correlations) indicate the “unique” contribution of an independent variable. Specifically, the squared semipartial correlation for a variable tells us how much R^2 will decrease if that variable is removed from the regression equation. If we want to know what R^2 would be if institutional quality was eliminated from the equation, just compute $R^2 - sr_1^2 = 0.211 - 0.069 = 0.142$, and if we want to know what R^2 would be if corruption was eliminated from the equation, compute $R^2 - sr_2^2 = 0.211 - 0.021 = 0.191$.

Table II.
Bootstrapping result
for confidence interval

Effect	Path	Mean	SD	95% lower bound (BC)	95% upper bound (BC)
Indirect effect	$LAW \rightarrow CPI \rightarrow ENT$	6.64	1.678	3.306	9.897

Notes: BC, bias-corrected. Mediation of the effect of institutional quality on opportunity entrepreneurship through Corruption Perception Index

Table III.
The direct effect,
indirect effect and
total effect

Path	Direct	Indirect	Total
$LAW \rightarrow ENT$	10.86	6.64	17.5
$CPI \rightarrow ENT$	-0.337	-	-0.337

Table IV.
Summary of zero-
order correlations,
semipartial
correlations, and
squared semipartial
correlation coefficients

Variable	R^2	Zero order	partial	Semipartial (part)	* sr^2
LAW	0.211	0.437	0.283	0.262	0.068
CPI		-0.377	-0.157	-0.142	0.021

Note: *Squared semipartial correlation

From the above results, we can conclude that better quality of institutions has a positive effect on productive entrepreneurship, which indicates that our first hypothesis is confirmed empirically and supports the previous researches such as Estrin *et al.* (2013) and Sobel (2008). Moreover, corruption tends to decrease the level of productive entrepreneurship; these results support our second hypothesis and confirm the previous research of Avnimelech *et al.*, 2014, in which, the authors examine the link between corruption and productive entrepreneurship and the participation of the institutional quality characteristics of a country. In addition, an examination of the specific indirect effect (see Table I) indicates that corruption is a mediator, since its 95% CI does not contain zero. Therefore, the main contribution of the current study to the literature is that the relationship between institutional quality and entrepreneurship is indeed mediated by corruption. This results support the third hypothesis that corruption is a significant mediator of the relationship between entrepreneurship and institutional quality.

6. Discussion, limitations and implications

6.1 Theoretical contributions

As the results show, there is an indirect and positive association between institutional quality, corruption and entrepreneurship. From the results we can conclude that better quality of institutions has a positive effect on productive entrepreneurship, which indicates that our first hypothesis is confirmed empirically and supports the previous researches such as Estrin *et al.* (2013) and Sobel (2008). However, this result does not support the findings of Hartog *et al.* (2010), which explain countries with a “better” rule of law have lower entrepreneurship. They explain this apparently counter-intuitive finding by arguing that in developed economies the benefits of the rule of law accrue primarily to large enterprises. Moreover, corruption tends to decrease the level of productive entrepreneurship. These results support our second hypothesis and confirm the previous research of Avnimelech *et al.*, 2014, in which, the authors examine the link between corruption and productive entrepreneurship and the participation of the institutional characteristics of a country.

The relationship between institutional quality and entrepreneurship mediated by corruption confirmed that reducing corruption has a strong impact on the promotion of productive entrepreneurship activities. Therefore, the findings of the current study confirmed that institutional quality has major contribution towards the development of entrepreneurship activities through the reduction of corruption.

6.2 Practical implications

As pointed out in the introduction section, the purpose of this research study was to provide information about the mediating role of corruption. We find clear evidence that institutional quality, after controlling for corruption, has a significant positive impact on entrepreneurship. The positive relationship between institutional quality and entrepreneurship is well known and documented. However, we present that institutional quality has also an indirect positive impact on entrepreneurship through its positive affect on reducing corruption rather than only direct impact. Institutional quality plays an important role for the development of entrepreneurship activities (Jimenez *et al.*, 2015; Fuentelsaz *et al.*, 2015). The strong relationship between institutional quality and entrepreneurship provides insight for policy makers to consider these qualities of institutions in order to encourage the entrepreneurs' activities.

The mediating role of corruption between institutional quality and entrepreneurship indicates that reducing corruption would lead to enhancement of entrepreneurship activities. These findings indicate that the total association between institutional quality and

entrepreneurship is not only direct but also that rule of law contributes to levels of entrepreneurship through reduced levels of corruption. As a result, countries with higher levels of rule of law tended to experience corruption at lower levels, which in turn contributes to the emergence of increased levels of entrepreneurship. Moreover, findings showed that there is a positive relationship between reduction of corruption and productive entrepreneurship. Therefore, these results may be beneficial for organizations fighting against corruption, because entrepreneurial activity can be added to the group of economical drivers constrained by corruption.

6.3 Limitations

The key conclusion of this paper is that the relationship between entrepreneurship and institutional quality is mediated by corruption. However, although the suggested method to test mediation effect has good characteristics and the results are promising, it should be noted that both model and results have some limitations. First limitation is dealing with simulation results that are obtained, because standard errors were not clustered by countries, which could lead to incorrect inference in a sample. The second limitation is that the data are scarce in terms of countries and years. However, the paper tracks information on 90 countries from 2009 until 2014, so the conclusions should have some empirical relevance. The third limitation has to do with those aspects that the model omits. The proposed model does not control for the country differences like GDP; in addition, some other proxies for institutional quality such as government effectiveness and doing business can be used for future studies. Therefore, the model can potentially lack more variables, and its findings are in accordance with its characteristics. However, further research is still needed. One direction for further research is to overcome the assumptions and simplifications that are the limitations of the model. In practice, however, it may be difficult for the policy maker to identify the best proxies and confident data.

7. Conclusion

The results of this study provide a more extended and expendable understanding of the connection between institutional quality and entrepreneurship. An important finding was that the corruption mediated the relationship between institutional quality and entrepreneurship.

The current study enhances the entrepreneurship literature through incorporating the mediation effect of corruption between the institutional quality and entrepreneurship relationship. The evidence on the indirect influence of corruption on the relationship between institutional quality and entrepreneurship proves that corruption has a major contribution toward the promotion of entrepreneurship.

The findings of the current and previous research studies suggest that in order to stimulate and enhance entrepreneurship, countries should create an environment that decreases corruption, which may in turn enhance institutional quality and consequently develop entrepreneurship. This study also provides information for an understanding of the relationship between institutional quality, corruption and entrepreneurship in an economy.

Notes

1. Based on expert opinion from around the world, the Corruption Perceptions Index measures the perceived levels of public sector corruption worldwide. The CPI currently ranks 168 countries "on a scale from 100 (very clean) to 0 (highly corrupt)"; this means that CPI grade is reversed, the higher the CPI grade, the cleaner the country.

2. "Researchers often conduct mediation analysis in order to indirectly assess the effect of a proposed cause on some outcome through a proposed mediator. The utility of mediation analysis stems from its ability to go beyond the merely descriptive to a more functional understanding of the relationships among variables. A necessary component of mediation is a statistically and practically significant indirect effect" (Preacher and Hayes, 2004).
3. This is one of the few surveys that provide data on entrepreneurship across countries and a rich set of characteristics on entrepreneurs.
4. Opportunity entrepreneurship is the share of the population between 18 and 64 involved in TEA, who stated that their incentives to become an entrepreneur are driven by opportunity reasons, and they made this choice to increase their income or to become more independent. This is opposed to necessity entrepreneurship where the main incentive is no other work option.
5. Necessity entrepreneurship originates from the lack of employment opportunities, when there is no option left other than to open your own business and try to somehow sustain yourself and your family. On the other hand, opportunity entrepreneurship originates from different existing economic opportunities, which can be captured by entrepreneurs in order to create value.
6. CPI ranks different countries according to their perceived corruption level in the public sector. The index has a composite origin; it is a mix of assessments and surveys acquired by many respectable institutions on corruption activity.
7. This indicator shows perceptions of people regarding the confidence of social rules, namely property rights, police, courts, contract enforcement and the risk of violence or crime.
8. Hayes and Preacher have written SPSS and SAS macros that can be downloaded for tests of indirect effects. In addition, Mplus and Amos can be used to bootstrap. If one has more than one mediator and is using Amos, one should consult for details from Macho and Ledermann (2011) on how to compute separate confidence intervals for each indirect effect.

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(The Appendix follows overleaf.)

Appendix 1

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Release 2.16.1 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

Model = 4
Y = TEA
X = LAW
M = CPI

Sample size
264

Outcome: CPI

Model Summary							
	R	R-sq	MSE	F	df1	df2	p
	.9642	.9297	26.7806	4043.3793	1.0000	262.0000	.0000

Model	coeff	se	t	p	LLCI	ULCI
constant	44.0989	.3512	125.5751	.0000	43.4074	44.7904
LAW	-19.6890	.3096	-63.5876	.0000	-20.2987	-19.0793

Covariance matrix of regression parameter estimates

	constant	LAW
constant	.1233	-.0452
LAW	-.0452	.0959

Outcome: TEA

Model Summary							
	R	R-sq	MSE	F	df1	df2	p
	.5086	.2586	55.5926	46.5695	2.0000	261.0000	.0000

Model	coeff	se	t	p	LLCI	ULCI
constant	.1680	3.7990	.0442	.9648	-7.3126	7.6485
CPI	-.3371	.0862	-3.9101	.0001	-.5069	-.1674
LAW	10.8602	1.7793	6.1038	.0000	7.3638	14.3567

Covariance matrix of regression parameter estimates

	constant	CPI	LAW
constant	14.4321	-.3235	6.2242
CPI	-.3235	.0074	-.1479
LAW	6.2242	-.1479	3.1658

***** TOTAL EFFECT MODEL *****

Outcome: TEA

Model Summary						
	R	R-sq	MSE	F	df1	df2
	.4668	.2179	58.4243	78.8230	1.0000	262.0000
						p
						.0000

Model						
	coeff	se	t	p	LLCI	ULCI
constant	15.0350	.6136	24.5028	.0000	13.8268	16.2432
LAW	4.2225	.4756	8.8782	.0000	3.1590	5.2860

Covariance matrix of regression parameter estimates

	constant	LAW
constant	.3765	-.2213
LAW	-.2213	.2262

***** TOTAL, DIRECT, AND INDIRECT EFFECTS *****

Total effect of X on Y						
	Effect	SE	t	p	LLCI	ULCI
	4.2225	.4756	8.8782	.0000	3.1590	5.2860

Direct effect of X on Y						
	Effect	SE	t	p	LLCI	ULCI
	10.8602	1.7793	6.1038	.0000	7.3638	14.3567

Indirect effect of X on Y						
	Effect	Boot SE	BootLLCI	BootULCI		
CPI	6.6377	1.6789	3.3059	9.8970		

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
CPI	.7695	.1944	.3716	1.1362

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
CPI	.7338	.1848	.3629	1.0842

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
CPI	-1.5720	.4355	-2.4651	-.7672

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
CPI	-.6112	.0707	-.7114	-.4341

R-squared mediation effect size (R-sq_med)

	Effect	Boot SE	BootLLCI	BootULCI
CPI	.1165	.0467	.0262	.2074

Normal theory tests for indirect effect

	Effect	se	Z	p
	6.6377	1.7010	3.9023	.0001

***** ANALYSIS NOTES AND WARNINGS *****

Table AI.
Model summary

Model	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	Std. error of the estimate	Change statistics					
					<i>R</i> ² Change	F Change	df1	df2	Sig.	F Change
1	0.437 ^a	0.191	0.189	8.34099	0.191	84.264	1	357		0.000
2	0.459 ^b	0.211	0.207	8.24855	0.020	9.047	1	356		0.003

Notes: ^aPredictors: (Constant), LAW; ^bpredictors: (Constant), LAW, CPI

Table AII.
ANOVA^a

Model		Sum of squares	df	Mean square	<i>F</i>	Sig.
1	Regression	5,862.453	1	5,862.453	84.264	0.000 ^b
	Residual	24,837.244	357	69.572		
	Total	30,699.697	358			
2	Regression	6,477.973	2	3,238.986	47.605	0.000 ^c
	Residual	24,221.724	356	68.039		
	Total	30,699.697	358			

Notes: ^aDependent variable: TEA; ^bpredictors: (Constant), LAW; ^cpredictors: (Constant), LAW, CPI

Table AIII.
Coefficients^a

Model		Unstandardized coefficients		Standardized coefficients		Sig.	Correlations		
		<i>B</i>	SE	β	<i>t</i>		Zero-order	Partial	Part
1	(Constant)	15.223	0.466		32.694	0.000			
	LAW	4.202	0.458	0.437	9.180	0.000	0.437	0.437	0.437
2	(Constant)	4.784	3.501		1.366	0.173			
	LAW	8.717	1.568	0.907	5.560	0.000	0.437	0.283	0.262
	CPI	−0.236	0.079	−0.490	−3.008	0.003	−0.377	−0.157	−0.142

Note: ^aDependent variable: TEA

Table AIV.
Model summary

Model	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	SE of the estimate
1	0.957 ^a	0.917	0.916	5.56096

Note: ^aPredictors: (Constant), LAW

Model		Sum of squares	df	Mean squares	<i>F</i>	Sig.
1	Regression	121,392.833	1	121,392.833	3,925.488	0.000 ^b
	Residual	11,039.964	357	30.924		
	Total	132,432.797	358			

Notes: ^aDependent Variable: CPI; ^bpredictors: (Constant), LAW

Table AV.
ANOVA^a

Model		Unstandardized coefficients		Standardized coefficients β	<i>t</i>	Sig.
		<i>B</i>	SE			
1	(Constant)	44.213	0.310		142.419	0.000
	LAW	19.121	0.305	0.957	62.654	0.000

Note: ^aDependent variable: CPI

Table AVI.
Coefficients^a

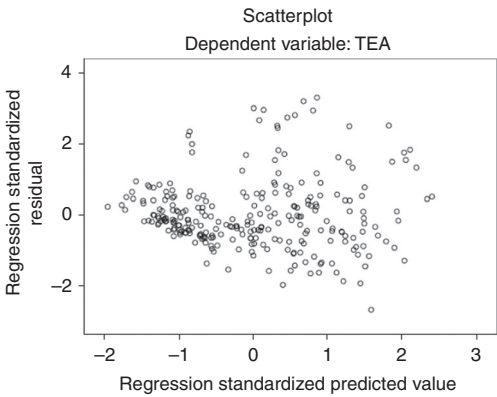
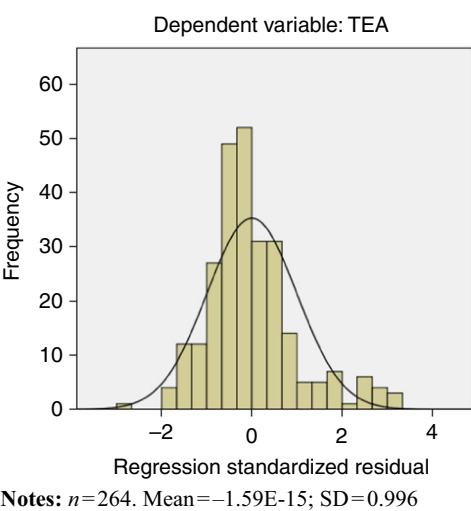


Figure A1.
Standardized residuals
against standardized
predicted values

Figure A2.
Normal probability
plot for TEA residuals



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