

Religious institutions and entrepreneurship

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Abstract This article focuses on the impact of religious institutions on entrepreneurship. We find clear evidence that different religious institutions have a significantly different impact on the tendency to become an entrepreneur. Our article makes important contributions to the research of both religion and entrepreneurship. First, it proposes empirical evidence in which the country's main religion significantly affects its level of entrepreneurship at the macro level. Second, it adds to our theoretical understanding of the mechanisms that characterize the effects of religion on entrepreneurship. We suggest that macro effects of religion as part of the country's culture and institutions affect the country's level of entrepreneurship beyond the direct effects of religion on the behavior of the religion's members in the society.

Keywords Religion · Entrepreneurship · Institutions · Culture · Country · Protestant · LinkedIn

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1 Introduction

The research on the effects of political and social forces on economic activity has received growing attention in recent years. Huntington (1996), Landes (1999) and Inglehart and Baker (2000) argue that explanations for economic growth should go further to include national cultures. In this regard, culture may influence personal traits such as willingness to work hard or willingness to take risks or attitude toward uncertainty or attitude toward wealth accumulation. Scholars dating back to Smith (1776) and Weber (1904) have argued that religion plays a fundamental role in shaping economic activities. Barro and McCleary (2003) argue that religion is an important dimension of culture and, based on a sample of 59 countries, found that church attendance and religious beliefs affect economic growth. In addition, Mehanna (2003) examined the role of religion on international trade and found a significant impact. Bartke and Schwarze (2008) found that religious faith shows a strong influence on risk propensity and that specific religion affiliations explain different risk attitudes. Furthermore, other scholars presented theoretical explanations regarding the role of religion in economic development (McCleary 2008).

Furthermore, Weber (1904) with others following argued that differences in entrepreneurial activity can be explained by cultural and religious factors, specifically the society's acceptance of the Protestant work ethic. In his classic book "The Protestant Ethic and the

Spirit of Capitalism” (Weber 1930), 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 wealth accumulation. Accordingly, religious values became motivators for the economic behavior of religious people and their descendants, even if the religious leaders did not expect this type of historical outcome. However, there is a lack of wide systematic cross-country empirical analysis of the impact of various religions on the forces that feed economic activity in general and entrepreneurship in particular.

The scope of this article is confined to addressing this gap by analyzing the effect of different religions on entrepreneurship. Furthermore, it will attempt to understand not only if and to what extent different religions affect entrepreneurship but also through what channels these effects are distributed.

Our article makes four important contributions to the research of the effect of religion on entrepreneurship. First, it proposes for the first time in the literature empirical evidence in which the country’s main religion significantly affects its level of entrepreneurship at the macro level. Second, as far as we know, this article is the only research in the literature to compare the effect of religion on entrepreneurship using all the main religions simultaneously under the same framework. Third, it adds to our theoretical understanding of the mechanisms that characterize effects of religion on entrepreneurship. We suggest that macro effects of religion as parts of the country’s culture and institutions affect a country’s level of entrepreneurship beyond the direct effects of religion on the behavior of the religion’s members in the society. Fourth, it uses a unique data set of 176 countries of entrepreneurial¹ activity—the largest data set presented in the literature of national entrepreneurs—collected in a novel approach from a professional online network, LinkedIn. Using this broad data set, we are able to present

¹ Our working process definition of entrepreneurial activity in this study is “the creation of new venture in the mid- and high-technology sectors.” This definition is quite similar to the GEDI index definition of entrepreneurial activity, which is “startup activity in the mid- and high-technology sectors, initiated by educated entrepreneurs and launched because of opportunity motivation” (Szerb and Acs 2011).

clear findings on the micro and macro effects of religion on entrepreneurship.

The article is organized as follows. Section 2 discusses theoretically the factors that influence entrepreneurship and the alternative data sets. Section 3 addresses the empirical specifications, presents our novel approach for a new set of data based on LinkedIn and raises our hypotheses. Section 4 analyzes our empirical results. Section 5 concludes and discusses the important policy implications derived from the results.

2 Entrepreneurship

2.1 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 attempt to explain entrepreneurship as a function of the nature of people engaged in entrepreneurial activity (Khilstrom and Laffont 1979); this is referred to as the micro approach to entrepreneurship research. 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) such as the local entrepreneurial environment, local culture and economic environment. This is referred to as the macro approach to entrepreneurship research (Ardichvili et al. 2003; Eckhardt and Shane 2003; Shane and Venkataraman 2000; Venkataraman 1997). Our study will focus mainly on the macro approach.

2.2 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 activities (through the political and legal arena, e.g., lobbying and lawsuits). This decision is influenced by the corresponding personal utilities arising from these activities, which in turn are shaped, on top of “indigenous” personal preferences, by the quality of the country’s social, culture, 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 the government's ability to transfer wealth through taxation and regulation, the profitability of unproductive political and legal entrepreneurship is reduced. Under this incentive structure, creative individuals are more likely to engage in the creation of new wealth through productive entrepreneurship. Accordingly, 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. These prevailing economic and political institutions are partially shaped by the country's main religion. According to Drakopoulou-Dodd and Gotsis (2007, 2009), religious belief may also influence individual ethical decision-making, thus favoring productive to unproductive entrepreneurial activity. Barro and McCleary (2003) stress that culture and religion are usually thought to affect personal traits such as honesty, thrift or openness to strangers. Moreover, within different religions, the value of wealth accumulation, innovating, and taking active responsibility for one's fate is different. Thus, following Baumol's theory, we claim that specific religions' norms might be associated with productive entrepreneurship rather than unproductive entrepreneurship.

2.3 Factors influencing entrepreneurship

The entrepreneurship literature periodically investigated which factors explain national entrepreneurship levels. This question has been examined through the lens of economic, technological, demographic, cultural and institutional variables (Acs et al. 2004; Audretsch and Thurik 2001; Bosma and Harding 2006; Bosma et al. 2007; Minniti et al. 2005; Reynolds et al. 2002; Reynolds et al. 2003; Thomas and Mueller 2000; Verheul et al. 2002).

2.3.1 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, competitiveness, population growth, human capital and the availability of risk capital were important in explaining regional variation in firm birth rates (Acs and Szerb 2007; Acs and Varga 2005; Armington and

Acs 2002; Lee et al. 2004; Wennekers and Thurik 1999).

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 (such as culture) are at play (Freytag and Thurik 2007; Grilo and Thurik 2005).

2.3.2 Social, cultural and institutional factors influencing entrepreneurship

Cultural aspects are assumed to shape the environment in which business is conducted (Freytag and Thurik 2007; Hofstede 2001). 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 (Freytag and Thurik 2007; Mueller and Thomas 2001; Stevenson and Lundström 2001). For example, an entrepreneur requires making risky decisions in uncertain environments, and hence individuals in more risk-averse cultures are less likely to become entrepreneurs (Caliendo et al. 2009; Elston and Audretsch 2011). Thus, the role of culture in fostering or blocking entrepreneurship was the interest of many studies (Busenitz et al. 2000; Carsrud and Johnson 1989; Davidson 1995; Davidson and Wilklund 1997; Hayton et al. 2002; Huisman 1985; Hunt and Levie 2004; Lee and Peterson 2000; Levie and Hunt 2004; McGrath and MacMillan 1992; Mueller and Thomas 2001; Shane 1993; 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). Some evidence exists showing that specific social and cultural characteristics are associated with national levels of entrepreneurship (Licht and Siegel 2006; Thomas and Mueller 2000; Thornton 1999). For example, Suddle et al. (2007) found, based on a survey of 28 countries, that entrepreneurial culture [a composite indicator, including cultural variables from various sources such as the World Values Survey (WVS)], need for achievement and achievement-motivation indices (Granato et al. 1996; Lynn 1991) and the GLOBE (House et al. 2004) performance-orientation index were significantly and positively related to nascent entrepreneurship, after controlling for economic,

institutional and demographic factors. Moreover, Perotti and Volpin (2004) suggest that lack of political (democratic) accountability and economic inequality hinder entrepreneurial activity. Lee et al. (2004), and Florida (2008) argues that social diversity also has a positive relationship with the rate of new firm formation. Zelekha (2013) suggests that country-specific characteristics—in particular urban, open, competitive and culturally diversified (including open minded for ethnic and gender diversity)—significantly influence the positive effect of immigrants on the country's level of entrepreneurship.

2.3.3 Religion and entrepreneurship

Recent studies argue that a relationship between religion and economic performance exists (Barro and McCleary 2003; Grier 1997; Guisa et al. 2006; McCleary and Barro 2006; McCleary 2008; Noland 2003). The literature suggests that the attitude toward entrepreneurship is one of the channels in which religion might affect economic performance. However, the influence of religious factors on entrepreneurship is a poorly understood phenomenon because the relationship is complex and indirect. The theoretical perspectives on this issue are undeveloped, and current empirical data are scarce. Moreover, the relationship between religion and entrepreneurship, at the individual level, is interdependent and affected by a wide range of additional factors such as personality, ethnicity, network structures, education (Carswell and Rolland 2004) and risk attitude (Caliendo et al. 2009). This relation is also interdependent at the macro level and affected by the political regime and national cultural factors.

Carswell and Rolland (2007) argue that religious practices are expected to affect individual and societal perceptions of entrepreneurial activities, given the religious belief systems and their significance for societal goals. Drakopoulou-Dodd and Seaman (1998) summarized three channels in which religion influences entrepreneurship: individual religious loyalty as a linkage of faith and entrepreneurial behaviors, shared religion as a synthesizer of societal meaning systems that enhance trust and religion as a symbolic role enacted by entrepreneurs. Dana (2009) shows that: (1) various religions value entrepreneurship to different degrees; (2) different religions yield dissimilar patterns of entrepreneurship; and (3) credit

networks, employment networks, information networks and supply networks of co-religionists affect entrepreneurship.

While, as mentioned above, the positive impact of religion on entrepreneurship has been conceptualized in the case of the Protestant work ethic (Weber 1904; Tawney 1926; Carswell and Rolland 2004 and others), the effects of different religions on entrepreneurship may be diverse, and certainly they are not easily subject to abstract reasoning and theoretical conceptualization. In fact, there are very limited works conceptualizing the specific effects of various religions on economic development and entrepreneurship. In the following we present the limited empirical evidence and theoretical reasoning regarding the impact of different religions on entrepreneurship.

As mentioned above, Weber (1904), Tawney (1926), Huntington (1996) and Landes (1999) argue that the Protestant work ethic (as opposed to the Catholic work ethic) provides a favorable climate for entrepreneurial activity. They argue that the Protestant (particularly Calvinist) work ethic influenced large numbers of people to engage in work in the secular world, developing their own enterprises, engaging in trade and accumulation of wealth, while the Catholic work ethic does not appreciate such wealth accumulation. Moreover, Becker and Woessmann (2009) found that Protestantism led to a higher educational level, which positively influenced the economic growth and entrepreneurship level. In addition, MacDonald (1972) found that Protestants tend to have a higher tendency for an internal locus of control (which is a significant psychological characteristic of entrepreneurs—see Brockhaus and Horwitz 1986) compared with Catholics. For an extensive overview of the literature, see Light (2010).

H1a The existence of a Protestant majority (or the higher the share of Protestants) in a country will have a positive effect (compared with Catholics) on the level of entrepreneurs in that country.

H1b The existence of a Catholic majority (or the higher the share of Catholics) in a country will have a negative effect (compared with Protestants) on the level of entrepreneurs in that country.

Gotsis and Kortezi (2009) conceptualized the potential benefits regarding creating social capital (for example, favoring network building among ethnic

communities) derived from the Greek Orthodox work ethic and theology. As a result, they expect positive effects, mainly through various cultural transmissions of Greek Orthodox, on the entrepreneurial process. Sherman (1997) documents a positive effect of religious orthodoxy upon both the attitudes and actions favorable to economic progress. Dana (2009) argues that Greek Orthodoxy fosters a work ethic and leadership style that may facilitate successful entrepreneurship (see more details in Tassiopoulos 2010).

H1c The existence of a Greek Orthodox majority (or the higher the share of Orthodox) in a country will have a positive effect (compared with Catholics) on the level of entrepreneurs in that country.

Jewish immigrants are well known to have high levels of entrepreneurs in their host countries. The explanation for this high proportion of Jewish entrepreneurs is related to their investment in education (Botticini and Eckstein 2005, 2007; Chiswick 1983),² the strong trust and nested network of the Jewish society (Godley 1996) and the high respect the Jewish religion has toward innovative thinking and action. For example, Minns and Rizov (2005), in a study of self-employment in Canada at the beginning of the twentieth century, found higher rates of self-employment for the Jewish members.

H2 The existence of a Jewish community in a country will have a positive effect (compared with all other religions) on the level of entrepreneurs in that country.

Collins (1997) outlines a framework by which elements of a traditional Buddhist society provide means to overcome social obstacles to economic reform and create the preconditions for entrepreneurial change. On the other hand, Dana (1995) claims that in some Buddhist cultures, socially embedded conceptions of Right Livelihood may actually militate against entrepreneurial activities, in particular, to avoid opportunities entailing creative destruction. Audretsch et al. (2007) presents evidence that Buddhism is inhibiting entrepreneurship in India.

² Botticini and Eckstein (2005, 2007) emphasized the transformation in the Jewish religion about the year 70 AD toward understanding the Torah. Each Jew was responsible for teaching his sons to read and understand Jewish rules. By this fact, Jews gained a competitive advantage in the form of human capital.

H3 The existence of a Buddhist majority (or a high the share of Buddhists) in a country will have a negative effect (compared with Protestants) on the level of entrepreneurs in that country.

Systematic research on the impact of Hinduism on entrepreneurship is scarce. However, the limited anecdotal findings suggest that it has a positive impact. Contrary to Weber's argument, many researchers suggest that the Hindu work ethic is quite similar to the Protestant work ethic. This includes a high degree of trade morality, free competition and the pursuit of wealth without guilt (Vinod 2012). Thus, as Weber suggested regarding the Protestants, this ethic can support entrepreneurship. Shukla (2007) argues that the Hindu system is quite effective in developing an entrepreneurial class. Field et al. (2010) suggested that in the Hindu system lower castes have the highest returns to entrepreneurship. Vinod (2012) describes the unexpected benefits of the Hindu caste system in helping amass social capital through risk-sharing, while nurturing entrepreneurship traits. Christopher (2011) suggests that Hinduism enhances entrepreneurship as Hindu entrepreneurs integrate their personal religious values into their entrepreneurial motivations and behavior.

H4 The existence of a Hindu majority (or the higher the share of Hindus) in a country will have a positive effect (compared with Catholics) on the level of entrepreneurs in that country.

Regarding Islam, to the best of our knowledge, a limited amount of empirical work has been done to confirm or contradict the well-known claim in the literature that Islam discourages entrepreneurship; see for example Lewis (2002). Landes (1999) argues that Islam has a negative effect on economic development and entrepreneurship. Accordingly, Islam's culture is related to a lack of freedom and limited property rights suppressing business, competition and economic development. Other aspects of Islam are insignificance of individuals and fatalism. These aspects discourage individual efforts and thus competition and entrepreneurship. According to Huntington (1996) other factors that hold down the economic development and entrepreneurship are mistrust of science, conservatism and traditionalism. Kuran (2007) suggests that the cause of economic underdevelopment in the Muslim world should be seen in inadequate institutions. He argues

that Islamic countries suffer from lack of adequate organizational capabilities to use new technologies. Moreover, Arslan (2001) found evidence that Muslims have a relatively low level of internal locus of control. Bartke and Schwarze (2008) found that Muslims are less risk-tolerant than Christians. Ghoul (2010) elaborates on factors that are currently impeding the emergence of Islamic entrepreneurship, including divergent interpretations given to the prohibitions put by the Muslim religion.

H5 The existence of a Muslim majority (or the higher the share of Muslims) in a country will have a negative effect (compared with all other religions) on the level of entrepreneurs in that country.

Dana (2009) argues that regardless of whether a person is religious, he or she is influenced by the values propagated by the dominant religion in his/her country. However, studies on the economic impact of religions, which are derived from Weber's focus on the spirit of the religious person, ignore such macro impact of religion on the national entrepreneurship level.

We suggest that culture, which religion is an important part of, may influence the macro exploitation of entrepreneurial opportunity through influencing the desirability, the perceived risks and the returns of entrepreneurial activities. We contribute to the existing theory by suggesting that the macro effect of religion as part of the country's culture affects a country's level of entrepreneurship beyond the effects of religion on the behavior of the religion's members in the society. Therefore, the effect of a country's majority religion will be similar even on the minority's members—i.e., the share of Protestants in a Catholic country will not change its entrepreneurship levels significantly and vice versa.

The existing literature actually gives some support to this mechanism. Barro and McCleary (2003) found that while religion has a positive impact on economic development, increases in church attendance, for given religious beliefs, actually reduce economic growth. This may suggest that the positive impact of religion is through the influence on the political regime. Huntington (1996) connects positive development in the Christian countries with the process of secularization. He stresses that the separation of secular and Church power led to the support of property rights, which is positive for economic development. The driving force for secularization in Christianity was Protestantism.

Finally, according to Arruñada (2010) Protestantism seems conducive to capitalist economic development, not by the direct psychological route of the Weberian work ethic but rather by promoting an alternative social ethic that is arguably more conducive to developing impersonal trade.

H6 Macro effects of religion, as parts of the country's culture, affect a country's level of entrepreneurship beyond the effects of religion on the behavior of the religion's members in the society.

2.4 Empirical challenges in the research of national entrepreneurship levels

One of the major obstacles that prevented previous empirical research is the scarcity of relevant data. Therefore, until a decade ago, the main line of research on entrepreneurship was based on estimating survey-based perceptions (mainly of MBA students) in small international samples regarding cultural, political and economic factors.

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 in 1999 with 10 countries, and in 2010 consisted of 59 countries. It measures entrepreneurship through both surveys and interviews with field experts, conducted by a team for each country. For the past 10 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 2010 data are based on a survey of 175,000 individuals in 59 countries.

However, there is significant criticism of GEM data. Scholars in the field of entrepreneurship presented several limitations in the GEM data main index—'total early stage entrepreneurial activity' (TEA) index—such as not capturing entrepreneurship in existing businesses, capturing both opportunity and necessity entrepreneurs in the same index, data inconsistency and different interpretation of the survey questions (should self-employment be regarded as entrepreneurship) over countries (see Acs 2006; Audretsch 2002; Baumol et al. 2007; Godin et al. 2008; Hindle 2006). Acs (2006) argued that one of the most troubling findings based on

GEM data is that the TEA index does not reflect the assumed linear relationship between entrepreneurship and economic development (according to the TEA index the rate of entrepreneurship in developing countries is higher than the rate in developed countries).³ Since the Protestant countries are more associated with the developed economies (see Barro and McCleary 2003), the bias can be significant; therefore, examining the effect of different religions using the GEM's data set may be inappropriate.

Due to the significant limitations of GEM data, a new index for measuring entrepreneurial activity was launched in 2010—the Global Entrepreneurship and Development Index (GEDI) by Acs and Szerb (2009, 2011). The GEDI offers a measure of quality and scale of entrepreneurship activity in 71 countries. It also captures the contextual features of entrepreneurship by measuring entrepreneurial attitudes, activity and aspirations. Entrepreneurial activity in the GEDI index is defined as startup activity in the mid- and high-technology sectors, initiated by educated entrepreneurs and launched because of opportunity motivation. This index, in contrast to the GEM index, presents the theoretical assumed linear relationship between entrepreneurship and economic development (Acs and Autio 2010).

Our new cross-country founders' data set was collected from LinkedIn. This online professional networking resource is targeted to executives of various organizations in approximately 200 countries. LinkedIn contains profiles of over 120 million members as of October 2011. This professional network is biased toward high-level 'managerial and entrepreneurial' positions.⁴ LinkedIn enables enhanced professional networking. Thus, entrepreneurs are expected to be the early adopters of this online network (Burt 2000).

LinkedIn 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 an incentive to report correctly because each member's profile is available for verification by other LinkedIn members. Individuals who report incorrect information risk being censored from membership. Thus, there is a transparency that may make these data more accurate than survey data.

LinkedIn members are asked to indicate the title and description of their current and past work position. A possible work position title is 'founder' (or 'co-founder'). According to LinkedIn (as of November 2011), there are 706,000 entrepreneurs (members who are currently or were previously titled as founders) and 493,000 current founders (people whose last position is founder of a company) worldwide (0.24 % of the *LinkedIn* membership), and 400,000 US entrepreneurs and 274,000 current US founders. The number of ICT founders in LinkedIn is more than 124,000 worldwide and more than 56,000 in the US.

We relied on the following data collection procedure. Each LinkedIn member provides a professional profile that includes current and prior employment and positions held. We used the advance search function. In the position title line, we wrote 'founder' with the timing of 'current.' In the location line, we chose each country separately. In the industry field, we marked all industries (for a robustness test we used also 'current or past' founders and only ICT sectors—the correlation was above 0.99). We conducted this procedure originally in September 2009, and we conducted this procedure again in October 2011 as a robustness test. We believe that it is better to evaluate the influence of religion on stock economic variables. Therefore, our benchmark regressions used the stock number of founders in September 2009. As a robustness test, we used a flow figure—the number of new founders added between September 2009 and October 2011.

With any data source, there are questions about reliability. Avnimelech and Feldman (2010) vetted the data with detailed information on entrepreneurial start-ups in the Triangle Regional Entrepreneurial Express (TREE) database.⁵ Moreover, they found no evidence of geographical bias of LinkedIn data within

³ Bosma et al. (2009) suggests that it is certainly not the case that higher TEA rates are always to be preferred. In developing economies, for example, a reduction in the TEA rate may be seen as a good sign because it may signal a decline in the rate of necessity entrepreneurship due to increased job opportunities, while in developed economies, a growth in the TEA rate is often seen as a good signal.

⁴ LinkedIn is used by its members to expand and manage their professional networks; thus, it is mainly used in positions in which business networks are important, such as in high level managerial and entrepreneurial positions.

⁵ They found that LinkedIn captured at least 70 % of the past and present entrepreneurs in the TREE database and almost all currently active entrepreneurs.

the US. In addition, we tested the correlation between the number of founders in each country according to LinkedIn data (founders who founded a firm between September 2009 and October 2011) and the GEDI Index and the GEM opportunity entrepreneurs for each country and found they exhibit strong and positive correlation (0.79 and 0.51⁶). We also tested the correlation between LinkedIn founders' data and several other related indicators: country's patent application data, the Global Competitiveness Index, the ease of doing business index and TI index of the corruption level; we found strong and positive correlation with all of these indexes (0.57, 0.65, 0.59 and 0.67, respectively).

While the age distribution of LinkedIn users is significantly different from world population age distribution, it is quite similar to the common age distribution of entrepreneurs.⁷ While there are different adoption rates in various countries, we believe that at the highest executive level (including company founders) there is a very high level of adoption of LinkedIn in all countries. Moreover, we believe that most entrepreneurs, regardless of their age or country of origin, will use LinkedIn as it is a significant tool for entrepreneurs to extend their business networks. Thus, we suggest that the number of entrepreneurs of high-growth firms in LinkedIn has minimal if any biases.

There are clear limitations to these data. First, when calculating the growth in the number of founders in LinkedIn between two points of time, we cannot be sure how much growth is attributed to new founders and how much is attributed to old founders that are new members. However, as we suggested above, the

⁶ The GEM data are known for their limitations (one of them is a bias toward necessity entrepreneurship). Therefore, we tested the correlation between the number of founders in each country according to LinkedIn data and the GEM Index of opportunity entrepreneurs.

⁷ According to the US Census Bureau (2012) the world population age distribution is the following: less than 18: 30.3 %; 18–24: 12.8 %; 25–34: 15.5 %; 34–44: 13.8 %; 45–54: 11.3 %; 55–64: 8.3 %; over 65: 8.0 % (average age, 31.5). According to GEM 2004, the distribution of entrepreneurs' age (age when establishing the firm) is the following: less than 18: not included in the sample; 18–24: 12.0 %; 25–34: 32.3 %; 34–44: 30.6 %; 45–54: 17.4 %; 55–64: 6.7 %; over 65: 10.0 % (average age, 44). According to Google's ad planner (see the following exhibit), the distribution of age of LinkedIn (2011) members is the following: less than 18: 1 %; 18–24: 5 %; 25–34: 15 %; 35–44: 32 %; 45–54: 30 %; 55–64: 13 %; over 65: 4 % (average age, 43.5).

entrepreneurs are probably the early adaptors of LinkedIn and thus already present very high adoption levels in LinkedIn. Second, the usage of LinkedIn by entrepreneurs could be driven from the country economic development stage or technology adaptation level. Therefore, we will use several controls in order to eliminate potential bias such as GDP per capita, Facebook usage level and Internet usage level. Third, we do not have the timing of the startups' founding. However, the fact that we also use, as a robustness check, the gap between two points of time prevents this problem. Fourth, LinkedIn is assumed to be biased toward ICT or high growth entrepreneurs. However, even if our results are relevant only to ICT founders, we still believe they are important. Fifth, LinkedIn individual member's data are based only on the current geographical location. LinkedIn does have data on companies' geographical location, headquarters and origin; however, this is a separate database that cannot be merged to the founder's data.

This database presents a 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, LinkedIn presents a "survey" of 120+ million members (as of October 2011) within almost 200 countries and presents almost the entire population of entrepreneurs; thus, it is much more accurate than other entrepreneurial data sets. Third, LinkedIn is continuously updated by its users and can give 'real-time' results. Fourth, LinkedIn is rich with other educational and professional background data. Therefore, it could be a platform for many important researches on entrepreneurship career profiles. Fifth, LinkedIn is a location-based network and thus can be used for regional studies as well.

3 The empirical estimation and database

The basic equation we use to estimate the parameters affecting the number of entrepreneurs is derived from the literature described and consists of the following parameters.

In order to estimate the number of entrepreneurs, *Entrep*, we employed a unique data set based on the online professional network of trusted business contacts—LinkedIn. While our dependent variable is the number of LinkedIn entrepreneurs per 1 million

population in a country, we can assume that this includes only “productive” entrepreneurs (we would not expect to find founders of illegal or non-ethical organizations in LinkedIn profiles).⁸ Moreover, we assume that these numbers will represent mainly the entrepreneurs of high-growth firms, which require intensive networking efforts.

In order to capture the effect of religion and test our hypothesis, we started by employing variables capturing the share in the population of the country’s various religions for each of the seven world’s main religions (Protestants, Catholics, Orthodox, Muslims, Jewish, Buddhists and Hindus), *relig* (Table 1). In an alternative specification (Table 2), we employed a dummy variable for the country’s majority religion as well as a dummy variable for the countries whose main religion is other (mainly African Christians and pagan countries). In the last specification (Table 3), we used both religion dummy variables and share in the population variable.⁹ In addition, we examined the country minorities’ share, *Minor*, using a measure for religious diversity. The different specifications allow us to compare whether the macro effects of the main religion on the country’s culture are establishing the country’s level of entrepreneurship beyond the religions’ effects on the behavior of the religion’s members in the society.

Following the literature described, we will also include in the specifications the human capital parameters, *HC*, using school life expectancy, the level of literacy and the level of education expenditures to product, which are expected to affect entrepreneurs positively since they create a skilled labor force that can take advantage of business opportunities; the level of corruption, *Corp*, using the TI index of the corruption level following Tanzi and Davoodi (1997), Lambsdorff (1999) and others,¹⁰ which is expected to affect

entrepreneurs negatively since it affects the incentive structure; the competitiveness level, *Comp*, which is expected to affect entrepreneurs positively since it affects 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, which is expected to influence negatively entrepreneurs since it distorts equal access to business opportunities; the country credit rating, *C*, which is expected to influence positively entrepreneurs ability to raise finance; the participation of women in the labor force, *W*, using female school life expectancy or female literacy, which is associated with a culture supportive of entrepreneurship (Florida 2008); the country poverty share, *Pov*; the strength of the democratic institutions including freedom of the press and independence of the judiciary system, *Demo*, using the democracy rank published by World Audit (an international not-for-profit company, registered in England by the registered charity, World Concern); and the urbanization level of the country, *Urban*, using share of urban population and population density, which are expected to have a positive effect since entrepreneurship and innovation are known to flourish in urban areas.

It should be stressed that we did not include the equation variables that are expected to influence the entrepreneurship level but at the same time are assumed to have strong causality or simultaneity problems with entrepreneurship such as GDP and Growth (Boettke and Coyne 2003). However, the information behind these variables is represented via some of the main variables, such as human capital and competitiveness.

Hence, the following equation for estimating a country level of entrepreneurs was used:

$$\begin{aligned} \ln Entrep = & A + a_1 \ln Relig + a_2 \ln HC + a_3 Corp \\ & + a_4 Comp + a_5 G + a_6 \ln C + a_7 Urban \\ & + a_8 W + a_9 \ln Minor + a_{10} Pov \\ & + a_{11} \ln Demo + \varepsilon_t \end{aligned} \quad (1)$$

where *A* is the constant variable, and ε_t is the error term.

⁸ 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 pornography 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.

⁹ In order to prevent strong correlations within the two sets of religion variables, following a step-wise process, we left only the variable that had the more significant impact.

¹⁰ 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

Footnote 10 continued

including ICRG and the level of the economy openness and competitiveness (as measured by the level of foreign trade to product or the index of economic freedom published by the Fraser Institute).

Table 1 Using only religion majority dummy variables (other religion omitted), estimation of equations explaining the effect of religion on entrepreneurship

Variable ^a	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Constant	-4.22 (-3.89)	-4.42 (-4.13)	-4.29 (-4.04)	-3.27 (-2.84)	-3.31 (-2.92)	-2.45 (-2.23)	-2.49 (-2.28)	-1.23 [‡] (-1.06)	-3.21 (-3.02)
Ln Cpi score	1.73 (6.11)	1.82 (6.46)	1.73 (6.12)	1.79 (6.37)	1.73 (6.23)	1.52 (5.61)	1.48 (5.50)	1.15 (3.98)	1.25 (4.72)
Ln female school life expectancy	1.44 (3.70)	1.36 (3.55)	1.17 (2.96)	0.98 (2.45)	1.00 (2.54)	0.85 (2.26)	0.74 (1.96)	0.43 [‡] (1.10)	0.49 [‡] (1.32)
Level of foreign trade in product	0.47 (3.19)	0.52 (3.62)	0.49 (3.41)	0.53 (3.67)	0.57 (3.96)	0.46 (3.40)	0.47 (3.49)	0.46 (3.51)	0.43 (3.31)
Ln democracy rank	-0.55 (-3.81)	-0.49 (-3.33)	-0.47 (-3.20)	-0.44 (-3.04)	-0.44 (-3.03)	-0.56 (-4.00)	-0.55 (-3.96)	-0.58 (-4.24)	-0.52 (-3.88)
Ln population density	0.19 (3.74)	0.16 (3.22)	0.18 (3.51)	0.15 (3.02)	0.16 (3.26)	0.13 (2.82)	0.14 (2.88)	0.11 (2.24)	0.11 (2.46)
Share of urban population	-	-	0.77 (1.91)	0.71 (1.78)	0.66 (1.68)	1.00 (2.64)	1.33 (3.27)	1.16 (2.85)	0.87 (2.11)
Urbanization growth rate	-	-	-	-	-	-	2.43 (2.10)	2.47 (2.18)	1.82 [‡] (1.63)
Literacy	1.70 (2.64)	1.32 (3.22)	1.27 (1.97)	0.83 [‡] (1.23)	0.80 [‡] (1.21)	0.90 [‡] (1.43)	0.97 [‡] (1.54)	0.50 [‡] (0.79)	0.73 [‡] (1.20)
Dummy	-	2.66 (2.72)	2.44 (2.49)	2.35 (2.42)	2.37 (2.49)	1.83 (2.00)	1.79 (1.97)	2.02 (2.25)	1.71 (1.95)
Jewish	-	0.89 [‡] (1.50)	0.97 (1.66)	0.78 [‡] (1.32)	0.75 [‡] (1.29)	0.60 [‡] (1.08)	0.69 [‡] (1.26)	0.68 [‡] (1.26)	0.46 [‡] (0.86)
Hindu	-	0.87 (3.01)	0.93 (3.23)	0.73 (2.44)	0.66 (2.24)	0.48 (1.67)	0.56 (1.94)	0.50 (1.79)	0.34 [‡] (1.22)
Protestant	-	0.87 (2.45)	0.82 (2.32)	0.65 (1.82)	0.64 (1.81)	0.77 (2.28)	0.83 (2.48)	0.75 (2.27)	0.64 (1.98)
Orthodox	-	0.42 (1.88)	0.41 (1.82)	0.27 [‡] (1.19)	0.25 [‡] (1.08)	0.30 [‡] (1.38)	0.32 [‡] (1.49)	0.33 [‡] (1.54)	0.12 [‡] (0.38)
Catholic	-	0.65 (1.90)	0.66 (1.96)	0.37 [‡] (1.03)	0.35 [‡] (0.99)	0.37 [‡] (1.09)	0.40 [‡] (1.18)	0.47 [‡] (1.41)	0.17 [‡] (0.56)
Buddhist	-	0.30 [‡] (1.31)	0.19 [‡] (0.84)	0.05 [‡] (0.19)	0.03 [‡] (0.12)	0.01 [‡] (0.05)	0.00 [‡] (0.02)	-0.09 [‡] (-0.42)	-0.19 [‡] (-0.87)
Muslim	-	-	-	-0.51 (-2.18)	-0.52 (-2.23)	-0.56 (-2.50)	-0.59 (-2.67)	-0.53 (-2.41)	-0.52 (-2.45)
Africa	-	-	-	-	1.55 (2.27)	-	-	-	-
N. America	-	-	-	-	-	0.72 (4.59)	0.72 (4.64)	0.75 (4.91)	0.59 (3.91)
UK	-	-	-	-	-	-	-	0.25 (2.70)	-
Ln Internet penetration rate	-	-	-	-	-	-	-	-	0.21 (3.78)
Ln facebook penetration rate	-	-	-	-	-	-	-	-	-
No. of observations	176	176	176	176	176	176	176	176	176

Table 1 continued

Variable ^a	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
R^2	0.81	0.83	0.83	0.84	0.84	0.86	0.86	0.87	0.87
Adj. R^2	0.80	0.82	0.82	0.82	0.83	0.84	0.85	0.85	0.86
SE	0.98	0.95	0.94	0.93	0.92	0.88	0.87	0.87	0.84

t values appear in parentheses

‡ Non-significant variable

^a The equations are in log-linear form and therefore CPI score, Females school life expectancy, Population density and Democracy rank variables are expressed in natural logarithms

Table 2 Using only religion share in population variables, estimation of equations explaining the effect of religion on entrepreneurship

Variable ^a	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Constant	-4.22 (-3.89)	-4.96 (-4.40)	-4.83 (-4.33)	-3.56 (-3.05)	-3.65 (-3.17)	-2.71 (-2.41)	-2.78 (-2.50)	-1.57‡ (-1.34)	-3.37 (-3.13)
Ln CPI score	1.73 (6.11)	1.77 (6.24)	1.66 (5.86)	1.77 (6.33)	1.72 (6.21)	1.53 (5.67)	1.49 (5.55)	1.17 (4.09)	1.23 (4.66)
Ln female school life expectancy	1.44 (3.70)	1.41 (3.65)	1.17 (2.97)	0.92 (2.32)	0.94 (2.41)	0.80 (2.14)	0.69 (1.83)	0.37‡ (0.96)	0.44‡ (1.20)
Level of foreign trade in product	0.47 (3.19)	0.53 (3.62)	0.49 (3.38)	0.54 (3.79)	0.58 (4.11)	0.48 (3.52)	0.48 (3.61)	0.48 (3.67)	0.44 (3.42)
Ln democracy rank	-0.55 (-3.81)	-0.48 (-3.20)	-0.45 (-3.05)	-0.40 (-2.75)	-0.39 (-2.71)	-0.52 (-3.71)	-0.51 (-3.66)	-0.53 (-3.93)	-0.47 (-3.53)
Ln population density	0.19 (3.74)	0.16 (3.09)	0.17 (3.45)	0.15 (2.92)	0.16 (3.19)	0.13 (3.69)	0.13 (2.76)	0.10 (2.09)	0.11 (2.53)
Share of urban population	-	-	0.94 (2.30)	0.84 (2.08)	0.79 (2.00)	1.08 (2.80)	1.45 (3.48)	1.26 (3.05)	0.96 (2.29)
Urbanization growth rate	-	-	-	-	-	-	2.56 (2.21)	2.62 (2.31)	1.93 (1.72)
Literacy	1.70 (2.64)	1.57 (2.38)	1.52 (2.33)	0.85‡ (1.27)	0.83‡ (1.24)	0.88‡ (1.37)	0.94‡ (1.49)	0.47‡ (0.74)	0.69‡ (1.13)
Jewish Percentage	-	3.75 (2.82)	3.42 (2.59)	3.40 (2.64)	3.43 (2.70)	2.77 (2.25)	2.73 (2.25)	3.10 (2.59)	2.42 (2.07)
Hindu Percentage	-	1.72 (2.07)	1.98 (2.39)	1.52 (1.84)	1.51 (1.86)	1.14‡ (1.45)	1.33 (1.71)	1.36 (1.79)	0.75‡ (0.98)
Protestant Percentage	-	1.29 (2.51)	1.42 (2.78)	1.32 (2.65)	1.30 (2.65)	0.97 (2.01)	1.11 (2.31)	1.11 (2.38)	0.60‡ (1.25)
Orthodox Percentage	-	0.88 (1.72)	0.88 (1.73)	0.74‡ (1.49)	0.75‡ (1.54)	0.97 (2.04)	1.08 (2.30)	1.06 (2.31)	0.62‡ (1.32)
Catholic Percentage	-	0.62‡ (1.43)	0.56‡ (1.31)	0.47‡ (1.10)	0.47‡ (1.13)	0.57‡ (1.42)	0.59‡ (1.48)	0.62‡ (1.61)	0.05‡ (0.13)
Buddhist Percentage	-	0.78‡ (1.38)	0.83‡ (1.49)	0.43‡ (0.76)	0.43‡ (0.78)	0.48‡ (0.89)	0.54‡ (1.02)	0.67‡ (1.29)	-0.09‡ (-0.17)

Table 2 continued

Variable ^a	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Muslim	–	0.54 [‡]	0.40 [‡]	0.25 [‡]	0.25 [‡]	0.20 [‡]	0.21 [‡]	0.15 [‡]	–0.30 [‡]
Percentage	–	(1.31)	(0.98)	(0.62)	(0.63)	(0.53)	(0.57)	(0.40)	(–0.75)
Dummy	–	–	–	–0.67	–0.66	–0.68	–0.72	–0.64	–0.61
Africa	–	–	–	(–3.00)	(–3.01)	(–3.21)	(–3.44)	(–3.08)	(–3.00)
Dummy	–	–	–	–	1.61	–	–	–	–
N. America	–	–	–	–	(2.39)	–	–	–	–
Dummy	–	–	–	–	–	0.69	0.69	0.71	0.55
UK	–	–	–	–	–	(4.34)	(4.37)	(4.61)	(3.54)
Ln Internet penetration rate	–	–	–	–	–	–	–	0.25	–
	–	–	–	–	–	–	–	(2.81)	–
Ln facebook penetration rate	–	–	–	–	–	–	–	–	0.22
	–	–	–	–	–	–	–	–	(3.85)
No. of observations	176	176	176	176	176	176	176	176	176
R^2	0.81	0.83	0.83	0.84	0.85	0.86	0.86	0.87	0.88
Adj. R^2	0.80	0.81	0.82	0.83	0.83	0.84	0.85	0.85	0.86
SE	0.98	0.96	0.95	0.93	0.91	0.88	0.87	0.85	0.83

t values appear in parentheses

[‡] Non-significant variable

^a The equations are in log-linear form and therefore CPI score, Females school life expectancy, Population density and Democracy rank variables are expressed in natural logarithms

Table 3 Using both religion share in population and majority dummy, estimation of equations explaining the effect of religion on entrepreneurship

Variable ^a	C-1	C-2	C-3	C-4	C-5	C-6	C-7	C-8	C-9
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Dependent variable ^b	Founders stock	Founders stock	Founders stock	Founders stock	Founders stock	Founders stock	Founders stock	Founders stock	Founders flow
Constant	–4.22	–5.10	–4.97	–5.08	–3.91	–2.85	–4.48	–4.66	–6.35
	(–3.89)	(–4.71)	(–4.63)	(–4.75)	(–3.47)	(–2.35)	(–4.15)	(–4.11)	(–5.05)
Ln CPI score	1.73	1.84	1.73	1.68	1.76	1.49	1.44	1.38	1.43
	(6.11)	(6.64)	(6.21)	(6.04)	(6.43)	(4.99)	(5.29)	(4.61)	(4.68)
Ln female school life expectancy	1.44	1.34	1.15	1.06	0.81	0.55 [‡]	0.52 [‡]	0.54 [‡]	1.77
	(3.70)	(3.54)	(2.97)	(2.75)	(2.10)	(1.38)	(1.38)	(1.38)	(4.10)
Level of foreign trade in product	0.47	0.51	0.48	0.48	0.53	0.53	0.48	0.53	0.57
	(3.19)	(3.64)	(3.41)	(3.45)	(3.86)	(3.88)	(3.61)	(3.93)	(4.09)
Ln democracy rank	–0.55	–0.48	–0.46	–0.45	–0.40	–0.42	–0.39	–0.35	–0.15 [‡]
	(–3.81)	(–3.30)	(–3.17)	(–3.14)	(–2.82)	(–2.99)	(–2.87)	(–2.49)	(–0.93)
Ln population density	0.19	0.16	0.17	0.18	0.15	0.13	0.12	0.15	0.13
	(3.74)	(3.21)	(3.52)	(3.62)	(3.07)	(2.55)	(2.63)	(3.25)	(2.40)
Share of urban population	–	–	0.78	1.10	1.08	0.93	0.66 [‡]	0.65 [‡]	1.20
	–	–	(1.94)	(2.52)	(2.54)	(2.19)	(1.58)	(1.49)	(2.51)
Urbanization growth rate	–	–	–	2.22	2.55	2.60	1.93	2.14	2.76
	–	–	–	(1.82)	(2.13)	(2.20)	(1.69)	(1.81)	(2.06)

Table 3 continued

Variable ^a	C-1	C-2	C-3	C-4	C-5	C-6	C-7	C-8	C-9
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Dependent variable ^b	Founders stock	Founders stock	Founders stock	Founders stock	Founders stock	Founders stock	Founders stock	Founders stock	Founders flow
Literacy	1.70 (2.64)	1.51 (2.37)	1.48 (2.35)	1.59 (2.53)	0.98 [‡] (1.50)	0.57 [‡] (0.85)	0.70 [‡] (1.11)	0.44 [‡] (0.66)	1.24 (1.70)
Dummy	–	1.31 (3.32)	1.23 (3.11)	1.28 (3.25)	1.13 (2.91)	1.03 (2.67)	0.83 (2.22)	1.00 (2.62)	0.41 [‡] (0.95)
Orthodox	–	1.02 (2.75)	1.01 (2.73)	1.04 (2.82)	0.73 (1.95)	0.77 (2.07)	0.39 [‡] (1.09)	0.63 (1.72)	0.22 [‡] (0.53)
Dummy	–	0.80 (2.73)	0.67 (2.27)	0.67 (2.28)	0.50 (1.71)	0.39 [‡] (1.32)	0.14 [‡] (0.47)	0.24 [‡] (0.81)	–0.06 [‡] (–0.18)
Muslim	–	4.26 (3.30)	3.92 (3.03)	3.85 (3.00)	3.75 (2.98)	3.99 (3.21)	3.32 (2.77)	3.61 (2.93)	1.93 [‡] (1.39)
Jewish	–	2.13 (2.67)	2.30 (2.89)	2.46 (3.09)	2.00 (2.51)	1.97 (2.51)	1.38 (1.80)	1.89 (2.43)	1.89 (2.13)
Hindu	–	1.70 (3.74)	1.76 (3.90)	1.85 (4.11)	1.74 (3.94)	1.69 (3.87)	1.28 (2.94)	1.60 (3.67)	1.16 (2.35)
Protestant	–	1.01 (2.72)	0.92 (2.47)	0.91 (2.46)	0.78 (2.14)	0.74 (2.06)	0.37 (1.04) [‡]	0.64 (1.77)	–0.14 [‡] (–0.36)
Catholic	–	–	–	–	–0.62 (–2.80)	–0.56 (–2.55)	–0.51 (–2.41)	–0.56 (–2.58)	–0.39 [‡] (–1.59)
Percentage	–	–	–	–	–	0.22 (2.26)	–	–	–
Hindu	–	–	–	–	–	–	0.24 (4.26)	–	–
Percentage	–	–	–	–	–	–	–	0.30 (2.86)	–
Protestant	–	–	–	–	–	–	–	–	–
Catholic	–	–	–	–	–	–	–	–	–
Percentage	–	–	–	–	–	–	–	–	–
Dummy	–	–	–	–	–	–	–	–	–
Africa	–	–	–	–	–	–	–	–	–
Ln Internet penetration rate	–	–	–	–	–	–	–	–	–
Ln facebook penetration rate	–	–	–	–	–	–	–	–	–
Ln GDP per Capita 2008	–	–	–	–	–	–	–	–	–
No. of observations	176	176	176	176	176	176	176	176	176
R ²	0.81	0.84	0.84	0.84	0.85	0.85	0.87	0.86	0.81
Adj. R ²	0.80	0.82	0.83	0.83	0.83	0.84	0.85	0.84	0.79
SE	0.98	0.93	0.92	0.92	0.90	0.89	0.85	0.88	1.00

t values appear in parentheses

^a The equations are in log-linear form and therefore CPI score, Females school life expectancy, Population density and Democracy rank variables are expressed in natural logarithms

^b We used as the dependent variable the count of founders in the country at a given point of time (September 2009)—as the religion variables seem to be more related to explain stock variables. However, as robustness test we used also the count of founders add in a country between September 2009 and October 2011—a flow variable

[‡] Non-significant variable at 0.1 level

The combined sub-samples were structured into a large sample of 176 countries, which covers almost the entire world, omitting several observations: 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 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 religion on the number of entrepreneurs, in particular, produced high explanatory levels. The best version (A-9, Table 1) yielded $\bar{R}^2 = 0.86$ ($R^2 = 0.88$) and $SE = 0.84$ and $D.W. = 2.1$ (the Durbin Watson test, which indicates a lack of serial correlation); the worst version yielded $\bar{R}^2 = 0.79$ ($R^2 = 0.81$). It should be mentioned in this context that cross-section data are being used rather than time-series data; therefore, the $D.W.$ 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.

We performed three sets of regressions. The first set, presented in Table 1, uses only a share of specific religion members in the population variables. The second set, presented in Table 2, uses only religion majority dummies. The last set, presented in Table 3, uses both types of religion variables. Tables 1, 2 and 3 show 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 and ranking.

In the following, we will discuss the results regarding the explanatory variables excluding the religion variables based on version B-3. Human capital, which is significant in the model, is represented by the level of literacy,¹¹ whose coefficient reached 1.27 in version B-3. This positive result indicates that a skilled labor force that can take advantage of business opportunities is a crucial parameter affecting the number of entrepreneurs (see also versions A-3 and C-3 in Tables 1 and 3). In some of the versions, this variable is not significant because of the influence of the Africa dummy, which has very high negative correlation with literacy.

The economic level of openness and competitiveness, which is significant in the model (in all versions), is represented by the level of foreign trade (import and

export) to product, whose coefficient reached 0.49 in version B-3. 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, which is significant in the model (in all versions that exclude the Facebook and Internet penetration levels control variables), is represented by the female school life expectancy, whose coefficient reached 1.17 in version B-3. It should be stressed that the significance of the female school life expectancy is in addition to the positive effect of general level of literacy in the population, indicating the independent role of cultural conservatism in parallel to the positive effect of human capital. This might indicate that progressive and equal societies might be associated with more entrepreneurial activity.

The strength of the democratic institutions, which is significant in the model (in all versions), is represented by the democracy rank published by World Audit, whose coefficient reached -0.47 in version B-3, meaning that as the country's state of democracy deteriorates, so the number of entrepreneurs shrinks. In the versions presented, we did not include the country's competitiveness index, freedom of press index and strength of legal system index because of the strong correlation these variables have with the level of the democracy index. This result also indicates the importance of progress and an equal society on entrepreneurship.

The level of corruption in the economy, as represented by the country's corruption grade in the TI indexes, which is significant in the model (in all versions), was found to have a particularly high and negative coefficient, 1.73, in version B-3 (the higher the TI grade, the lower the level of corruption) and indicates that even a small change in the level of corruption can significantly reduce entrepreneurship rates.

The level of population density, *Dens*, which is significant in the model (in all versions), has a positive coefficient, 0.18, in version B-3, meaning that in dense societies we expect to see more entrepreneurs. The level of urban population, *Urban*, and the urban population growth rate, *Urbanrate*, are also both positive and significant.

The main variables in the estimation, the effect of different religions, were found to have different coefficients with the assumed ranking. In version

¹¹ Other variables that describe HC level were also significant but had lower levels of fitness.

B-3, all of the religion dummies were significant apart from the Muslim dummy (in version C-3, the Muslim dummy is also significant). In general, findings collected from the various versions suggest the following ranking of religion's positive effect on entrepreneurship tendency: Judaism, Hinduism, Protestantism, Greek Orthodoxy, Buddhism, Catholicism, Islam and other religions (including mostly paganism and African Christians).

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 correlated with the country's competitiveness index, represented it better; the country credit rating; the country minorities share; and the country poverty share probably due to the significant effect of both the level of literacy and the female school life expectancy.

4.1 Religions' share in the population effects on entrepreneurship

First, we examined whether the share of each religion in the population has an effect on entrepreneurship levels (Table 1). Version A-1 presents the basic model without the religion variables. Versions A-2 and A-3 present two specifications of the basic model with the religion variables. Versions A-4 to A-7 add geographical dummies. Versions A-8 and A-9 add Internet and Facebook penetration rate controls.

We found that the Jewish religion, Hindu religion, Protestant church and Orthodox church shares in the population variable have a significant effect (see version A-2 and A-3 in Table 1). In the following, we will discuss the results regarding the religion share in the population variables based on version A-3. The Jewish religion share in the population variable had the highest coefficient, 3.42 (support of H2); the Hindu religion share in the population variable coefficient reached 1.98 (support of H4); the Protestant share in the population variable coefficient reached 1.42 (support of H1a); the Greek Orthodox share in the population variable coefficient reached 0.88 in the same version (support of H1c); the Catholic share in the population variable coefficient reached 0.56 in the same version but was not significant; the Buddhist religion share in the population variable coefficient reached 0.83 but was not significant; the Muslim

religion share in the population variable coefficient reached 0.25 but was not significant; the other religion share in the population variable was omitted from all versions.

4.2 Religion majority dummy effects on entrepreneurship: macro effects

In order to examine our hypothesis that macro effects of religion as parts of the country's culture are affecting a country's level of entrepreneurship, we constructed several tests (Table 2).

First, we examined whether the religion majority dummies have an effect on entrepreneurship levels. We found that the Jewish religion, Hindu religion, Protestant church, Greek Orthodox church, Catholic church and the Buddhist religion majority variables have a significant effect (see version B-2 and B-3 in Table 2). These results were also more significant than the results of the religion variables in Table 1, suggesting that the macro level effect is more significant. Second, as mentioned, the country share of religion minorities' variable was not significant (see version B-4). This means that the effect of the majority dummy is not affected by the size of the majority religion. This may suggest that the effect we are capturing by the majority dummies is purely a macro effect (support of H6). In addition, we added specifications that include geographical dummies (versions B-5 to B-8) and Internet and Facebook penetration rate controls (versions B-9 and B-10).

In the following, we will discuss the results regarding the religion dummy variables based on version B-3 (Table 2). The Jewish religion majority dummy variable (has only one observation with the value 1) had the highest coefficient—2.44 (support of H2); the Hindu religion majority dummy variable (has only three observations with the value 1) coefficient reached 0.97 (support of H4); the Protestant church majority dummy variable coefficient reached 0.93 (support of H1a); the Greek Orthodox church majority dummy variable coefficient reached 0.82 in the same version (support of H1c); the Catholic church majority dummy variable coefficient reached 0.42 in the same version (support of H1b); the Buddhist religion majority dummy variable coefficient reached 0.66 (support of H3); the Muslim religion majority dummy variable coefficient reached 0.19 but was not

significant; the other religions majority dummy variable was omitted from all versions.

4.3 Religion mixed effects on entrepreneurship

Finally, in order to support our hypothesis that macro effects of religion as parts of the country's culture affect a country's level of entrepreneurship beyond the effects of religion on the behavior of the religion's members in the society, we added an additional set of regressions in which we included both types of religion variables. Due to the fact that we cannot examine both the specific religions share in the population variables and the dummy variables at the same specification because of multi-co-linearity of the two types of variables (for example, for the Protestant variables the Pearson correlation was 0.81), we tested which variable is more significant for each specific religion and left only that variable. The results of this process are presented in Table 3. Version C-1 presents the basic model without the religion variables. Versions A-2 to A-4 present three specifications of the basic model with the mixed religion variables. Versions A-5 to A-8 add geographical dummies and robustness control variables. Finally, version A-9 uses as the dependent variable the flow figure of LinkedIn entrepreneurs instead of the stock figure.

In the following we will discuss the results regarding the religion share in the population variables based on version C-3. The Jewish religion share in the population variable coefficient reached 3.92 (support of H2); the Hindu religion share in the population variable coefficient reached 2.30 (support of H5); the Protestant church share in the population variable coefficient reached 1.76 (support of H1a); the Greek Orthodox church majority dummy variable coefficient reached 1.31 in the same version (support of H1c); the Catholic church share in the population variable coefficient reached 0.92 (support of H1b); the Buddhist religion majority dummy variable coefficient reached 1.01 (support of H3); the Muslim religion majority dummy variable coefficient reached 0.67 (support of H5); the other religion majority dummy variable was omitted from all versions.

4.4 Control variables

In order to examine the robustness of the results, various control variables were added to the estimation.

The *first* control variable was unemployment rate, since it may be connected with growth in necessity entrepreneurs. This variable, *Unemp*, was not significant. The *second* types of control variables were variables for colonial history (dummy variables for colonies under the following countries: Britain, France, Portugal, Belgium, The Netherlands, Germany, Spain and the Ottoman Empire or part of the Soviet Union) since they may influence the cultural and the human capital aspects of the economies. Thus, a variable for every colonial power was added, and only the variable for the British Empire, *UK*, was found to be significant and positive (meaning contributes to entrepreneurship), and its coefficient reached the level of 0.72 (see version B-8 in Table 2). However, we found that the *UK* variable is highly correlated with the Protestant church variable (as expected) and therefore had to be omitted. In any case, these findings are consistent with those reported in the literature with regard to former colonies and in particular those of the British Empire. The *third* types of control variables were dummies 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* (coefficient reached the level of -0.59 ; see version B-8 in Table 2) and for *NorthAmerica* (coefficient reached the level of 1.55; see version B-6 in Table 2). However, their inclusion in the estimation also did not change the results significantly. At the same time, we found that the *Africa* variable is highly correlated with the Catholic church variable and therefore had to be omitted.

The *fourth* types of control variables were a social network variable and an Internet penetration variable, based on Facebook users (per 1 million population), *Facebook*, and the level of Internet users (per 1 million population), *Internet*, in order to make sure that the coefficients are not biased because of possible determination of LinkedIn levels by the general social network tendency or Internet usage tendency. Although the Internet and the Facebook variables were found significant (coefficient reached the level of 0.25 and 0.21; see version B-9 and B-10 in Table 1), their inclusion in the estimation did not change the results significantly and did not create a multicollinearity problem. An alternative variable, based on adjusted numbers of Facebook users after controlling for differences in GDP per capita, was found not

significant (see version B-10). In addition, we tried to use the Internet and Facebook penetration rate variables as dependent variables (alternatively to the LinkedIn entrepreneurs levels) in order to reject a possible claim that the variables found significant at the original estimation are merely explaining social network tendency and not entrepreneurship levels. However, as expected, these specifications failed, and most of the major variables were not significant. Other possible control variables, such as level of population growth and average population age, were found not to be significant.

Furthermore, as mentioned, we also supported the validity of the LinkedIn data set by testing the correlation of the data to several comparable subsamples of entrepreneurship data sets (see Sect. 3).

5 Summary and conclusions

Recent studies suggest the existence of a relationship between religion and economic activity (Barro and McCleary 2003; McCleary and Barro 2006; Guisa et al. 2006). This article focuses on the impact of religion on entrepreneurship, one of the most important forces that feeds economic activity. In order, to do so we used a unique data set on entrepreneurs collected from LinkedIn.

We find clear evidence that various religions have a significantly different impact on entrepreneurship. We find that Jews have the highest entrepreneurship tendency, followed by Hindus, Protestants, Orthodoxes, Buddhists, Catholics and Muslims. Moreover, the results support our theoretical contribution that macro effects of religion as part of the country's culture affect a country's level of entrepreneurship beyond (and maybe more than) the effects of religion on the behavior of its members in the society. Furthermore, it seems that a country's entrepreneurship level is determined mainly by its majority religion and not by the relative sizes of the different religious societies. Does this mean, for example, that Catholics act differently in a country whose majority religion is Protestant (or vice versa, Protestants in a Catholic country) and if so what exactly changes in their tendency to become an entrepreneur? We leave these questions and others to future research. However, we believe that our findings give support to Dana (2010), who claimed, "A religion does not necessarily directly

promote or prohibit entrepreneurship. Rather, religions teach, promote and propagate cultural value systems within a given society. Value orientations in turn affect propensity toward entrepreneurial activity... Regardless of whether a person is religious, it can be argued that one is influenced by cultural values propagated by religions" (pp. 2–3).

In this regard, it must be stressed that the macro effect of religion was found significant although important aspects of culture were controlled, including the economy level of openness and competitiveness, the participation of women in the labor force, the strength of the democratic institutions, the level of corruption or the level of government involvement in the economy. This outcome suggests that the macro effects of religion are more likely associated not through its effect on the institutional level but rather on the public educational level, which is common for both the majority religion's members in the society as well as the minority's religions members. The results regarding the Catholic and the Muslim religions—which are associated with more involvement of religion in state policy and administrations, especially in the public education system—are also consistent with this line of thought.

This clear evidence has significant policy implications nowadays when many governments around the world are trying to motivate entrepreneurs by influencing the regulatory infrastructure of the economy or the financial constraints of entrepreneurs. Our findings suggest that governments (mainly in pagan, Catholic and Muslim countries) must examine the role of religion and cultural beliefs on entrepreneurship and the ways in which the education system transforms religious beliefs and constraints on young people's tendency to become entrepreneurs. More broadly speaking, government should focus entrepreneurial education on the issues of cultural orientation that may influence entrepreneurial attitudes such as risk taking, locus of control, dealing with uncertainty, attitude toward capital gains and activism.

The results also stress the need for further research: first, on the ways religions affect entrepreneurship in general and on the values that majority religions introduce in the public education system, in particular; second, by including the level of religious devotion for each religion's society in a country, it can better capture and differentiate the effects of religion on the macro level of the entire country's population

compared to the personal effect on the religion's own members in the society; third, more theoretical explanation is required in order to explain the full ranking we presented. Moreover, it will be helpful to understand which specific religious rules, customs and ethics influence the tendency to become an entrepreneur.

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