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No. 8247

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Discussion Paper No. 8247  
February 2011

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CEPR Discussion Paper No. 8247

February 2011

## **ABSTRACT**

### **Which Institutions Encourage Entrepreneurs to Create Larger Firms?\***

We develop entrepreneurship and institutional theory to explain variation in different types of entrepreneurship across individuals and institutional contexts. Our framework generates hypotheses about the negative impact of higher levels of corruption, weaker property rights and especially intellectual property rights, and a larger state on entrepreneurs who plan to grow faster. We test these hypotheses using the Global Entrepreneurship Monitor surveys in 55 countries for 2001-2006, applying a multilevel estimation framework. We confirm our main hypotheses but we find no significant impact from intellectual property rights.

JEL Classification: D23, D84, J24, L26 and P11

Keywords: corruption, entrepreneurship, global entrepreneurship monitor, government, institutions and property rights

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\* The authors thank Paul Reynolds for advice on the consolidated Global Entrepreneurship Monitor (GEM) Adult Population Survey Data Set: 2001-2006. Global Entrepreneurship Monitor is an international project started in 1998 jointly by Babson College, USA and London Business School, UK, and extended to involve other national teams.

We are also grateful to Zoltan Acs, Gian Fazio, Oleh Havrylyshyn, Philipp Koellinger, Wim Naudé, Paul Reynolds, Gerald Roland, David Smallbone, László Szerb, Friederike Welter, the participants of the London UCL and of Imperial College workshops on entrepreneurship, of the annual ASSA/ACES conferences in San Francisco and Denver, of the Annual Academy of Management conference in Chicago, and University of Staffordshire for comments and criticism.

Submitted 04 February 2011

## **1. INTRODUCTION**

Entrepreneurship is a multi-faceted activity, with a variety of definitions and interpretations (Parker 2009). For some researchers, the key characteristic of entrepreneurs is their ability to innovate and create new and large scale business ventures (Acs and Audretsch 1990). Others contrast entrepreneurship with paid employment, and analyse the former as a labour market choice to become self-employed (Evans and Leighton 1989). In practice, the evidence suggest that entrepreneurship covers a multitude of activities from large scale new firm creation via developing new business models within existing firms to more flexible employment relationships for a single individual through self-employment. While an enormous amount of theoretical and empirical work analyses the determinants of entrepreneurship, there has been inadequate recognition that these determining characteristics may vary according to what type of entrepreneur is being considered. Thus, some of the factors conducive to the formation of micro-enterprises might be fundamentally different to those underpinning innovative new venture creation which plan to grow to a significant scale. This may also have important implications for business policy to support entrepreneurship.

This argument is likely to have particular force when we refer to the institutional context supporting entrepreneurial activity across countries. Since Baumol (1990, 1993), a literature has emerged suggesting that entrepreneurial activity will vary by country according to the quality of supporting institutions. Institutional theory has argued that company behaviour, including entrepreneurial choices, will be context specific (Meyer and Peng 2005), and a literature has emerged to show that entrepreneurial activity is sensitive to the quality of institutions (Batjargal 2003; Sobel 2008) as well as to the level of development. Within this context, entrepreneurship, and especially entrepreneurial aspirations, are both seen as elements

in the process of autonomous experimentation leading to innovations and fuelling economic progress (Ricketts, 2006). Important theoretical developments of these notions include Busenitz, Gomez and Spencer (2000) while Aidis *et al.* (2010) establish empirically the central role of corruption, the quality of property rights and the size of the state sector in explaining the variation in rates of entrepreneurial entry across countries. Our approach in this paper is to explore whether the plans of entrepreneurs to create jobs are influenced by the institutional characteristics of the countries where they live. Our framework generates hypotheses on the institutional factors influencing the expected size of new entrepreneurial firms at time of the start-up, in terms of the aspirations to generate employment five years hence. We test these hypotheses using a large scale cross-country cross-individual dataset containing 13,336 observations on entrepreneurs' growth aspirations comprising 55 countries<sup>1</sup> (Global Entrepreneurship Monitor (GEM) 2001-2006) combined with a number of institutional datasets. Taking into account the hierarchical structure of the data, we employ multilevel modelling with individuals representing level one and countries or country-years representing level two. We also address the problem of potential selection bias which might arise from the interdependence between individual's choice of whether to become an entrepreneur and his/her growth aspirations, by utilizing a Heckman selection framework.

We go on to establish empirically that the proposed aspects of the institutional context do affect the employment growth plans of entrepreneurs. Controlling for the level of development and numerous individual characteristics, we show that less corruption and better protection of property rights enhance the growth plans of entrepreneurs. In turn, governance and allocative disincentives indicated by the size of the government are shown to have a

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<sup>1</sup> The 2001-2006 GEM dataset includes the following countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Croatia, Czech Republic, Denmark, Ecuador, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Jordan, South Korea, Latvia, Malaysia, Mexico, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Russia, Singapore, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, Uganda, UK, United Arab Emirates, United States, Uruguay, Venezuela.

negative and significant effect on entrepreneurial employment aspirations. However, though the literature has suggested that intellectual property rights may also be important for entrepreneurship, we find no evidence that they count for employment growth.

These findings have important implications for entrepreneurs and policy-makers. We place the aspirations by entrepreneurs to create more jobs in the spotlight, because raising employment is important for its own sake and dynamic new ventures are strongly correlated with innovation, technological change and investment. Entrepreneurs planning to build relatively large scale businesses are advised to look closely at both levels of corruption and the property rights environment. If possible, they should choose to locate where the quality of the property rights system is higher and corruption less widespread. Policy-makers seeking to encourage high-aspiration entrepreneurship in order to stimulate innovation, employment and growth in the economy as a whole should focus above all else on containing the levels of corruption and improving the quality of the basic property rights systems and on contract enforcement, rather than a narrower focus on intellectual property rights.

The existing literature is largely silent on the question of how entrepreneur's job growth aspirations might be determined and almost none of existing papers address the question across institutional contexts. Autio (2005, 2007) provides insights about regional patterns of high-growth aspiration entrepreneurial activity, its associations with the national entrepreneurial environment, and individual characteristics of high-growth aspiration entrepreneurs, but does not offer testable implications regarding their determinants. There are however two relevant recent contributions in the literature: Bowen and De Clercq (2008), who analyse the impact of the institutional environment on the allocation of entrepreneurial effort toward high-growth activities using aggregate data, and Autio and Acs (2010), who similarly to us apply a multilevel framework, but focus on a single institutional dimension, namely intellectual property rights. We provide a more general theoretical and empirical framework and focus on planned employment growth rates rather than the number of jobs which

entrepreneurs aspire to create. This difference is important because expected employment does not accurately measure employment growth aspirations. This is because even in a business classified on the basis of the expected level of future employment as a high-growth aspiration venture, the employment growth rate may become zero or even negative when we take account of the current level of employment. The errors introduced by failing to control for the initial level of employment are not trivial; out of all new entrepreneurs who expect to employ other people in five years time, 28.5% have their expected employment equal to their current level of employment.

We make original contribution in three main areas. Our conceptual work based on institutional theory by North (1990), Baumol (1990) and Williamson (2000) develops a framework to analyse the role of the national institutional context on types of entrepreneurship, differentiated according to employment growth aspirations. We propose three specific hypotheses concerning the impact of corruption, strength of property rights and the size of the state on planned employment growth. Further, we address the statistical issues arising from the joint determination of entrepreneurship and of growth aspirations and resulting from the fact that the dataset has a hierarchical structure. We address the first by using Heckman's methodology to verify whether selection models are appropriate to take account of potential interdependences, and the second by the use of multilevel modelling. Finally, based on theory, our empirical results indicate which institutions influence entrepreneurial employment growth aspirations. The negative impact of corruption is highlighted, as is the general benefit of sound property, but not intellectual property rights. Larger state sectors have a generally demotivating effect on job creation by entrepreneurs.

The paper proceeds as follows. The next section develops institutional theory to identify the institutional factors likely to influence entrepreneurs' employment growth aspirations. It concludes with the three hypotheses to be tested. Section 3 describes the data and the methodology, including the individual and macro level control variables such as the level of



development (GDP per capita) to be used in the empirical analysis. Empirical results and discussion follow in Section 4, and Section 5 presents conclusions and policy implications.

## **2. EMPLOYMENT GROWTH ASPIRATIONS OF ENTREPRENEURS; THEORY AND HYPOTHESES**

This paper analyses the ways in which a number of key institutional dimensions might influence entrepreneurial aspirations. Since Douglass North's definitive analysis (1990), it has been understood that many of the incentives underlying rational behaviour which economists regard as too obvious to discuss with reference to developed market economies in fact rely on the quality of institutions in the country under analysis. Entrepreneurial organisations, like all others, will adapt their strategies to fit the opportunities and limitations defined by the institutional framework in which they operate. Baumol argues that the quality of institutions affects the allocation of entrepreneurial effort between alternative activities, e.g. productive or non-productive (Baumol 1993, 2005). More generally, the literature has established that a well-functioning business environment provides positive incentives for entrepreneurs while a weak institutional environment is likely to be deleterious (North 1990, 1994; Baumol 1993; Davidsson and Henrekson 2002; Harper 2003; Aidis *et al.* 2010). For example, strong property rights are a crucial ingredient in the development of efficient capital markets, and therefore the flow of funds to entrepreneurs. Similarly, it has been understood that the establishment and enforcement of intellectual property rights for inventors of new products and processes will stimulate the flow of innovation. As a third example, one can cite the argument that corruption will impact disproportionately on entrepreneurs relative to existing organisations because it is more difficult for them to evaluate the likely future scale and frequency of demands on their income stream (Aidis and Mickiewicz, 2006). From the sociological perspective, Busenitz, Gomez and Spencer (2000) highlight that variation in formal institutions also has deep social

and cultural roots, which influence the social desirability of entrepreneurial activity. Bowen and de Clerq (2008) develop a framework building on Whitley (1991) who proposes that the institutional context influences national business systems, and goes on to suggest particular institutions likely to affect the behaviour of entrepreneurs. However, their list of critical institutions is *ad hoc*, largely derived from their predicted effects on entrepreneurs rather than from institutional theory and in particular does not take account of key distinctions, for example concerning the exogeneity of institutions and differences in their speed of change, which are particularly important when using data which have a time dimension.

Addressing these concerns, in our work, we build on the frameworks of North (1990), Williamson (2000) and Aidis *et al.* (2010). North introduces a critical distinction: between *formal* institutions, namely the “rules of the game” comprising the laws and formal institutional structures that define the economic incentives guiding individual and organisational choices and strategies, and *informal* institutions that comprise the social arrangements, networks and loosely knit structures that explain how many of these incentives are either enhanced or muted by the actual operations of institutions. Estrin and Prevezer (2011) analyse how formal and informal institutions interact either to encourage or to disincentivise entrepreneurial activity. Formal institutions are clearly of great relevance to entrepreneurship, and of these perhaps the most important is the property rights system which underlies the operation of a market economy. However, the literature also places great emphasis on informal institutions, for example on the role of social networks in supporting early entrepreneurial activity and in substituting for weak or deficient formal institutions.

Williamson (2000) places further structure on the analysis with the proposition that institutions can be considered in terms of a hierarchy comprising four levels, each placing constraints on the levels below. He places informal institution, denoted social embeddedness, at the top of the hierarchy because these are the deepest rooted and the slowest changing. When considering the variation of entrepreneurship across countries, Baumol (1990) might

argue that the most important example of such an institution is represented by the levels of individual, legal and administrative probity. Corruption is an important indicator of this norm and can therefore be viewed in Williamson's sense as embedded (McMillan and Woodruff 2002; Aidis *et al.* 2010). At the second level are the constitutional foundations of the formal institutional environment. As Williamson notes (p. 598), here "the definition and the enforcement of property rights and the enforcement of contract law are important features", and this is especially so for entrepreneurs who need to rely on the enforceability of their claims as residual claimant to the returns from the organisations that they have created (Acemoglu and Johnson 2005; Johnson *et al.* 1999, 2000; Hodler 2009). The third level is governance, and is concerned with shaping the way in which the individuals interact with each other in practice. The key areas in the depth and quality of governance that are of relevance to entrepreneurship include regulation of incumbent firms to prevent anti-competitive behaviour that might restrict the activities of entrepreneurs and the barriers to entry (Djankov *et al.* 2002). Generally, the dimensions of governance relate to the scale and effectiveness of the state apparatus. Finally, at the fourth level, Williamson (2000) considers resource allocation and employment, and the traditional economist's analysis of prices, quantities and incentives. From the entrepreneurship perspective, the main way that this will influence individual choices is via opportunity costs and rewards from entrepreneurship as against alternative forms of employment (Parker 2009).

In their study of institutions and entrepreneurship, Aidis *et al.* (2010) develop hypotheses concerning all four levels in the hierarchy, namely informal institutions (corruption), formal institutions (property rights), governance and resource allocation; with the latter two combined into a single indicator as the size of the government. They also highlight the critical role of the level of development, indicated by for example by GDP per capita, in moderating some of these effects. It is well known that levels of entrepreneurial activity decline with level of development up to a point, and then rise, as innovative activity plays an increasingly

important role in the growth process (Wennekers *et al* 2005). However, this relationship depends on various aspects of institutions. For example, individuals in poor countries choose entrepreneurship or self-employment rather than taking paid work because the opportunities for work are relatively few and so the opportunity cost of entrepreneurship is low. However, the returns to entrepreneurship will be reduced when corruption is high, property rights are weak or entry regulations are burdensome. Similarly, formal property rights may tend to be stronger in more developed economies but considerable variation remains present that could lead to differences in entrepreneurship rates (e.g. France is characterised by weaker protection of property rights than Germany (Heritage Foundation)).

The work cited above addressed the question of how the institutional context affects the decision by individuals as to whether to become an entrepreneur rather than to choose paid employment or not to be involved in the labour force. Our analysis in this paper will instead focus on differences between entrepreneurs. It will apply the Williamson's (2000) framework and build on previous findings to explain the impact of different institutions on employment growth aspirations. This is the element of entrepreneurship of particular relevance for business policy and company strategy because entrepreneurs that intend to grow rapidly are also likely to be the ones that are bringing new products to markets or developing new business models or production processes. In the discussion that follows we therefore propose ways that the key institutions identified in the literature as influencing the entrepreneurial entry decision might also influence the employment growth aspirations of those entrepreneurs, addressing each of the levels of Williamson's (2000) hierarchy in turn.

We focus on the institutional dimensions that the literature has regarded as crucial in determining entrepreneurship, namely, corruption, the protection and enforcement of property rights and the size of the state sector. Both freedom from corruption and property rights provide the basis for voluntary exchange and the market economy and have been identified empirically as a critical determinant of entrepreneurial activity (Djankov *et al* 2002; McMillan

and Woodruff 2002; Aidis *et al.* 2010). The size of the state sector impacts on entrepreneurship via the returns to entrepreneurial activity and the opportunity cost of alternative employment choices (Parker 2004, 2009; Henrekson, 2005; Aidis *et al.* 2010). We discuss these aspects in turn below.

## **2.1 Corruption**

It has been argued that corruption is damaging to new firm entry, by raising the costs and therefore reducing the returns to entrepreneurial activity (Anokhin and Schulze 2009). It makes the economic environment highly uncertain (Choi and Thum 2005), in a manner that impacts relatively more on potential new firms than incumbents, who have developed experience of operating in a corrupt environment and operate via an established set of social networks to limit the scale and impact of corrupt practices in their businesses (Aidis *et al.* 2008a; 2010). New firms need to develop experience and contacts, and in the interim therefore operate at a disadvantage to existing enterprises, which further reduces the returns to entrepreneurship. Baumol (1990) argued that entrepreneurship is an activity that could take productive, non-productive or destructive forms according to the institutional environment in which entrepreneurs operated. Desai and Acs (2007) suggest that destructive entrepreneurship is probably best understood through the concept of rent seeking; “any redistributive activity that takes up resources” (p.5). They cite Murphy *et al.* (1993) who explore the trade-off between entrepreneurship (and innovation) and rent seeking (redistributing existing wealth, often through corrupt practises); they find that the latter is rewarded more highly than the former in many institutional contexts. The corresponding hypothesis related to the link between environments that have higher levels of corruption and the lower likelihood of entrepreneurial entry is tested using the GEM dataset by Aidis *et al.* (2010). They confirm the hypothesis and note implicit supporting evidence for the view that corruption is a higher order (embeddedness level) institution because the phenomenon is very slow to change.

The effects of a corrupt institutional environment seem likely to be particularly pernicious when we consider higher growth aspiration entrepreneurship. As noted above, corruption will reduce the returns to all types of entrepreneurship. However, it seems likely that very small scale enterprises and self-employed workers can largely fly below the radar screens of corrupt officials, in a manner that would not be possible for new firms which have a larger economic footprint. Moreover, as noted by Desai and Acs (2007), a corrupt environment may have negative supply side effects on entrepreneurs, and especially on those with higher aspirations, leading them to satisfy their ambitions through rent seeking rather than the formation of new firms. In the light of this we hypothesise that:

***Hypothesis 1:*** A higher level of corruption will reduce the employment growth aspirations of entrepreneurs.

## ***2.2 Protection of property rights***

Recent theories of entrepreneurship emphasise that “the institution of private property ... has an important psychological dimension that enhances our feelings of ... internal control and personal agency, and it thereby promotes entrepreneurial alertness” (Harper 2003, p. 74). It is important that property rights not only guarantee the *status quo*, but also have the ‘find and keep’ component, which is essential for entrepreneurial activities, related to discovery, innovation and the creation of new resources (Harper 2003). Acemoglu and Johnson (2005) show that property rights have pronounced effects on investment, financial development and long-run economic growth. In their empirical account, Aidis *et al.* (2010) find the property rights system to play the pivotal role in determining entrepreneurial entry, in particular in low and middle income countries. Johnson *et al.* (2002) also provide evidence that weak property rights discourage entrepreneurs from reinvesting profits.

However the literature has not investigated whether property rights will have a differential effect with respect to entrepreneurs' plans for employment growth. The significance of property rights is related to the opportunity for the entrepreneur to utilise the resources of others via secure contracts. For example high-growth aspiration projects are likely to be more dependent on external finance. Moreover, because the assets that entrepreneurs rely upon are often liquid, they may be easier to expropriate. In contrast, less sophisticated and less contract-intensive forms of entrepreneurship such as simple one-person businesses will be less sensitive to the quality of protection of property rights. Lower aspiration forms of entrepreneurship may instead rely on localised trust that can partially substitute for a deficient formal institutional environment (Aidis *et al* 2008a). Arrangements of this kind are commonplace in many developing countries (De Soto, 1989; 2000). Therefore high-growth aspiration entrepreneurship may be more sensitive to institutional quality.

Hence, the first part of our second hypothesis is formulated in general terms as:

***Hypothesis 2a:*** Stronger property rights with respect to contract enforcement will encourage higher employment growth aspiration entrepreneurship.

Bowen and de Clerq (2008) among others have argued that intellectual property rights form the most important component of property rights, relevant for higher employment growth aspiration entrepreneurs. This is because they are likely to be basing their decision to enter a market upon an innovation of product or process, and they are therefore especially exposed to imitation or theft of their ideas. The intellectual property rights framework is therefore the element of Williamson's (2000) second level of institutional hierarchy that they chose to stress in analysing the impact of property rights on higher employment growth aspiration entrepreneurship. This provides an alternative to hypothesis 2a namely,

**Hypothesis 2b:** Stronger property rights with respect to intellectual property will encourage higher employment growth aspiration entrepreneurship.

### **2.3 Size of the government**

Aidis *et al.* (2010) showed that the third level of Williamson's hierarchy as applied to entrepreneurship could be combined as a single variable, indicating the size of the government sector. A large state sector is usually synonymous with generous levels of welfare provision, for example unemployment benefits, pensions and child welfare for women in work. These benefits must be paid for, and this is usually done by high levels of personal taxation, often within a progressive tax regime in which high earners, such as successful entrepreneurs, pay higher marginal rates. This will reduce the expected returns to entrepreneurial activity. Moreover, when the welfare system for those in employment is generous, the opportunity cost of entrepreneurship as against other forms of employment or non-participation in the labor force is raised. Taken together, these factors would suggest that a larger state sector will reduce entrepreneurial activity; a hypothesis confirmed by Aidis *et al.* (2010).

In this context, we may also consider the impact on higher employment growth aspiration entrepreneurship. If a larger state sector is financed by higher levels of average and marginal taxation, this is likely to deter high growth entrepreneurship more by reducing the net returns to entrepreneurship (Carroll *et al.* 2000).

Accordingly we hypothesise:

**Hypothesis 3:** A greater scale of government economic activity will reduce the employment growth aspirations of entrepreneurs.



### 3. DATA AND METHODOLOGY

#### 3.1 Individual Data

To test our hypotheses we merge GEM data with a country-level institutional indicators and macroeconomic controls. We utilize data collected through the GEM adult population surveys in 2001-2006 that cover 55 countries worldwide. With very few exceptions, the data consist of representative samples of at least 2,000 individuals in each country. The samples are drawn from the working age population which avoids the potential selectivity bias that could affect studies which focus on existing entrepreneurs. GEM surveys were completed through phone calls and through face-to-face interviews in countries, where low density of the telephone network could create a bias. National datasets are harmonised across all countries included in the survey<sup>2</sup>.

The GEM data capture a wide range of business creation activities. We can distinguish between (a) individuals who intend to create a new venture, (b) who are in the process of establishing a new firm (start-ups, or nascent entrepreneurs)<sup>3</sup>, (c) currently operating young firms (under 3.5 years), and (d) other owners-managers of established businesses. We concentrate on young firms as our proxy for entrepreneurial entry. This category serves well the purpose of our study as, unlike the nascent entrepreneurship category, it provides good coverage of the current level of employment, used for defining our dependent variable (see subsection 3.3). It is hard for start-ups to respond to questions concerning the current level of employment given the early stage of their venture, for example, writing a business plan. Thus in our dataset, only 8% of the sample start-ups report the level of employment as against 83% for young firms.

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<sup>2</sup> For more details of the sampling procedure see Reynolds *et al.* (2005, 2008).

<sup>3</sup> Start-ups or nascent entrepreneurs are defined in GEM as individuals between 18-64 years old, showing some action towards setting up a new business whether fully or partly owned. They also must not yet have paid any wages or salaries for more than three months.

### 3.2 *Dependent variable*

Our dependent variable, the employment growth aspirations (*EGA* as listed in the equation 1, presented in section 3.5 below) of owners-managers of new firms (entrepreneurs), is calculated as the expected percentage change in the level of employment in five years from the current level. Following the existing practice (Parker 2009), we add the owner-manager to the expected and current employees to calculate both the expected and the current employment correspondingly. The rate of employment growth reflecting entrepreneurial aspirations is measured by the difference between the natural logarithms of expected and current employment. Previous studies utilizing GEM data (Bowen and De Clercq 2008; Autio and Acs 2010) focus on expected employment alone<sup>4</sup>, which we do not consider as an accurate measure of growth expectations. This is because, when we take account of the current level of employment, we find that the employment growth rate may become zero or even negative, even in a business classified on the basis of the expected level of future employment as a high-growth aspiration venture. In our sample, out of all new entrepreneurs who expect to employ other people in five years time, 28.5% have their expected employment equal to their current level of employment, which indicates a true expectation of zero growth<sup>5</sup>. Accordingly, in this study we utilize the expected rate of employment growth by new firms to capture entrepreneurial aspirations.

Figure 1 show country-level differences in new businesses' employment growth aspirations with 95% confidence intervals. These were calculated from a random-intercept model that included only country effects. The average employment growth aspirations of new owners-managers vary from as low as 11% in Greece to as high as 75% in Colombia (with

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<sup>4</sup> The question is worded, 'How many people will be working for this business, not counting the owners but including all exclusive subcontractors, when it is five years old?' which does not capture net employment creation.

<sup>5</sup> There are also cases when new entrepreneurs expect to employ people five years hence, but the expected rate of employment growth is actually negative (4.5%).

Chile and Peru scoring close behind)<sup>6</sup>. Countries with predicted residuals above the horizontal line at zero have mean employment growth expectations higher than all countries' average (44%).

{Figure 1}

### ***3.3 Cross Country Data; variables related to our main hypotheses***

To test Hypothesis 1, we use the Heritage Foundation Index of 'Freedom from Corruption' to measure the level of corruption, inversely (*l.FreeCorr*: the operator *l*, is added to denote that a variable is lagged one year). This indicator shows the perception of corruption in the business environment, including levels of governmental administrative, judicial and legal corruption (Beach and Kane 2008). It ranges from 0 to 100, with 100 denoting the *lowest* levels of corruption.

For the strength of property rights (Hypothesis 2a), no universally accepted set of measures yet exists<sup>7</sup>, though many scholars have relied on the Heritage Foundation–Wall Street Journal index of quality of property rights (e.g. Acemoglu and Johnson, 2005; Aidis *et al* 2010; Autio and Acs 2010). However, the Heritage Foundation variable integrates two dimensions of property rights, namely protection from arbitrary government and protection of private contracts and given our theoretical framework we follow Acemoglu and Johnson (2005) in believing the former to be more important, especially for entrepreneurship. We therefore use as our main measure of strength of property rights the Polity IV measure of

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<sup>6</sup> These mean scores for countries are calculated on the basis of random intercepts, while confidence intervals are based on empirical Bayesian predictions.

<sup>7</sup> These include indicators provided by the International Country Risk Guide (especially law and order and investment profile measures; see: <<<http://www.prsgroup.com/>>>), the World Bank measures of governance effectiveness (especially, the rule of law indicator; see: Kaufmann *et al*, 2009); the World Bank's Doing Business indicators (especially, those related to enforcing contracts; see: World Bank, 2009); the Frazer Institute indices (especially: legal structure and security of property rights indicator; see: Gwartney *et al*, 2008) and the Heritage Foundation / Wall Street Journal indices (especially: property rights; see: Beach and Kane, 2008). In addition, given that the protection of property rights is conditional on the more fundamental feature of lack of arbitrariness in government actions, one may rely directly on measures of constraints on executive branch of the government (Marshall and Jagers, 2007; for application, see: Acemoglu and Johnson, 2005). All these indicators are highly correlated, especially as underlying source information comes from the limited number of sources (see: Kaufmann and Kraay, 2008).

efficient constraints on the arbitrary power of the executive branch of the government, dubbed as “*constraints on executive*” (*l.ExecConstr*).

Our measure of the strength of intellectual property rights (Hypothesis 2b) is based on the executive survey conducted by World Economic Forum. It is scored as a continuous variable from 1, denoting weak protection, to 7, representing the world’s most stringent level of protection (*l.IntelPro*). Finally to measure the size of the state (Hypothesis 3), we use the Heritage Foundation measure, which is based on the quadratic transformation of the ratio of government expense to GDP, with lower scores signifying a *larger* government (*l.GovSize*).

### **3.4 Control Variables**

We follow Aidis *et al.* (2010) in controlling for the level of development by using per capita GDP at purchasing power parity (*l.GDPpc*) as well as the GDP annual growth rate (obtained from the World Bank World Development Indicators) for cyclical effects (*l.GDPgrowth*).

Commencing with macro-level variables, we follow Bowen and De Clercq (2008) in controlling for FDI (foreign direct investment) (*l.FDI*). Prior research identifies various indirect transmission mechanisms including technological externalities, backward and forward linkages and competition (Damijan *et al* 2003; Navaretti and Venables 2004; Javorcik 2004). Entrepreneurship, especially of the high-growth aspiration type, may serve as a mechanism through which a new idea or technologies from foreign subsidiaries may spill over to domestic companies (Audretsch and Thurik 2004, Cohen and Levinthal 1989). FDI may increase competition, affecting both the market position of domestic incumbent firms and discouraging the entry of new start-ups (De Backer and Sleuwaegen 2003; Bowen and De Clercq 2008). We use UNCTAD data for the share of FDI in GDP.

Given the multilevel nature of our data it is also important to control for the individual characteristics of entrepreneurs (Parker 2009). In particular, business networks have been

found to play an important role via social learning using role models (Minniti *et al.* 2005b) in assisting entrepreneurs to find the resources required for business creation (Aldrich *et al.* 1987; Djankov 2006; Nanda and Sorensen 2007; Aidis *et al.* 2008a; 2008b). Network capital also facilitates entrepreneurs' access to finance (Aldrich *et al.* 1987, Johannisson 2000) and is often regarded as an intangible asset that can be used to overcome difficulties arising from failure of formal institutions (Estrin and Mickiewicz 2011). We control for this by using the response to a GEM question about whether the individual knows an entrepreneur personally (*KnowsEntrep*) and also introduce a dummy variable denoting individual experience of being a business angel (*BusAngel*) which is expected to be positively associated with entrepreneurs' expectations of employment growth.

Previous entrepreneurial experience is argued to make subsequent entry more likely by enhancing self-efficacy, both through "direct mastery experience (learning by doing) and vicarious experience (learning by seeing)" (Harper 2003, p. 46). However, owning another existing business (*EstabBus*) may raise the opportunity cost of a new involvement, discouraging serial entrepreneurship.

A number of scholars have articulated the influence of risk aversion on the individual decision to become an entrepreneur (Kihlstrom and Laffont 1979; Cramer *et al.* 2002). The conventional wisdom is that individuals with lower risk aversion are more likely to become engaged in entrepreneurial activity. Both Arenius and Minniti (2005) and Ardagna and Lusardi (2008) find that an increased fear of failure, associated with higher risk aversion, discourages nascent entrepreneurial activity. We control for this by using a GEM question about whether the fear of failure would prevent the individual from starting a business (*FearFail*).

Previous GEM-based research shows that individuals with higher educational attainment are more likely to start a business (Minniti *et al.* 2005b) and to direct their efforts towards high-growth activities (Autio 2005). We use two variables to control for education, concerning secondary (*EducSecpost*) and tertiary education (*EducPost*) respectively. In addition, middle-

aged persons are more likely to start a business (Reynolds *et al* 1999; Minniti *et al* 2005b) and we control for a quadratic in the age of the individual (*Age*, *AgeSq*). Entrepreneurial activity is found to vary significantly with gender: being a male is more likely to drive up the rates of entrepreneurship (Minniti *et al* 2005a; Grilo and Thurik, 2005) so we include a dummy variable for gender (*Male*). Individuals who are currently employed also found to be more likely to become entrepreneurs (Minniti *et al* 2005a), so we include a dummy variable for employment status (*CurrEmp*).

Finally, we control for the current level of employment of young ventures in our sample, expecting the higher initial level of employment to be negatively related to employment growth plans of entrepreneurs (*InEmployment*).

Definitions of variables discussed above are reported in Table 1 below.

{Table 1}

### **3.5 Methodology**

We follow Autio and Acs (2010) in using multilevel modelling to address the issues of unobserved heterogeneity within the context of a cross-country, cross-time, cross-individual dataset. Multilevel modelling takes account of the fact that our dataset has a hierarchical structure in which individuals represent level one and country-years samples represent level two. This allows us to control for clustering of the data within a country or country-year. Failure to do this would lead to biased results. Specifically, clustering may give rise to the problem of unit dependencies, where, for example, two entrepreneurs from the same country in the same year are more likely to exhibit similar patterns in their behaviour whether this concerns growth aspirations or any other strategic choice. In this case, the independence assumption does not hold, and a multi-level, random effects model should be employed to obtain the correct standard errors (Rabe-Hesketh *et al.* 2005). We utilise more sample information by choosing country-years rather than countries for our level two groupings to take account of differences in samples collected in different years, where applicable.

We examined if the choice of multilevel modelling with country-year effects is justified on this dataset: we tested the significance of country-year group effects (random intercepts) by performing a likelihood ratio test which compares the multilevel model with a single-level model<sup>8</sup>. We found that country-group effects are significant for models of entrepreneurial employment growth aspirations, thus confirming the choice of methodology. We further tested the appropriateness of utilizing a random intercept versus a random slope model where in the first instance we allow only for intercept to vary randomly across country-year groups while in the second we allow for both the intercept and the slope to vary randomly across country-year groups. In testing for random slopes, we used a likelihood ratio (LR) test comparing a pair of a random-intercept model with a random-slope model for each individual-level variable. The results of LR tests (available upon request from the authors) suggest that a random intercept model is preferred.

In addition to individual effects (subscript  $ij$  below) we also introduced country-year averages (subscript  $j$  below), distinguishing between individual level and group level variation, so that for instance coefficient  $\beta_5$  for  $InEmployment_{ij}$  represents an individual effect of being in employment, and coefficient  $\beta_{16}$  for  $InEmployment_j$  represents a peer effect of employment prevalence rate in a given country-year group that may affect the individual entrepreneurial decision. By using the LP test we verified that the inclusion of peer effects was needed.

Our regression model is therefore specified as follows:

$$\begin{aligned}
EGA_{ij} = & \beta_0 + \beta_1 CurrEmp_{ij} + \beta_2 Age_{ij} + \beta_3 AgeSq_{ij} + \beta_4 Male_{ij} + \beta_5 InEmployment_{ij} + \\
& + \beta_6 EducSecpost_{ij} + \beta_7 EducPost_{ij} + \beta_8 EstabBus_{ij} + \beta_9 BusAngel_{ij} + \beta_{10} KnowsEntrep_{ij} + \\
& + \beta_{11} FearFail_{ij} + \beta_{12} CurrEmp_j + \beta_{13} Age_j + \beta_{14} AgeSq_j + \beta_{15} Male_j + \beta_{16} InEmployment_j \\
& + \beta_{17} EducSecpost_j + \beta_{18} EducPost_j + \beta_{19} EstabBus_j + \beta_{20} BusAngel_j + \beta_{21} KnowsEntrep_j + \\
& + \beta_{22} FearFail_j + \beta_{23} l.GovSize_j + \beta_{24} l.ExecConstr_j + \beta_{25} l.FreeCorr_j + \beta_{25} l.Intelpro + \\
& + \beta_{26} l.FDI_j + \beta_{27} l.GDPgrowth_j + \beta_{28} l.GDPpc_j + u_{0j} + \varepsilon_{ij}
\end{aligned} \tag{1}$$

<sup>8</sup> LR=2(-15822.074 - (-15958.364)) = 272.58 on 1 d.f. This is significant at the 5% level of chi<sup>2</sup> distribution on 1 d.f. (3.84).

where  $EGA_{ij}$  is our measure of entrepreneurial growth aspirations,

$$\{ CurrEmp_{ij}, Age_{ij}, AgeSq_{ij}, Male_{ij}, InEmployment_{ij}, EducSecpost_{ij}, EducPost_{ij}, EstabBus_{ij}, BusAngel_{ij}, KnowsEntrepreneur_{ij}, FearFail_{ij} \}$$

represent individual-level direct effects,

$$\{ CurrEmp_j, Age_j, AgeSq_j, Male_j, InEmployment_j, EducSecpost_j, EducPost_j, EstabBus_j, BusAngel_j, KnowsEntrepreneur_j, FearFail_j \}$$

represent individual-level country-year mean effects to control for the effect of individual-level indicators at a country-year level, and

$$l.GovSize_j, l.ExecConstr_j, l.Intelpro_j, l.FreeCorr_j, l.FDI_j, l.GDPgrowth_j, l.GDPpc_j$$

represent the lagged values of the institutional variables and macroeconomic controls<sup>9</sup>. Our study may be subject to potential endogeneity which may arise because the mean country-year individual entry outcome is likely to affect some of the macro variables, for instance GDP growth rate. We address this issue by lagging our macroeconomics and institutional variables by one year.

The combination of  $u_{0j} + \varepsilon_{ij}$  represents the random part of the equation, where  $u_{0j}$  are the country-year level residuals and  $\varepsilon_{ij}$  are individual-level residuals.

We note in Table 2 potential problems of multicollinearity; intellectual property protection and freedom from corruption are correlated with each other and with GDP per

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<sup>9</sup> We also encountered the same problem with outliers in the employment growth expectations variable as Autio and Acs (2010) and resolved it in the similar way. We eliminated 171 individual-level observations based on the definition of severe outliers as being outside the outer fence (defined by inter-quartile range multiplied by three). We checked the sensitivity of our results to eliminating outliers and found that some of our results do not hold in the presence of outliers but our approach is justified by the fact that expectations become very imprecise for largest numbers and are beyond a plausible range.



capita. Therefore, after running the baseline model as specified by equation 1 above (and reported as (1) in Table 4 below), we run two additional models, without intellectual property rights and freedom from corruption respectively (models (2) and (3) in Table 4). To assess the impact of collinearity with GDP pc, we run two further models (models (4) and (5) in Table 4), using alternative controls for the level of development; a set of GDP pc dummies denoting the five quintiles of its distribution<sup>10</sup>.

{Tables 2 and 3}

We must also consider the bias related to potential interdependence between the choice of whether to become an entrepreneur and growth aspirations. In order to tackle this, we need to test for selection bias by introducing into the employment growth aspirations (second stage) equation the inverse Mill's ratio calculated the equation i the choice to become an entrepreneurship (first stage or selection equation). To identify the first stage of the Heckman selection model (Wooldridge 2002), we must find a variable that is correlated with the first stage dependent variable (entrepreneurial entry) and uncorrelated with the second.(growth aspirations). For robustness, we utilised two alternative identification strategies. In the first, we use a series on start-up entry regulation procedures from the World Bank's Doing Business indicators. Theory suggests that entrepreneurial entry will be closely related to start-up entry regulation procedures (see e.g Djankov *et al* 2002) but because they constitute sunk costs, they should not be relevant for employment growth expectations. of new firms. Our alternative identification strategy focuses on informal finance. This is a major influence on entrepreneurial entry (Bygrave 2003) but is likely to play a less important role in large scale projects where formal sources of funds will be needed. We therefore introduce the prevalence

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<sup>10</sup> Similarly, as can be seen in Table 3, two of our mean country-year individual variables, namely 'knows other entrepreneurs' and 'owner-manager of established business' are highly correlated with 'business angel in past three years' variable. We checked sensitivity of our results by dropping the 'business angel in past three years' variable aggregated by country-year mean. As a result of this robustness check the significance of social capital proxied by 'knows other entrepreneurs' aggregated by country-year mean was marginally driven down to 10% level of significance in specifications 2-4 (Table 4) whereas it turned out to be insignificant in specification (1).

rate of informal investors into the selection equation<sup>11</sup>. We calculated two inverse Mill's ratios, based on each of the above selection equations respectively and included them as a control in the second stage equation. However neither were statistically significant. We conclude that there is no selection bias arising from the possibility that the factors determining the decision to become an entrepreneur might differ from those determining a new firm's employment growth expectations. Accordingly, we focus attention henceforth solely on the employment growth aspirations models.

#### **4. EMPIRICAL RESULTS**

Our empirical results are reported in Table 4. The regressions are highly significant, as are all the reported test statistics. Moreover, the regressions conform to our expectations in the sense that the control variables are frequently significant and have the predicted sign. We also confirm most of our hypotheses. Commencing with hypothesis 1, we find the coefficient on freedom from corruption to be highly significant and with the expected sign in all three specifications where it is included. Thus as predicted we find that entrepreneurs in institutional environments which are more corrupt have lower employment aspirations. We also find very strong evidence in support of hypothesis 2a. Our variable, constraints on executive, that we use to measure the strength of property rights is entered into all five specifications and is always highly significant. The strength of property rights is therefore found to enhance employment aspirations of entrepreneurs. The results concerning hypothesis 2b are however not consistent with our predictions. We fail to identify a significant impact of the strength of intellectual property rights on the employment growth aspirations of entrepreneurs in any of the three specifications. Finally, we find strong support for hypothesis 3 in all five

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<sup>11</sup> These are derived from GEM data by taking the average percentage of respondents who invested in another start-up in the past three years in each country-year sub-sample.

specifications; the coefficient on the (inverse) size of the government is positive and significant in all the equations.

{Table 4}

Turning to the control variables, the patterns largely conform to findings elsewhere in the literature. As in Bowen and De Clercq (2008), foreign entry has some fragmentary positive effects on entrepreneurs' employment growth expectations though these results are sensitive to controlling for corruption. Lower levels of corruption are probably associated with better protection of foreign investors and a more competitive business environment in which the power of incumbents is weakened to the benefit of entrepreneurs.

The relationship between age and new firms' employment growth plans are negative; older individuals have lower aspirations. However, the country-year means of age reveal a non-linear relationship with employment growth aspirations falling until entrepreneurs reach middle age, and rising thereafter. Higher education and being a male are positively associated with growth aspirations, as is previous experience as a business angel. However, being in employment has no impact on employment growth aspirations and education has no effect at country-year aggregate level, suggesting that while individual effect of education is strong, the broader environmental effects are less clear cut. Being the owner of an existing business has a negative and highly significant impact on expectations of entrepreneurs to increase employment which may be associated with higher risk of reallocating entrepreneurial effort away from existing venture. The impact of network capital is significant and positive across all specifications. However, its country-year mean effect is sensitive to multicollinearity. We also find that greater risk aversion is likely to discourage planned employment growth. The current level of employment, although with the expected negative sign, is insignificant, though the subsample average has a significant negative effect, suggesting again the impact of competition. Per capita GDP is negatively related to high growth projects, though this finding is not consistent across all specifications. When GDP per capita is replaced with a set of

quintile dummies, countries which fall within the lowest 20<sup>th</sup> percentile of GDP per capita are found to be more employment growth-oriented, which is consistent with the view that there is a wider set of opportunities in developing economies.

## **5. DISCUSSION AND CONCLUSIONS**

Our theoretical contribution in this paper has been to explore how the key institutions argued by the literature to influence the prevalence of entrepreneurship across countries may also affect their employment growth aspirations. We base our work on the ideas of Baumol (1990, 1993) and Williamson (2000) as well as the developments by Aidis *et al.* (2010). We hypothesised that employment growth aspirations will be reduced in institutional environment in which corruption is more pervasive; property rights, including intellectual property rights, are less clearly defined and enforced; and in which the state plays a greater role in economic activity.

We tested our hypotheses on a large cross-country grouped individual dataset. This allowed us to advance the empirical definition of employment growth aspirations by using expected increases from current levels of employment over a five year horizon. The dataset was structured hierarchically with individuals representing level 1 and country-year samples level 2, so we chose to employ multilevel modelling methods in our empirical work. We also verified that the employment growth aspirations of entrepreneurs can be estimated separately from the choice to become an entrepreneur by using the Heckman model.

We tested a variety of specifications to address issues of multicollinearity, and our results were found to be largely robust to these alternatives. We confirmed the first hypothesis and the more general version of the second hypothesis (2a), concerning the effects of corruption and of property rights correspondingly. We interpret our results as follows. For low-growth aspiration ventures or plans to become self-employed, new entrepreneurs can rely on informal

institutions and localised trust to build self-efficacy necessary for successful entry. However, higher growth aspiration projects require more reliance on formal, impersonal institutions and the stability they may offer. Hence, weak property rights become a binding constraint for entrepreneurial development to higher aspiration prospects. Weak protection of property rights affect negatively the motivation of entrepreneurs to expand their businesses: they start new ventures, but restrict themselves to small, subsistence scale projects. However, it is perhaps surprising that we are unable to confirm the impact of strong intellectual property rights on employment growth aspirations. One possible explanation is that even for highly innovative entrepreneurs who plan to create large scale organisations on the basis of their inventions, the overall strength of the property rights system is the key, rather than any single aspect such as intellectual property rights. In addition, intellectual property protection perhaps relates more to security against private expropriation, which may be counterbalanced to some extent by private governance arrangements. In contrast, the risk from arbitrary government is more difficult to limit.

We also confirm the third hypothesis about the role of the state. Our empirical work confirms that the scale of the state's activities affects entrepreneurial growth aspirations negatively. The state may play many important roles in society, but there is a cost in terms of entrepreneurial job creation. Interestingly, we find (Table 2) that property rights protection is not closely correlated with the size of the government. This implies that the connection between the size of the state and weak rule of law as postulated by Hayek (2006 [1960]) is problematic. However, the most important part of Hayek's legacy relates to the link between the constitutional order, political institutional order and economic outcomes. What we have demonstrated is that the rule of law is especially important for high-growth aspiration entrepreneurs. However, property rights need to be disentangled from the issues related to the size of the state and the impact of the two needs to be considered separately. In this respect, our results are consistent with other research. In particular Acemoglu and Johnson (2005)

argue strongly that political institutions imposing effective constraints on arbitrary action by the government are at the core of property rights protection.

There are some important limitations to our study which one might wish to address in subsequent research. While GEM provides the largest cross-country dataset available on entrepreneurial activity, the number of countries and especially less developed countries is restricted. Moreover, the time horizon of the dataset is still quite short, probably not long enough for testing significant institutional development within any one country over time. Hence, our hypotheses relate primarily to the impact of variation in institutions, and this variation is primarily cross-sectional. To some extent this problem will be addressed by undertaking a similar analysis to that presented in this paper when the number of countries and years has expanded, especially once GEM includes more low and middle income countries. A further limitation is that we have not fully exploited the cross-country individual characteristic of the dataset. This is because we sought to focus on how institutions impact differentially on entrepreneurial aspirations. Future work should also consider the interaction between institutions and individual characteristics, for example the fear of failure or the human capital of entrepreneurs.

Our paper has important implications for would-be entrepreneurs. We have confirmed the importance of education, personal networks and youth for entrepreneurs who plan fast employment growth. We have also highlighted the problems caused for these aspirations by corruption. Individuals aspiring to create larger firms in institutional context where corruption is rife need to place developing strategies to address corruption at the top of their agendas. If they have the option to move their businesses to environments where corruption is less endemic, those options should be exercised. Similarly the critical role of property rights and the rule of law in setting the contexts for successful entrepreneurship must be emphasized. It may be that if entrepreneurs are forced to operate in contexts where property rights are weak they should lower their aspirations in terms of the growth of the enterprise. It is in such

institutional context that we find that those entrepreneurs who failed in their entry are particularly less like to try again (Aidis *et al*, 2008a), therefore a choice of right entry strategy becomes essential.

Our findings also have important implications for policy makers. Considerable evidence has been amassed which link innovation, employment, growth and economic development to high-aspiration entrepreneurship (Davidsson and Henrekson 2002). Our paper provides evidence that entrepreneurship in general can flourish in many contexts, perhaps in part because formal institutions such as property rights can be replaced to a greater or lesser extent by informal ones like social networks. However, this sanguine view does not apply for high-growth aspiration entrepreneurship. This is significantly reduced in an environment where corruption is high or property rights are poor. We have stressed that formal institutions can be improved much more rapidly than informal ones, but significant and sustainable progress in the former almost certainly requires as a pre-requisite progress in the latter, consistent with the theory framework we adopted. Hence policy-makers in environments where corruption is widespread or property rights are weak need to think deeply about education and other factors affecting culture and informal institutions as well, to strengthen them if they wish to encourage high employment growth entrepreneurship.

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**Table 1: Descriptive statistics and definitions of explanatory and variables**

Variable	Definition	Mean	S.D.
<i>Explanatory variables: business environment &amp; macroeconomic variables</i>			
Constraints on executive (t-1)	Polity IV ‘Executive Constraints’; scores from 1=“unlimited authority” to 7=“executive parity”; higher value denotes less arbitrariness	6.56	1.09
Intellectual property rights (t-1)	Intellectual Property Protection index (Global Competitiveness Report); scores from 1=“weak protection” to 7=“strong protection”	5.03	1.23
Freedom from corruption (t-1)	Heritage Foundation ‘Freedom from Corruption’ index, ranging from 0 to 100; higher value denotes less corruption	67.1	23.2
Government size, HF (t-1)	Heritage Foundation ‘Government size’ index, ranging from 0 to 100; higher value denotes smaller government	55.12	23.73
GDP per capita ppp (t-1)	GDP per capita at purchasing power parity, constant at 2000 \$USD (WB WDI 2010)	24,005	12,278
GDP growth rate (t-1)	Annual GDP growth rate (WB WDI 2010)	3.40	2.56
FDI/GDP (t-1)	FDI stock/GDP (UNCTAD)	37.68	27.64
<i>Explanatory variables: personal characteristics</i>			
Age	The exact age of the respondent between 14 and 99 at time of interview	39	12
Age squared	Age squared	-	-
Male	1=male, zero otherwise	.61	.49
Current employment level	Current number of employees + owner-manager	70	4501
Being in employment	1=respondent is either in full or part time employment, 0 otherwise	.92	.27
Education: Secondary & Post-secondary	1=respondent has a secondary or post-secondary education , 0 otherwise	.44	.50
Education: Post-secondary	1=respondent has a post-secondary education	.19	.39
Owner-manager of existing business	1=current owner/manager of business, 0 otherwise	.04	.18
Bus angel in last 3 years	1=business angel in past three years, 0 otherwise	.09	.29
No fear of failure	1=respondent believes that the fear of failure would not prevent him/her from starting a business	.77	.42
Knows other entrepreneurs	1=personally knows entrepreneurs in past two years, zero otherwise	.63	.48
<i>Dependent variable:</i>			
New firm’s expectations of employment growth, EGA	Percentage change in the expected level of employment in 5- yrs’ time over the current level of employment by new firms	.45	.68

Source: GEM 2001-2006 unless specified otherwise; the reported statistics are based on the set of observations actually used in estimations (13,205) to eliminate the joint effect of missingness in all variables.

**Table 2: Correlation matrix for institutional variables**

	Constraints on executive (t-1)	Intellectual property rights (t-1)	Freedom from corruption (t-1)	Government size, HF (t-1)	FDI/GDP (t-1)	GDP per capita ppp (t-1)	GDP growth rate (t-1)
Constraints on executive (t-1)	1.00						
Intellectual property rights (t-1)	.33	1.00					
Freedom from corruption (t-1)	.35	.87	1.00				
Government size, HF (t-1)	-.47	-.55	-.61	1.00			
FDI/GDP (t-1)	.21	.22	.35	.00	1.00		
GDP per capita ppp (t-1)	.34	.84	.88	-.52	.32	1.00	
GDP growth rate (t-1)	-.45	-.42	-.39	.40	.06	-.37	1.00

Source: Polity IV, Global Competitiveness Report (various issues), Heritage Foundation, UNCTAD, World Bank WDI.

**Table 3: Correlation matrix for country-year means**

	Current employment level	Age	Male	Being in employment	Education: second or postsec	Education: postsecondary	Owner-manager of exist. bus	Bus angel in last 3 years	Knows other entrepreneurs	No fear of failure
Current employment level	1.00									
Age	-.006	1.00								
Male	-.005	-.51	1.00							
Being in employment	.039	.027	-.040	1.00						
Education: second or postsec	.032	.263	-.181	.284	1.00					
Education: postsecondary	-.002	.112	-.212	.372	.529	1.00				
Owner-manager of exist. bus	.036	-.332	.116	.154	-.077	.002	1.00			
Bus angel in last 3 years	.074	-.291	.205	.127	.047	.019	.56	1.00		
Knows other entrepreneurs	.059	-.430	.336	.181	.021	.070	.45	.65	1.00	
No fear of failure	.090	.135	-.033	-.166	.174	-.059	-.186	-.001	-.132	1.00

Source: GEM 2001-2006.

**Table 4:**  
**Estimation results, Multilevel Random Intercept model (specifications 1-5)**

	(1)	(2)	(3)	(4)	(5)
	EGA	EGA	EGA	EGA	EGA
<i>Individual level variables</i>					
Current employment level $\times 10^{-06}$	-1.60 (1.28)	-1.60 (1.28)	-1.59 (1.28)	-1.59 (1.28)	-1.60 (1.28)
Age	-0.007*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)	-0.007*** (0.002)
Age squared $\times 10^{-05}$	2.03 (2.56)	1.87 (2.55)	1.98 (2.56)	1.98 (2.56)	1.87 (2.55)
Male	0.114*** (0.012)	0.116*** (0.012)	0.114*** (0.012)	0.113*** (0.012)	0.116*** (0.012)
Being in employment	0.027 (0.024)	0.028 (0.024)	0.024 (0.025)	0.024 (0.025)	0.028 (0.024)
Education: second or postsec	0.029* (0.015)	0.028* (0.015)	0.029* (0.015)	0.029* (0.015)	0.028* (0.015)
Education: postsecondary	0.060*** (0.019)	0.061*** (0.019)	0.060*** (0.019)	0.060*** (0.019)	0.060*** (0.019)
Owner-manager of exist bus	-0.082** (0.033)	-0.078** (0.033)	-0.081** (0.033)	-0.081** (0.033)	-0.078** (0.033)
Bus angel in last 3 years	0.086*** (0.020)	0.082*** (0.020)	0.085*** (0.020)	0.085*** (0.020)	0.082*** (0.020)
Knows other entrepreneurs	0.096*** (0.012)	0.097*** (0.012)	0.095*** (0.012)	0.096*** (0.012)	0.097*** (0.012)
No fear of failure	0.105*** (0.014)	0.103*** (0.014)	0.105*** (0.014)	0.105*** (0.014)	0.103*** (0.014)
<i>Country-year level means</i>					
Current employment level $\times 10^{-05}$ , country-year mean	-2.17* (1.26)	-2.25* (1.27)	-2.25* (1.31)	-2.13 (1.33)	-2.15* (1.30)
Age, country-year mean	-0.060* (0.034)	-0.051 (0.034)	-0.063* (0.035)	-0.071** (0.034)	-0.064* (0.033)
Age squared, country-year mean	0.001* (0.000)	0.001 (0.000)	0.001* (0.000)	0.001** (0.000)	0.001* (0.000)
Male, country-year mean	-0.179 (0.308)	-0.235 (0.304)	-0.261 (0.322)	-0.264 (0.323)	-0.366 (0.309)
Being in employment, country-year mean	0.000 (0.098)	-0.026 (0.098)	0.041 (0.102)	0.050 (0.103)	-0.009 (0.101)
Education: second or postsec, country-year mean	0.075 (0.083)	0.057 (0.083)	0.075 (0.087)	0.076 (0.087)	0.054 (0.085)
Education: postsecondary, country-year mean	-0.147 (0.103)	-0.126 (0.102)	-0.136 (0.108)	-0.171 (0.106)	-0.176* (0.103)
Owner-manager of exist bus, country-year mean	-0.894*** (0.340)	-0.866** (0.341)	-0.966*** (0.356)	-0.902** (0.359)	-0.769** (0.350)
Bus angel in last 3 years, country-year mean	-0.623 (0.595)	-0.462 (0.578)	-0.604 (0.629)	-0.617 (0.625)	-0.490 (0.587)
Knows other entrepreneurs, country-year mean	0.276* (0.152)	0.302** (0.151)	0.334** (0.159)	0.320** (0.160)	0.297* (0.156)



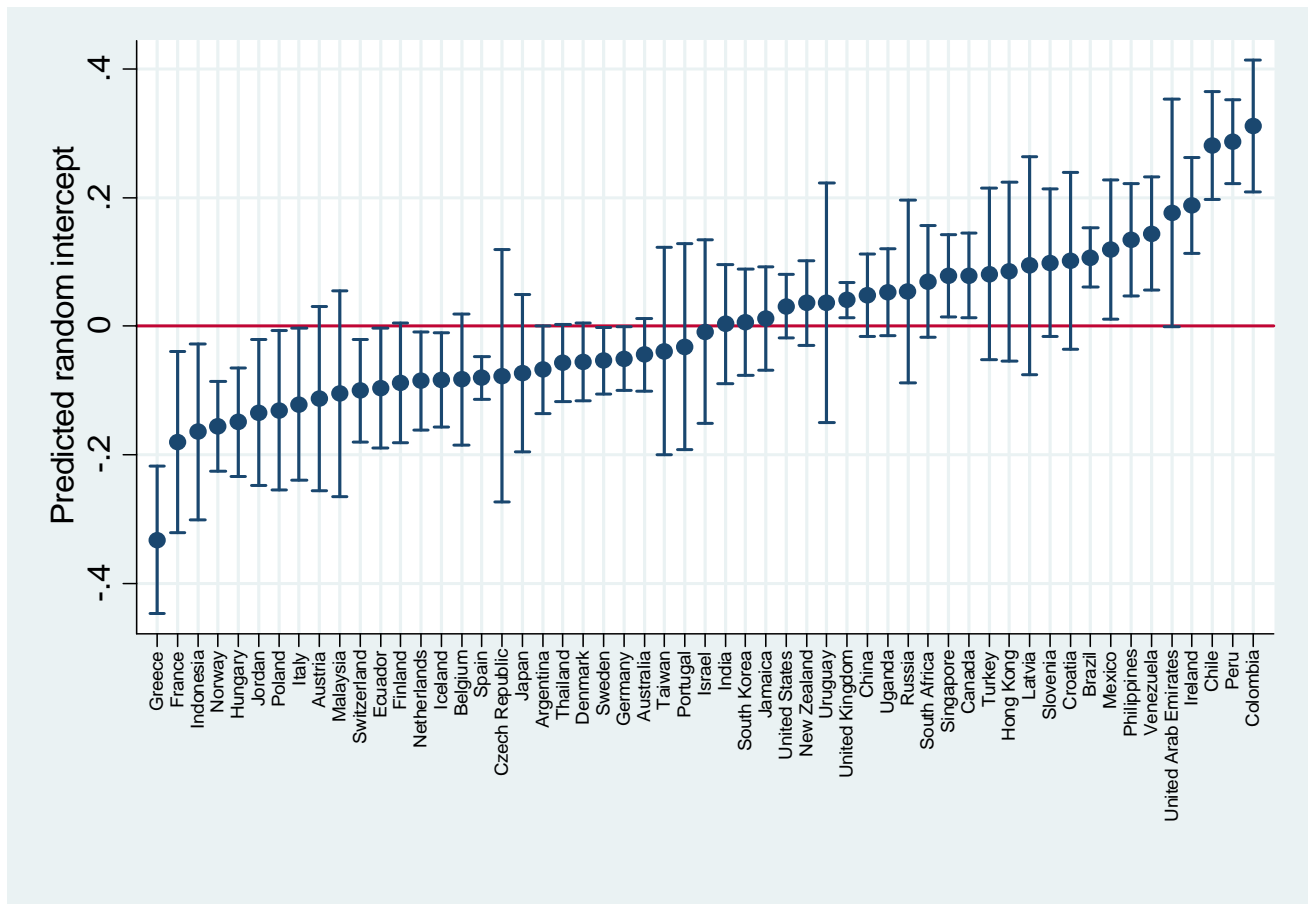
No fear of failure, country-year mean	0.127 (0.129)	0.140 (0.130)	0.172 (0.135)	0.173 (0.140)	0.164 (0.137)
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**Table 4. Follow up.**

	<i>Variables related to hypotheses 1-3</i>				
Government size, HF (t-1)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)
Constraints on executive (t-1)	0.038*** (0.012)	0.036*** (0.012)	0.039*** (0.013)	0.039*** (0.013)	0.034*** (0.012)
Intellectual property rights (t-1)	-0.026 (0.018)	- -	0.004 (0.016)	-0.006 (0.018)	- -
Freedom from corruption (t-1)	0.004*** (0.001)	0.003*** (0.001)	- -	- -	0.002*** (0.001)
	<i>Macroeconomic level control variables</i>				
GDP growth rate (t-1)	0.008** (0.004)	0.008** (0.004)	0.007 (0.004)	0.007* (0.004)	0.008** (0.004)
GDP per capita ppp (t-1) x 10 <sup>-06</sup>	-5.21*** (1.94)	-6.03*** (1.86)	-2.92 (1.92)	- -	- -
GDP per capita ppp (t-1): iq1	- -	- -	- -	0.060 (0.057)	0.139*** (0.053)
GDP per capita ppp (t-1): iq2	- -	- -	- -	0.009 (0.044)	0.053 (0.043)
GDP per capita ppp (t-1): iq3	- -	- -	- -	0.035 (0.044)	0.036 (0.043)
GDP per capita ppp (t-1): iq4	- -	- -	- -	0.037 (0.041)	0.036 (0.040)
FDI/GDP (t-1)	0.000 (0.000)	0.001 (0.000)	0.001** (0.000)	0.001* (0.000)	0.001 (0.000)
Constant	1.223 (0.850)	0.987 (0.836)	1.277 (0.887)	1.400 (0.873)	1.188 (0.838)
Observations	13,205	13,336	13,205	13,205	13,336
Number of country-year groups	182	184	182	182	184
Log Likelihood	-13205	-13320	-13212	-13211	-13322
df	29	28	28	31	31
Random effects parameters					
sigma_u	0.087*** (0.010)	0.088*** (0.010)	0.095*** (0.010)	0.093*** (0.010)	0.090*** (0.010)
sigma_e	0.655*** (0.004)	0.654*** (0.004)	0.655*** (0.004)	0.655*** (0.004)	0.654*** (0.004)

Standard errors in parentheses; p<0.01, \*\* p<0.05, \* p<0.10

**Figure 1.** New businesses' employment growth expectations: country effects in rank order with 95% confidence intervals



Source: GEM 2001-2006

Note: We calculated the intercepts and confidence intervals using the set of observations without 171 outliers (see discussion in section 3.5). We verified however that utilising all observations do not change the results in any significant way, apart from Chile overtaking Peru to become one of the two countries (alongside Colombia) with highest entrepreneurial aspirations.