Paper to be presented at the DRUID 2011

on

INNOVATION, STRATEGY, and STRUCTURE -
Organizations, Institutions, Systems and Regions
at
Copenhagen Business School, Denmark, June 15-17, 2011

The Effect of Corruption on Entrepreneurship

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Abstract

The article focuses on the impact of corruption on "productive" entrepreneurship following Baumol (1990) seminal work.
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ABSTRACT

The article focuses on the impact of corruption on "productive" entrepreneurship following Baumol (1990) seminal work. In order to do so we used a unique dataset on international levels of entrepreneurial activity collected from Linkedin, combined with data generated by TI on corruption levels of different countries. Our empirical work includes a sample of 176 countries.

We find clear evidence that corruption, after controlling to all variables that might be correlated both to corruption and to entrepreneurship, has a significant negative impact on entrepreneurship. We suggest that this finding has significant policy implications.

1. Introduction

The research of public sector corruption receives growing attention in recent years. Macrae (1982) defines corruption as an arrangement that involves a private exchange between two parties, which 1) has an influence on the allocation of resources either immediately or in the future, and 2) involves the use or abuse of public or collective responsibility for private ends (see also Bardhan, 1997). Corruption exists in all countries, both developed and developing.

The scope of this article is confined to corruption in relation to rent seeking which in turn (see section II) negatively affects entrepreneurship. Since government officials have the authority to redistribute resources or grant regulatory concessions, this authority can be exploited for personal gains. According to Rose-Ackerman (1999) the motivation for corruption exists whenever an official has discretion over the distribution of a "good" or the avoidance of a "bad" to the private sector. In theory, the greater the amount of discretion which is given to government officials, the more opportunities there will be for rent seekers to allocate there time from productive entrepreneurship to unproductive lobbying (Baumol, 1990).

Various international organizations such as the International Monetary Fund, the OECD, and the World Bank are promoting campaigns against corruption (see Jain, 2001; Rose-Ackerman, 1997). There are also various institutions, including Transparency International (TI) and the World Bank, that generate data on the perception of corruption. In this paper we use data generated by TI to study the effect of corruption on productive entrepreneurship (based on data generated from Linkedin), such effect was never been examined empirically at the macro level.

Numerous studies of corruption have been concerned with the causes of corruption. Three studies, all by Ades and Di Tella, focus on the causes of corruption. In the first one, Ades and Di Tella (1997a) conclude that corruption is higher in countries with an active industrial policy. In the second study, Ades and Di Tella (1997b) find that increases in market competition and judicial autonomy reduce corruption. In the third study Ades and Di Tella (1999) find that countries where firms enjoy higher rents tend to have higher corruption levels. In addition, they find that corruption is higher in countries where domestic firms are sheltered from foreign competition by natural or policy induced barriers to trade, with economies dominated by a few number of firms, or where antitrust regulations are not effective in preventing anticompetitive practices.

An empirical study by Gurgur and Shah (2005) identifies various causes of corruption and concludes that the major causes of corruption are a lack of service orientation in the public sector, weak democratic institutions, economic isolation (closed economy), colonial past, internal bureaucratic controls, inequality and centralized decision-making. In essence, the higher the quality of the bureaucracy, the lower corruption will be.

Lambsdorff (1999) provides a review of empirical research on the causes of corruption that was carried out during the mid-1990s. He states that the freedom of press and the independence of the judiciary are important factors that may reduce corruption. In addition, he stresses that the studies of causes of corruption also conclude that a high level of corruption goes along with abundance of natural resources and a low percentage of women in the labor force and the parliament. Further, cultural dimensions were determined to be important, in particular, a mentality of accepting hierarchies was found to increase corruption (see in this regard also Hofstede, 2001, for culture dimensions).

Other studies demonstrated that the size of the public sector within an economy (Tanzi, 1998; Treisman, 2000), or the level of remuneration in the public sector (Van Rijckeghem and Weder, 1997), have a direct impact on the levels of corruption within a country.

Several other studies have been concerned with the effects of corruption. There is a consensus that the cost (tangible and intangible) of corruption to society may be tremendously high. Tangible costs include, for example, administrative inefficiency and biased investments. Tanzi and Davoodi (1997) present evidence that corrupted government' officials direct public investment towards large projects, probably at the expense of basic expenditures. Intangible costs include, for example, the loss of trust in democracy, in leaders and in government bodies. Murphy, Shleifer, and Vishny (1991) argue that corrupted societies create incentives that stimulate the most talented people to earn their income through bribing rather than in more productive activities. As far as we know, the present research is the first in literature which deals with the effect on corruption on entrepreneurship.

Theoretically, the payment of bribes to corrupt government bureaucrats to get "favors" can add to the costs and uncertainty of doing business in a country. It requires firms or entrepreneurs to devote resources to manage bribes, while these resources could be invested more profitably otherwise. Moreover, since bribery is

illegal, potential investors cannot be certain that government promises will be fulfilled or may be concerned that doing business in such a country will harm their reputation. This means that corruption can decrease the expected profitability of investment projects (including entrepreneurship), and therefore may reduce the total investment and entrepreneurship in such a country. In addition, when the business sector is characterized with high levels of corruption the prestige of being an entrepreneur, a leading business executive or an investor decrease; this may lead to a decrease in the level of entrepreneurs in the economy (Burt, 2000; Carsrud and Johnson, 1989).

This theoretical reasoning regarding the negative impact of corruption on business sector activity has been tested by several empirical analyses, although not for entrepreneurship. Mauro (1995) uses cross-country measures of corruption to show that corruption is negatively associated with private investment and growth. Similarly, Habib and Zurawicki (2002) provide evidence that corruption deters FDI. They find the impact of corruption on FDI to be larger than that on local investment. Cuervo-Cazurra's (2006) analysis of FDI inflows into 106 host economies found that corruption has a negative influence on FDI, and that investors from countries that have signed the OECD Convention on Combating Bribery of Foreign Public Officials in International Transactions are more deterred by corruption than investors from countries with high levels of corruption (see also: Gyimah-Brempong, 2002; Keefer and Knack, 1997; Li et al., 2000). We suggest that similar to the higher impact corruption has on FDI (compared to local investments) it has higher impact on entrepreneurship compared to other business activities.

Our paper makes two important contributions to the research of both corruption and entrepreneurship. First, it proposes for the first time in the literature empirical evidence in which countries with high levels of corruption will usually face low levels of "productive" entrepreneurship. Second, and maybe even more importantly, establishing a new transmission mechanism in which corruption has a negative influence on growth through its effect on entrepreneurship[1] in general and the number of entrepreneurs in particular.

The paper is organized as follows. Section 2 discusses the factors that influence Entrepreneurship. Section 3 analyzes the data and addresses the statistical problems

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[1] In this study we follow Gartner (1988) definition of entrepreneurship as "the creation of new venture that occur in the context of social and economic processes".

facing the analysis. Section 4 presents our empirical results. Section 5 concludes and presents policy implications.

2. Entrepreneurship

2.1 Entrepreneurship and Economic Growth

Schumpeter (1934) argued that the entrepreneur is the prime mover in economic development and his function was to innovate and to introduce new activities into the market. Acs and Audrestch (1990) and Acs (1992) argued that entrepreneurs play an important role in the economy, serving as agents of change, being a considerable source of innovation activity, stimulating industry evolution and cluster emergence and becoming the main source of job creation. Acs (2006) stress that entrepreneurs create new businesses, and new businesses in turn create new jobs, intensify competition, and may even increase productivity through technological change. Moreover, entrepreneurship is important to long term economic growth because it is a fundamental source of transferring new knowledge into economic commercialized knowledge (Audretsch et al., 2006). Thus, entrepreneurship is considered to be one of the most significant drivers of economic growth and wealth creation (Acs, 2006; Audretsch et al., 2006; Carree and Thurik, 2005; Wennekers and Thurik, 1999). An entrepreneurial spirit is considered to be one of the most significant elements in recent economic development (Malach-Pines at el., 2006; Zimmerer & Scarborough, 2001). More specifically, Audretsch and Fritsch (2002) suggest that since the 1990s the engine of economic growth shift from general knowledge generation toward entrepreneurship based knowledge generation. Thus, high measured levels of entrepreneurship will thus translate directly into high levels of economic growth (Acs, 2006).

Empirically, innovations and competition were found to be the most relevant factors linking entrepreneurship to economic growth (Wennekers and Thurik, 1999). Lee et al. (2004) found that at the regional level, high level of new firm creation significantly contributes to regional economic vitality and is a major signal of a dynamic economy. Eakin and Kao (2003) found that entrepreneurship at the regional level has a positive impact on productivity growth. Audretsch and Fritsch (2002) found that regions with higher startups rate exhibit higher growth rates.

In this regard, Reynolds et al. (1999), for example, show that one-third of the differences in national economic growth rates can be attributed to differences in

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entrepreneurial activity. Zacharakis et al. (2000) study sixteen developed economies and find that entrepreneurial activity explains approximately one-half of the differences in GDP growth between countries. Henderson (2002) shows that entrepreneurs significantly impact economic activity at the local level through fostering localized job creation, increasing wealth and local incomes, and connecting local economies to the larger, global economy.

2.2 The Psychological and Opportunity Approach to Entrepreneurship

There are two main paths of academic research approaches to entrepreneurship. The first path tries to explain why a person decides to be an entrepreneur. Such studies attempted to explain entrepreneurship as a function of the nature of people engaged in entrepreneurial activity (Eckhardt and Shane, 2003); this is referred as the micro-psychological approach to entrepreneurship research (Shane and Venkataraman, 2000). The second path explains regional variation in firm formation at an aggregate level by looking at normative, structural and institutional variations in geographical areas (Aldrich and Zimmer, 1986). This is referred as the macro-opportunity approach to entrepreneurship research (Ardichvili et al., 2003; Venkataraman, 1997). Our study will focus mainly on the macro-opportunity approach. Van Praag (1996) defines opportunity as "the possibility to become an entrepreneur if one wants to". Opportunity depends on starting capital, entrepreneurial ability, entrepreneurial environment, and the economic environment.

2.3 Productive and Unproductive Entrepreneurship

One of the major contributions to the economics of entrepreneurship is Baumol's (1990) theory of productive and unproductive entrepreneurship. Baumol claims that entrepreneurs have a choice whether to engage in value creating opportunities or rent seeking through the political and legal arena (e.g., lobbying and lawsuits). This decision is influenced by the corresponding rates of return to these activities, which in turn shaped by the quality of the country social, political and legal institutions.

When institutions provide honest norms, secure property rights, a fair and balanced judicial system, contract enforcement, and effective constitutional limits on government's ability to transfer wealth through taxation and regulation, it reduces the profitability of unproductive political and legal entrepreneurship. Under this incentive

structure, creative individuals are more likely to engage in the creation of new wealth through productive market entrepreneurship. Thus, differences in measured rates of private sector entrepreneurship are partially due to the different directions entrepreneurial energies are channeled by prevailing economic and political institutions, through the rewards and incentive structures they create for entrepreneurial individuals.

Following Baumol's theory, we claim that a direct links exists from environment of corruption in a specific country to limited productive entrepreneurship. In other words, high level of corruption in a specific country reduces the rates of returns of productive entrepreneurship relative to rent seeking through unproductive means (i.e. not including innovation-based rent seeking). Therefore, it is expected that countries with high levels of corruption will usually face low levels of productive entrepreneurship.

Fuethermore, Baumol's theory, which was discussed in length in numerous entrepreneurship literature (such as Baumol, 1993, 2002; Boettke, 2001;Boettke and Coyne, 2001; Coyne and Leeson, 2004; Kreft and Sobel, 2005; and Ovaska and Sobel, 2005), was examined only in one limited empirical paper - Sobel (2008). Sobel (2008), in a limited sample of 48 states of the U.S. (data generally centered on the year 2000), examined the relationship between measures of the quality of state political and legal institutions and measures of both productive and unproductive entrepreneurship. He found that better institutional structures produce higher venture capital investments per capita, a higher rate of patents per capita, a faster rate of sole proprietorship growth, and a higher establishment birth rate of new companies. The results also show that those states with the worst institutions have the worst records on total lobbying activity and legal quality/lawsuit abuse, part of the unproductive types of entrepreneurship.

2.4 Factors influencing Entrepreneurship

The entrepreneurship literature investigated periodically which factors explain national entrepreneurship levels. This question has been examined periodically through the lens of economic, technological, demographic, cultural and institutional variables (Reynolds et al, 2002; Reynolds et al, 2003; Acs et al, 2004; Minniti et al., 2005; Bosma & Harding, 2006; Bosma et al.,2007; Thomas & Mueller, 2000; Verheul, Wennekers, Audretsch & Thurik, 2002).

2.4.1 Economic Factors influencing Entrepreneurship

Early studies on entrepreneurship, at a regional level, found that factors such as unemployment rate, population density, industrial clustering, urbanization level, and the availability of venture capital and other risk capital were important in explaining regional variation in firm birth rates (Lee at el., 2004). Armington and Acs (2002) found that industrial intensity, market competitiveness, income growth, population growth and human capital were closely related to new firm formation. Reynolds et al., (1994) found that academic research and development expenditure to be significantly associated with rates of new firm formation across regions.

However, the relative stability of differences in entrepreneurial activity between countries, particularly ones with similar levels of such economic development indicators, suggests that also other non-economic factors are at play (Freytag & Thurik, 2007; Grilo & Thurik, 2005).

2.4.2 Social, Cultural and Institutional Factors influencing Entrepreneurship

Cultural aspects are assumed to shape the environment in which business is conducted (Freytag & Thurik, 2007). According to existing research, culture influences a wide range of economic behaviors, including the decision to become self-employed rather than to work for others (Audretsch, Grilo and Thurik, 2007; Freytag & Thurik, 2007; Mueller & Thomas, 2001; Stevenson & Lundström, 2001). Thus, the role of culture in fostering or blocking entrepreneurship was the interest of many studies (such as Busenitz et al., 2000; Davidson 1995; Huisman 1985; Lee & Peterson 2000; McGrath & MacMillan 1992; Mueller & Thomas 2001; Tiessen, 1997; Noorderhaven et al., 2004).

The socio-cultural environment influences the exploitation of entrepreneurial opportunity by influencing the desirability, perceived risks and returns of entrepreneurial activities (Shane, 2003). Shane (2003) claims that the exploitation of entrepreneurial opportunities involves certain types of decision-making approaches. Specific norms and cultural beliefs are associated with these types of actions.

Some evidence exists that broad social and cultural characteristics are associated with national levels of entrepreneurship. The frequency of entrepreneurship has been shown to be associated to some extent with the occurrence of certain social and culture specific variables (Thomas & Mueller, 2000). However, these

relationships have not been systematically found linked to aggregate indicators of entrepreneurship (Davidson & Wilklund, 1997; Hayton, George & Zahra, 2002; Shane 1993.

In addition, certain cultural beliefs and values encourage entrepreneurial activity. Weber (1904) with others following argued that differences in entrepreneurial activity can be explained by cultural and religious factors, specifically a society's acceptance of the Protestant work ethic. In his classic Book "The Protestant Ethic and the Spirit of Capitalism" (1930), Max Weber claimed that Protestant values played a critical role in the formation of entrepreneurial activities, the spirit of capitalism and people's economic behaviors even several generations afterwards. In his opinion, the Puritan aspects of the Calvinist moral code led to the striving for profit, and through reinvestment of profit, wealth accumulation. Accordingly, religious values became motivators for the economics behavior of religious people and their descendents, even if the religious leaders did not expect this type of historical outcome.

Perotti and Volpin (2004) suggest that lack of political (democratic) accountability and economic inequality hinder entrepreneurs. Bartholomew (1997) articulated how national institutional patterns, such as access to research and educational institutions, access to sources of financing and availability of pools of educated labor, help determine the manner in which an innovation emerges within a country.

Shapero and Sokol (1982) address the issue of minority and immigrant communities which face exclusion and therefore suppose to participate more intensively in entrepreneurship. Similarly, Saxsnian (1999) and Lee at el., (2004) have suggested that regional rates of entrepreneurship are associated with levels of immigration. Lee et al., (2004) argues that social diversity and creativity have a positive relationship with new firm formation. Florida (2008) showed that social diversity and human capital have positive and significant relationships with regional innovation and entrepreneurship. It is argued that low barriers of entry into the regional networks and diverse culture facilitate the influx of a particular kind of human capital that promotes innovation and accelerates information flow, leading to the higher rate of new firm formation (Lee at el., 2004).

2.5 Empirical Challenges in the research of national entrepreneurship levels

One of the major problems prevented previous empirical research is scarcity of relevant data. Therefore, until now, the main line of research on entrepreneurship is based on estimating survey based perceptions (mainly of MBA students) in small international samples regarding cultural, political and economic factors (although the major disadvantages facing the use of such surveys and particularly the use of data that is not derived from real activity). In this regard, Begley et al. studied a survey sample of 13 countries and found that market opportunities as represented by level of competitiveness, skilled labor and supportive government regulation (the latter negatively) associated with individuals' interest in starting a business. Busenitz et al. (2000) studied a survey sample of 6 countries institutional profile and show that regulatory, cognitive, and normative dimensions affect levels of entrepreneurship.

The current leading database on entrepreneurship is the Global Entrepreneurship Monitor (GEM). GEM is a leading academic research consortium dedicated to collection and analysis of information on global entrepreneurship activity. GEM was initiated at 1999 with 10 countries and it currently consist 54 countries. For the past ten years GEM reports have been the only source of comparable data across a large variety of countries on attitudes toward entrepreneurship, start-up and established business activities, and aspirations of entrepreneurs for their businesses. GEM's 2009 data is based on survey of 180,000 individuals in 54 countries. While this is an impressive number it is insignificant compared to Linkedin's 85 million members from across approximately 200 countries.[2]

Levie and Hunt (2004) examined the extent to which culture can explain differences in new business activity in different nations, and considered both universal, cultural values using measures derived from the Schwartz Values Survey of 47 nations and beliefs related to new business activity using measures based on the 2002 and 2003 Global Entrepreneurship Monitor (GEM) data.

The relationships between cultural values and entrepreneurial activities were also studied by Suddle, Beugelsdijk and Wennekers (2007) using a composite indicator for entrepreneurial culture, including cultural variables from various sources such as the World Values Survey (WVS), need for achievement and achievement-

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[2] The GEM data also include information on attitudes and perceptions to entrepreneurship that are absent at Linkedin. Another important advantage of using GEM data is the fact that it is constructed for academic research while Linkedin data should be gathered and organized before it can be used for academic research.

motivation indices (Granato, Inglehart & Leblang, 1996; Lynn, 1991) and the GLOBE (House, 2004) performance-orientation index. All together, they used data for nascent entrepreneurship in the 28 countries included in the Global Entrepreneurship Monitor of 2002. Controlling for economic, institutional and demographic factors, their newly developed measure of entrepreneurial culture was found to be significantly and positively related to nascent entrepreneurship.

3. The Empirical Estimation and the Database

The basic equation, which is derived from the literature, to estimate the parameters affecting the number of entrepreneurs consists of the following parameters:

In order to estimate the number of entrepreneurs, *Entrep*, we employed a unique dataset based on an online professional network of trusted business contacts called *Linkedin*. Data on founders/entrepreneurs in each country was collected from *Linkedin*. This online professional networking resource is targeted to executives of various organizations in approximately 200 countries. *Linkedin* consist profiles of over 85 million members as of December 2010. Members are asked to provide detailed information on their careers, specifying their current and past employment, their education, and other business related activities. While there is always a chance that individuals will present incorrect information, there is incentive to report correctly because each member's profile is available to be verified by other *LinkedIn* members. Individuals who report incorrect information risk being censored from membership. Thus, there is a transparency that may yield these data more accurate than survey data. Members indicate if they are a founder of firm. According to Linkedin (for December 2010) there are more than 333,000 current founders (people that their last position is a founder of a company) or 0.39% of the *LinkedIn* membership. This percentage is almost identical to findings from the Kauffman Index of Entrepreneurial Activity (Fairlie, 2009). According to Linkedin the leading countries in the absolute number of founders are the United States with almost 194,000 founders, the UK with 21,000 founders, India with 14,500 founders, Canada with 13,500 founders, and the Netherlands with 12,000 founders

While our dependent variable is the entire number of entrepreneurs in a country (when collecting founders' data from Linkedin we include all members that defined themselves as founders in their profile), we can assume that this include only "productive" entrepreneurs (we would not expect to find founders of illegal or non ethical organizations in Linkedin profiles). For example, while the legal worldwide gambling industry annual revenues are approximately $335 billion (H2 Gambling Capital, 2010) there are only 323 founders from the Gambling industry worldwide in Linkedin. Similarly, there are zero founders related to the Porn industry (annual revenues of approximately $100 billion) in Linkedin. On the other hand, there are 1,874 founders in Linkedin related to the e-learning industry which has an annual turnover of less than $30 Billion.

With any data source there are questions about reliability. Avnimelech and Feldman (2010, 2011) vetted the data with detailed information on entrepreneurial start-ups in the Triangle Regional Entrepreneurial Express (TREE) database. They found that Linkedin capture at least 70% of the past and present entrepreneurs in the TREE database and almost all currently active entrepreneurs. Moreover, Avnimelech and Feldman (2010) found no evidence of geographical bias of Linkedin data within the United States. In addition, we compared, on 01 January 2011, the number of founders of technological firms in Israel according to IVC Research center (3,721) and Linkedin data on Israeli currently active founders (4,549) and currently active founders of technology startups (3,138). This result also suggests that Linkedin is a comprehensive source on entrepreneurs. While there are different adoption rates in various countries we believe that at the highest executive level (including company founders) in all countries there is a very high level of adoption of LinkedIn. According to Linkedin Blog at August 2010 there were more than 35 million linkedin members in the United States; more than 15 million Linkedin member in Europe, and 6 million in India.

This database presents couple of important advantages. First, using Linkedin represents a direct link for real entrepreneur's activities, since Linkedin is used by entrepreneurs as a working tool. Second, since there is no agreed definition for entrepreneurship – e.g., whether innovation is a necessary element or does self-employment suffice, or whether self-employment and ownership of a small business firm are equally entrepreneurial – a novel approach can be based on self definition of entrepreneurs, similar to the situation in Linkedin.

However, the usage of Linkedin could be driven from the country economic development stage. Therefore, we will use several controls in order to eliminate potential bias such as internet usage level.

In order to capture the effect of corruption, $Corp$, we employed the TI index of the corruption level following Tanzi and Davoodi (1997), Lambsdorff (1999) and others. It should be mentioned that these indexes tend to be related to one another (resulting in multicolinearity) and therefore an examination should be made of their weighted average, as reflected in the final score and rank. In this regard it should be stressed that the TI index is the most frequently used and constructed by standardizing and equally weighting values from numerous other indicators including ICRG. Moreover, in the last decade the TI index has expanded significantly and in 2008 covered 180 countries.

In addition, human capital parameters, HC, using school life expectancy, the level of literacy or the level of education expenditures to product, is expected to affect positively entrepreneurs since it creates skilled labor force which can take advantage on business opportunities; the level of the economy openness and competitiveness (as measured by the level of foreign trade (import and export) to product or the index of economic freedom published by the Fraser Institute), $Comp$, is expected to affect positively entrepreneurs since its effect on equal access to business opportunities; the involvement of the public sector in the economy, G, using the level of government total expenditures to product or the level of government consumption to product , is expected to influence negatively entrepreneurs since it distort equal access to business opportunities; the country credit rating, C, is expected to influence positively entrepreneurs; the participation of women in the labor force and the parliament, W, using female school life expectancy or female literacy that is associated with a culture supportive of entrepreneurship (see Florida, 2008); the country main religion, $relig$ and in addition the share of a Jewish community in the population, which may represent a direct impact of the Jewish community which are known for its entrepreneurship orientation or a proxy of openness to immigration that is associated with a culture supportive of entrepreneurship (see Florida, 2008); the country minorities share, $Minor$, using a measure for ethnic diversity; the country poverty share, Pov; and the strength of the democratic institutions including the freedom of press and the independence of the judiciary system, $Demo$, using the democracy rank

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published by World Audit (an international not-for-profit company, registered in England by the registered charity, World Concern).

Hence, the following equation for corruption was estimated:

$$\ln Entrep = A + a_1 \ln Corp + a_2 \ln HC + a_3 Comp + a_4 G + a_5 C + a_6 \ln W \ (1)$$

$$+ a_8 \operatorname{Re} lig + a_9 \ln Minor + a_{10} Pov + a_{11} \ln Demo + \varepsilon_t$$

where:

A - the constant variable.

ε_t - the error term.

The combined sub samples from structured into a large sample of 176 countries, which are practically the entire world without several observations that were omitted: countries that were under total or partial international boycott or a non-functioning state during the sample period of 2009-2010 (North Korea, Iraq, Somalia and Cuba) and micro-countries (Marshall Islands, Tuvalu, Micronesia, Nauru, Palau, Fiji, Andorra, Vatican City, Luxembourg, Lichtenstein, Monaco, Montenegro, San Marino, Kosovo and East Timor). In addition, some missing values were calculated indirectly, using average values of other countries in the same region or alternatively using values of the original country for the closest year found.

4. Results

The OLS estimation of the various estimations for world entrepreneurs in general and for the effects of corruption on the number of entrepreneurs in particular, produced high explanatory levels. The best version (A-6, Table 1) yielded = 0.847 ($R^2 = 0.858$) and SE=0.865 and DW=2.227 (indicating a lack of serial correlation). It should be mentioned in this context that cross-section data are being used rather than time series data and therefore the DW statistic has only minor significance. Nonetheless, it does provide an indication that the regression has not omitted any major explanatory

variable that is common to the whole sample and provides evidence that the unexplained residuals from the estimations are in fact the result of a random walk and are not correlated as a result of an important missing variable. Table 1 also shows that the main variables are characterized by a high level of significance, by stability across the various versions and by coefficients with the expected signs.

Human capital is represented by the level of literacy, whose elasticity reached 0.953 in version A-6. The close to one elasticity indicating that skilled labor force which can take advantage on business opportunities is a crucial parameter affecting the number of entrepreneurs.

The economy level of openness and competitiveness is represented by the level of foreign trade (import and export) to product, whose elasticity reached 0.470 in version A-6. This result implies that the exposure to foreign ideas and transactions creates an environment of creativity and business opportunities.

The participation of women in the labor force and the parliament is represented by the female school life expectancy, whose elasticity reached 0.831 in version A-6. It should be stressed that the significance of the female school life expectancy is in addition to the positive effect of literacy, indicating the independent role of cultural diversity in parallel to the positive effect of human capital.

The strength of the democratic institutions is represented by the democracy rank published by World Audit, whose elasticity reached -0.513 in version A-6, meaning that as the country's state of democracy deteriorates so does the number of entrepreneurs shrinks. We did not use in the empirical work the country's competitiveness index due to the strong correlation this variable had with the level of

the democracy index. Another result indicating the important of cultural diversity and open society on entrepreneurship.

Religion was in most cases represented by the Protestant variable whose elasticity reached 0.475 in version A-6; the Greek Orthodox Church variable, whose elasticity reached 0.627 in the same version; and the Relative size in the country population of the Jewish Diaspora communities, whose elasticity reached 0.081 in the same version. The Hindo variable was found significant with only some of the version (whose elasticity reaches 0.845 in version A-4 for example). These findings are consistent with Weber's theory, as well as with the limited literature on the effect of religion on economic activity (see for example Mehanna, 2003).

The main variable in this estimation – the negative effect of corruption level – was found to have a particularly high elasticity and was represented either by the countries corruption grade in the TI indexes (see A-6) or countries corruption rank (see A-7). The magnitude of the coefficient, 1.449 in version A-6 (the higher the TI grade, the lower the level of corruption, while the higher the TI rank, the higher the level of corruption), indicates that even a small change in the level of corruption can significantly damage entrepreneurship. Thus, even in countries where other factors contribute positively to entrepreneurship, a change in the level of corruption can have a significant influence. Table 2 presents a simulation of the effect of changes in the corruption level at various points along the volume of entrepreneurs curve.

Following Helpman, Melitz and Yeaple (2004), we also tested for the relative economic importance of some of the variables by calculating their adjusted coefficient of correlation (beta variable), which is the product of a variable's estimated elasticity and its standard deviation divided by the dependent variable's standard deviation (see

Table 3). These adjusted coefficients convert the estimated elasticity's into units of standard deviation in a manner that enables the comparison of their relative economic importance. Table 3 shows that a change of one unit of standard deviation in the corruption variable brings about a change of 31.8 percent in the entrepreneurs variable as compared to -20.9 percent for the democracy variable, 8.6 percent for the human capital variable and so on. These results indicate that the corruption variable has significant effect with regard to its effect on entrepreneurs.

All the rest of the variables were found not to be significant - the involvement of the public sector in the economy, which should have represented the distortion in equal access to business opportunities, but probably the country democracy rate, which was highly correlates with the country's competitiveness index, represented it better; the country credit rating; the country minorities share probably also due to the effect of the country democracy rate; and the country poverty share probably due to the significant effect of both the level of literacy and the female school life expectancy.

In order to examine the robustness of the results, various control variables were added to the estimation that were thought to be important in the determination of entrepreneurship.

The first type of control variables was connected to population: population density, urban population and unemployment, since they may be connected with network externalities for creativity and business opportunities (see for example, Shane, 1996 and Thornton, 1999). Thus, a variable for the level of population density, $Dens$, a variable for the level of urban population, $Urban$ and a variable for the level of unemployment, $Unemp$, were added and found all to be significant. Both population density and urban population were found to be positive (meaning contributes to entrepreneurship) and there elasticity reached the level of 0.166 and 0.997 (see version A-6 in Table 1), while unemployment found negative with elasticity reached

the level of -1.288 (see version A-4 in Table 1). However, their inclusion in the estimation did not change the results significantly.

The second type of control variables were variables for Colonial history, since it may influence the cultural and the human capital aspects of the economies. Thus, a variable for every Colonial power was added and found that only the variable for the British Empire, UK, to be significant, positive (meaning contributes to entrepreneurship) and its elasticity reached the level of 0.670 (see version A-6 in Table 1). These findings are consistent with those reported in the literature with regard to former colonies and in particular those of the British Empire and also consistent with the positive effect of the Protestant variable. In any case, its inclusion in the estimation did not change the results significantly.

The third type of control variable was a dummy for geographic effect, representing possible additional cultural effects. Thus, a dummy variable for each continent was added and found to be significant only for Africa, $Africa$ (elasticity reached the level of -0.681, see version A-6 in Table 1). However, its inclusion in the estimation did not change the results significantly as well.

Other possible control variables, such as level of population growth and average population age, found not to be significant.

5. Summary and Conclusions

The article focuses on the impact of corruption on "productive" entrepreneurship. According to Baumol (1990), in corrupt environments more potential entrepreneurs will allocate their time and efforts to non-innovative rent seeking activities such as lobbying and bribing government officers instead of being involved in productive entrepreneurship activities. In order to do so we used a unique datset on entrepreneurs collected from Linkedin. We also use data generated by TI on corruption levels of different countries.

We find clear evidence that corruption, after controlling to all variables that might be correlated both to corruption and to entrepreneurship, has a significant negative impact on entrepreneurship. This clear evidence has significant policy implication nowadays when many governments over the world are trying to improve regulations

as a lesson from the sub-prime and financial institutions crisis. The financial institution are lobbying agents these new regulations with the claim that such severe regulations would harm the open economy and entrepreneurial spirit. This study clearly suggests that tight regulations that might reduce corruption may actually increase entrepreneurship levels.

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Table 1

Estimation of equations explaining the effect of Corruption on Entrepreneurship**

Variable	A−1	A−2	A−3	A−4	A−5	A−6	A−7
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Constant	-1.873	-2.546	-3.308	-3.574	-4.554	-4.669	-0.76
	(-1.747)	(-2.421)	(-3.027)	(-3.136)	(-4.316)	(-4.388)	(-0.732)
Protestant	0.41	0.48	0.68	0.63	0.61	0.51	0.47
	(1.889)	(2.275)	(3.180)	(2.915)	(2.794)	(2.352)	(2.008)
Orthodox	0.67	0.63	0.49	0.52	0.51	0.52	0.45
	(2.486)	(2.408)	(1.811)	(1.877)	(1.810)	(1.815)	(1.474)
Hindu	0.46	0.56	0.74	0.85	0.85	0.72	0.78
	(1.105)	(1.391)	(1.735)	(1.968)	(1.967)	(1.661)	(1.647)
Females school life expectancy*	0.71	0.83	0.91	0.92	1.18	1.39	1.62
	(1.888)	(2.275)	(2.375)	(2.283)	(3.049)	(3.689)	(4.005)
Urban population	0.81	1.00	0.76	0.78	0.81	-	-
	(2.139)	(2.708)	(1.974)	(2.003)	(2.055)	-	-
Level of foreign trade in product	0.55	0.47	0.53	0.54	0.50	0.54	0.64
	(4.032)	(3.494)	(3.790)	(3.725)	(3.421)	(3.718)	(4.050)
Literacy	0.91	0.95	0.83	1.29	1.49	1.48	1.71
	(1.456)	(1.575)	(1.298)	(2.082)	(2.404)	(2.356)	(2.514)
Population Density*	-	0.17	0.19	0.20	0.22	0.21	0.24
	-	(3.585)	(3.886)	(4.148)	(4.525)	(4.212)	(4.588)
Unemployment rate	-	-	-	-1.29	-	-	-
	-	-	-	(-2.145)	-	-	-
Jewish penetration to 1000 people	0.07	0.08	0.10	0.10	0.10	0.11	0.13
	(1.659)	(2.030)	(2.371)	(2.418)	(2.340)	(2.676)	(2.839)
Africa	-0.83	-0.68	-0.69	-	-	-	-
	(-4.096)	(-3.428)	(-3.290)	-	-	-	-
UK	0.73	0.67	-	-	-	-	-
	(4.620)	(4.357)	-	-	-	-	-
Democracy rank*	-0.47	-0.51	-0.38	-0.41	-0.42	-0.43	-0.59
	(-3.421)	(-3.820)	(-2.770)	(-2.934)	(-2.979)	(-3.001)	(-3.089)
TI grade*	1.63	1.45	1.69	1.61	1.60	1.69	-
	(6.124)	(5.518)	(6.241)	(5.882)	(5.774)	(6.118)	-
TI rank*							-0.50
							(-2.822)
R^2	0.85	0.80	0.84	0.84	0.83	0.83	0.80
$\overline{R}^2$	0.84	0.79	0.83	0.82	0.82	0.82	0.80
S.E.	0.90	1.03	0.91	0.93	0.94	0.95	1.03
D.W.	2.22	2.14	2.16	2.19	2.17	2.16	2.14

* The Variable are represent by ln.

** The equations are in log-linear form and therefore the output and the corruption variables are expressed in natural logarithms. t-values appear in parentheses.

Table 2

Simulation of the effect of Corruption on Entrepreneurship

Cpi runk	1	25	50	75	100	125	150	175	200
Founders									
1	1	0	0	0	0	0	0	0	0
100	100	20	14	12	10	9	8	8	7
1,000	1,000	200	141	115	100	89	82	76	71
5,000	5,000	1,000	707	577	500	447	408	378	354
10,000	10,000	2,000	1,414	1,155	1,000	894	816	756	707
25,000	25,000	5,000	3,536	2,887	2,500	2,236	2,041	1,890	1,768
50,000	50,000	10,000	7,071	5,774	5,000	4,472	4,082	3,780	3,536
75,000	75,000	15,000	10,607	8,660	7,500	6,708	6,124	5,669	5,303
100,000	100,000	20,000	14,142	11,547	10,000	8,944	8,165	7,559	7,071
150,000	150,000	30,000	21,213	17,321	15,000	13,416	12,247	11,339	10,607

* The simulation is based on A- 7

Table 3

The relative economic importance of the variables**

Variable***	
	Beta Co.
Protestant	0.08
Orthodox	0.06
Hindu	0.05
Females school life expectancy*	0.22
Level of foreign trade in product	0.14
Literacy	0.13
Population Density*	0.14
Democracy rank*	-0.18
Jewish penetration to 1000 people	0.10
TI grade*	0.37

* The Variable are represent by ln.

** The equations are in log-linear form and therefore the output and the corruption variables are expressed in natural logarithms.

*** The relative economic importance of the variables was calculated using the Beta coefficient, based on A-6.