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INSTITUTIONAL INFLUENCES ON STRATEGIC ENTREPRENEURIAL BEHAVIORS

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Abstract

The purpose of this paper is to examine the existence of cross-level moderating effects between national appropriability conditions, individual level predictors and entrepreneurial growth aspirations. We test a multi-level model that connects the determinants of strategic resource allocation decisions at the individual level with the strength of the intellectual property rights regime at the national level. The results suggest that the strengths of the intellectual property regime will moderate negatively the relationship between an individual's education and her growth aspirations and moderate positively the relationship between an individual's income and her growth aspirations. The findings support claims that strategic entrepreneurial behavior cannot be fully understood without giving attention to the context in which those behaviors are observed
.

JEL-classification: L26, J24, C3, M13, F5

Keywords: strategic entrepreneurship, multi-level analysis, intellectual property protection, growth aspirations

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INTRODUCTION

One of the pertinent questions in the emerging agenda of strategic entrepreneurship research concerns the susceptibility of strategic entrepreneurial behaviours to institutional and cultural influences (Schendel *et al.*, 2007:3). The protection of intellectual property rights constitutes a particularly important influence, because it directly influences the leakage of opportunities through imitation, and thus, the efficiency with which the creation of competitive advantage can be combined with the pursuit of opportunity (Hitt *et al.*, 2001; Schendel *et al.*, 2007). As Schendel and Hitt (2007:4) observed, nations differ in terms of their regimes of intellectual property protection, and therefore, the sharing of profits amongst innovators, developers, users, and consumers. The protection of intellectual property, therefore, is likely to have a direct influence on the allocation of effort into strategic entrepreneurship. In this paper, our objective is to advance the understanding of how the protection of intellectual property influences the allocation of effort into strategic entrepreneurship by individuals.

Strategic entrepreneurship research addresses the intersection between strategic management and entrepreneurship in an effort to advance the understanding of how the creation of competitive advantage can be combined with the pursuit of opportunity (Ireland *et al.*, 2003). Where strategic management research has been primarily concerned with the creation and exploitation of competitive advantage, entrepreneurship research has focused on the individual-opportunity nexus to understand how, by whom and with what consequences opportunities for entrepreneurial action are recognized and exploited (Shane *et al.*, 2000). In this research we focus on strategic entrepreneurial actions of individuals and consider the decision to allocate one's human and financial capital to the pursuit of growth through an entrepreneurial venture in lieu of alternative occupational pursuits. In the great majority of new ventures, the founder's human and social capital constitute the most valuable, rare, and difficult-to-imitate aspect of the venture's initial resource endowment, and therefore, the defining

aspect of its initial competitive advantage (Davidsson *et al.*, 2003). For the individual, the decision to invest her human, financial, and social capital into a new venture typically precludes the pursuit of alternative occupations, and the opportunity cost of this decision for the individual grows higher as a function of the value of her human, financial, and social capital (Cassar, 2006). Particularly for high-human capital individuals, therefore, the decision to pursue growth opportunities through an entrepreneurial venture is a highly strategic decision in its own right, and also one that merges opportunity pursuit with the creation of initial competitive advantage in the venture.

To understand the influence of intellectual property protection on an individual's decision to allocate her human, social, and financial capital into the pursuit of growth through an entrepreneurial venture, we build a multi-level theory that connects resource allocation decisions at the individual level with the strength of the intellectual property rights regime at the national level. At the individual level, we treat the decision to allocate one's human, social, and financial capital into a new venture as a rational decision made by individuals who seek to maximize the utility achievable with these resources. Although we acknowledge that decisions to pursue entrepreneurial ventures are also influenced by many non-rational aspects, such as cognitive biases, personal preferences, and social and cultural norms, the centrality of trade-offs associated with resource allocation decisions compels us to emphasize the rational aspects of this decision. These trade-offs are influenced by institutional conditions, specifically, the intellectual property protection regime (Foss *et al.*, 2008). The strength of the IPR regime influences the appropriability of returns accruing to individual human capital, and more broadly, the functioning of markets for technology (Arora *et al.*, 2001; Teece, 1998). We argue that the IPR protection regime will have a differential effect on how a given individual's education and household income influence her pursuit of growth through an entrepreneurial venture. This is because of the way this technical appropriability impacts trade-offs associated with the allocation of human and financial capital by individuals.

We test our model using data from the Global Entrepreneurship Monitor (GEM) survey (Reynolds *et al.*, 2005). Consisting of interviews with over 900 000 individuals in 54 countries over a period of 10 years, this data resource is uniquely suited for the study of the influence of institutional conditions on individual-level strategic entrepreneurial behaviors. We combine individual-level data from the GEM dataset with country-level data from Heritage Foundation and the International Monetary Fund to analyse cross-level interaction effects on individuals' entrepreneurial growth aspirations. So doing, we seek several distinctive contributions to the nascent literature on strategic entrepreneurship. First, we respond to the call by editors of the Strategic Entrepreneurship Journal to examine effects of institutional conditions, IPR protection regime in particular, on strategic entrepreneurship. Second, we respond to several recent calls by various authors to develop and test multi-level theories and theoretical models in entrepreneurship and strategic management research (Busenitz *et al.*, 2003; Davidsson *et al.*, 2001; Hitt *et al.*, 2007). This is the first study to examine country-level moderating effects on individual-level entrepreneurial growth aspirations. By adopting a multi-level approach, our analysis contributes toward a more generally applicable theory of strategic entrepreneurship than what is possible using single-country data, where variation in institutional conditions is typically zero. Third, by looking at growth aspirations of nascent and early-stage entrepreneurs, we move beyond post-hoc designs typically used in studies of entrepreneurial growth and shed light on growth aspirations and motivations that ultimately drive strategic entrepreneurship. Studying entrepreneurial growth decisions as they unfold eliminates the survival bias that afflicts post-hoc designs. Fourth, specific to our framework, we examine the impact of intellectual property protection on entrepreneurial growth aspirations. In addition to constituting a central determinant of how profits on innovation are shared between innovators, producers, and users (Schendel *et al.*, 2007), IPR protection falls within the remit of national governments, and a better understanding of how they

influence entrepreneurial growth decisions will hopefully contribute to better-informed policy decisions when it comes to fostering strategic entrepreneurship.

The next section of this paper discusses the contextual influences on entrepreneurial growth aspirations, as well as the cross-level moderating effect of the national intellectual property protection regime on such aspirations. We develop hypotheses regarding the effect of an individual's education and household income on her entrepreneurial growth aspirations. Next we focus on the cross-level moderating effect of national intellectual property protection regime on these relationships. Section three discusses the variables and methods, and section four presents our findings. The findings show that institutional conditions moderate the extent to which individuals aspire to exploit their human and financial capital through entrepreneurial ventures. The strength of a country's IPR protection regime moderates *negatively* the relationship between an individual's education and her entrepreneurial growth aspirations, and it moderates *positively* the relationship between an individual's household income and her entrepreneurial growth aspirations. This, we argue, is because of how IPR protection regulates the exploitation of innovator's own human intellectual capital versus that of others. The conclusions are in the final section.

STRATEGIC ENTREPRENEURIAL BEHAVIORS IN A MULTI-LEVEL APPROACH

Entrepreneurship is customarily described as opportunity-seeking behavior that operates at multiple levels (Davidsson *et al.*, 2001; Lumpkin *et al.*, 1996; Stevenson *et al.*, 1985). As such, this behavior is firmly embedded in a given social and economic context, within which some individuals stumble upon and discover opportunities through their interactions with others (Aldrich, 1999; Kirzner, 1997; Sorensen, 2007a). However, not all individuals take the decision to harness their own and others' human capital for the pursuit of opportunities thus discovered. The decision to pursue entrepreneurial growth typically involves significant trade-offs, prompting careful weighting of the potential value of

the opportunity against costs arising from resource investment and from the preclusion of alternative pursuits (Cassar, 2006). Because such trade-offs are influenced by situational contingencies, it is: "…improbable that entrepreneurship can be explained solely by reference to a characteristic of certain people independent of the situations in which they find themselves" (Shane *et al.*, 2000: 218). Therefore, to understand why some individuals and not others choose to pursue entrepreneurial growth, it is important to develop and test multi-level theories that consider not only individual-level characteristics, but also, the context within which those characteristics influence entrepreneurial behaviors (Busenitz *et al.*, 2003; Davidsson *et al.*, 2001; Phan, 2004).

Although the multi-level character of entrepreneurial behaviors is widely recognized, most theories describing entrepreneurship focus on a single level of analysis. Some theories focus on the allocation of effort into entrepreneurial activities within the economy (Baumol, 1993; Baumol, 1996; Kirzner, 1973; Levie *et al.*, 2008; Murphy *et al.*, 1991a; Schumpeter, 1996), others emphasize the importance of social and institutional influences on entrepreneurial behaviors while downplaying the role of the individual (Aldrich *et al.*, 1994; Sorensen, 2007b), and yet others have focused on individual-level behaviors (Gartner, 1988; McMullen *et al.*, 2006; Sarason *et al.*, 2006; Shane, 2000). To our knowledge, none of the received theories on entrepreneurship mix levels of analysis. In order to analyze institutional influences on individual-level strategic entrepreneurial behaviors, it is necessary to combine explanations from two levels of analysis into a coherent framework. This multi-level approach presents distinctive challenges for theory development (Kozlowski *et al.*, 2000). First, theories focusing on different levels tend to emphasize different constructs and different causal mechanisms, thereby making it challenging to create meaningful, causality-preserving connectivity across levels of theory building. For example, the most salient individual-level theories of entrepreneurship have tended to emphasize psychological, cognitive, and social desirability influences on individual-level entrepreneurial behaviors, whereas most system-level theories have focused on issues such as culture,

government bureaucracy, and the distribution of information in socio-economic systems. Constructs used at one level do not always translate easily into causal mechanisms at another level. Second, in multi-level theory, directionality across levels matters. Usually, multi-level theories focus on aggregation processes that compose or compile micro-level processes into macro-level phenomena, but a reverse directionality is also possible, with higher-level conditions influencing micro-level processes, as is the case in our theoretical model. Third, specific to our research design, observed individual-level effects can be caused by both selection and behavioral processes – i.e., whether contextual factors guide the selection of high-potential individuals to entrepreneurship, or whether those conditions condition the behaviors of individuals who already have selected the entrepreneurial option. Distinguishing between the two is a challenge for both theory building and theory testing.

The above considerations prompted the following choices in our theory building. First, we build a 'top-down' model in which higher-level conditions influence individual-level decision processes. In our model, thus, the emphasis is on theoretical disaggregation rather than aggregation, and the directionality in our model operates from context to individual decisions. Second, the causal link in our theoretical model operates through the influence of institutional conditions on personal resource allocation trade-offs faced by individuals. Consistent with previous considerations, we consider the main effect of intellectual property protection to operate through the distribution of profits between various stakeholders in innovative processes (Schendel *et al.*, 2007). While we recognize that the decision to enter entrepreneurship is influenced by numerous factors, both rational and less rational (in terms of considerations related to the maximization of economic utility), the focus on the distribution of economic utility implies an emphasis on the rational aspects of individual decision processes. An emphasis on the rational aspects of individual strategic choices is consistent with, for example, the employment choice literature (Lazear, 2004). Third, as our national-level causal mechanism, we consider the effect of the intellectual property protection regime on markets for technology. This

mechanism has been previously evoked in the entrepreneurship literature (Shane, 2002). Finally, we build a model that incorporates both selection and behavioral arguments, and we control for the selection effect in our empirical analysis.

In the following, we build a theoretical model on resource allocation commitments made by individuals facing opportunity costs in national markets for know-how (Arora *et al.*, 2001; Teece, 1998).

INSTITUTIONAL INFLUENCES ON ENTREPRENEURIAL GROWTH ASPIRATIONS

The pursuit of growth through an entrepreneurial venture is a fundamental aspect of strategic entrepreneurial behaviours (Davidsson *et al.*, 2002; Ireland *et al.*, 2003; Lumpkin *et al.*, 1996) and a necessary precondition of entrepreneurial firm growth: even though mere aspiration will not guarantee firm growth, it is rare for firms to grow in the absence of growth aspiration (Delmar *et al.*, 2008). While an extensive literature exists that has sought to explain entrepreneurial occupational choice (Blanchflower *et al.*, 1998; Dunn *et al.*, 2000; Evans *et al.*, 1989; Hellmann, 2007a; Lazear, 2005), much less has been said about the choice to aspire for growth, once entry decision has been made (Cassar, 2006; Davidsson, 1989; Wiklund *et al.*, 2003a; Wiklund *et al.*, 2003b). Entrepreneurial entry and growth aspiration can be modeled as individual-level decisions through which individuals seek to take advantage of their human capital to pursue economic opportunities (Baumol, 1996; Shane *et al.*, 2000). When seeking to exploit their human capital to advance valued goals, entrepreneurs face important economic trade-offs (Åstbro *et al.*, 2005; Bosma *et al.*, 2004b; Bruderl *et al.*, 1992; Kim *et al.*, 2006; Uusitalo, 2001). First, potential entrepreneurs need to decide whether an entrepreneurial venture provides a better conduit than regular employment for the realization of valued goals. Second, entrepreneurs need to decide how much effort and resources (in the form of human capital) they should invest into growing their venture. Such trade-offs are not easy to strike, as human capital invested into

one use, such as the creation of a new growth venture, cannot be simultaneously invested into another use, such as the search of a beneficial employment relationship (Sparrowe *et al.*, 2001). Furthermore, because human capital investments tend to be path dependent (people develop specialized skills in their current occupation), career transitions become increasingly difficult over time. Therefore, the decision to start a high-growth venture is seldom taken without a careful consideration of related trade-offs.

Macroeconomic conditions are likely to weigh on individual-level considerations related to human capital exploitation. A particularly important influence on entrepreneurial growth decisions has to do with technical appropriability conditions – the intellectual property rights (IPR) protection regime – and how it impacts the ability of inventors and investors to protect their human and intellectual capital and exploit that of others (Feldman *et al.*, 2002). We argue that technical appropriability conditions will differentially influence the alternatives available to high-income and well-educated individuals, respectively. Our theoretical model is illustrated in Figure 1.

*** figure 1 around here ***

In the following, we first lay out the direct hypotheses concerning the effect of education and household income on entrepreneurial growth aspirations. We then focus on the main aspect of our study, i.e., the moderating effect of national appropriability conditions on these relationships.

Education, Household Income, and Growth Aspirations

Consistent with received literature, we argue that an individual's education will have a positive effect on her entrepreneurial growth aspirations. We propose two causes for this positive association. First, education enhances entrepreneurs' skills, cognitive capacity and social capital, thereby enhancing her growth self-efficacy. Second, education represents a valuable human capital asset in its own right, and

the opportunity costs involved in allocating one's human capital into an entrepreneurial venture will, ex ante, prompt well-educated individuals to select higher-quality opportunities, and, ex post, drive the entrepreneur to seek faster growth through the venture so as to cover associated opportunity costs.

For nascent and new ventures, the entrepreneur's human capital, as expressed in her education, experience, and skills, constitutes arguably the single most important initial resource endowment (Shrader *et al.*, 2007; Wright *et al.*, 2007). Education represents a key aspect of entrepreneurs' human capital (Bosma *et al.*, 2004a; Cooper *et al.*, 1994; Ucbasaran *et al.*, 2008): it enhances cognitive ability, thereby enabling individuals to better recognize opportunities, as well as to manage to complexities involved with the start-up process (Shane *et al.*, 2000). Through the process of obtaining formal education, individuals may also acquire valuable social capital and contacts that can be leveraged to mobilize resources for the pursuit of entrepreneurial opportunities (Gerber *et al.*, 2008; Stevens *et al.*, 2008). The skills and competencies developed through formal education also serve to enhance the entrepreneur's legitimacy, enabling her to mobilize the resources necessary to fuel entrepreneurial firm growth and enhance its sustainability (Bruderl et al., 1992; Honig, 2004; Ucbasaran et al., 2008). These mechanisms enhance educated individuals' ability to grow their ventures, as well as her self-efficacy in doing so. This translates into faster growth expectations.

Education also increases opportunity costs associated with alternative occupational pursuits (Murphy *et al.*, 1991b). Building up human capital through education represents a major investment of time and money, one expected to produce subsequent returns in the form of high-quality employment and increased renumeration (Dominitz *et al.*, 1996; Kane *et al.*, 1995). Because individuals typically can pursue only one career path at any given time, the opportunity costs associated with the allocation of individual-level human capital to alternative uses are not taken lightly (Cassar, 2007). In order for individuals with a high education to choose entrepreneurship over employment, therefore, the expected returns to this alternative have to be commensurate with the opportunity costs involved, making highly

educated individuals more choosy about which entrepreneurial opportunities to pursue. Once the educated individual has chosen the entrepreneurial option, the same opportunity costs would drive her to seek faster growth in an effort to recoup returns that are commensurate with the opportunity costs involved. Both of these mechanisms should translate into a positive relationship between education and expected growth in the new venture.

Consistent with the above arguments, Davidsson and Honig found a positive association between formal education and opportunity identification (Davidsson *et al.,* 2003), and Bates (1990) found that highly educated individuals were more likely to start new firms. There is also increasing evidence to support the importance of education for entrepreneurial growth aspirations at both individual and national levels (Autio, 2007; Levie *et al.*, 2008). Summarizing, we hypothesize:

H1 *An individual's level of education will be associated positively with her aspiration to grow her venture.*

Financial income provides another important precursor of entrepreneurial growth aspirations. Two mechanisms are relevant for our argument in this paper. First, household income has a positive influence on income expectations (e.g., Smith *et al.*, 1990). Similarly to highly educated individuals, individuals from high-income households would place greater *ex ante* demands for the quality of entrepreneurial opportunities when choosing between alternative occupational pursuits. High-income households would likely provide a fertile environment for accessing high-quality opportunities, because the social connectivity associated with financial wealth would enable individuals from high-income households to see more entrepreneurial growth opportunities (Dunn *et al.*, 2000). Second, high-income households are better endowed with financial resources. Alongside with human capital, entrepreneurs require financial resources to pursue entrepreneurial opportunities. While the most promising new ventures can tap venture capital to access resources, this option is usually only available for the most

promising ventures (Wright *et al.*, 2006). Empirical data suggests that founders' own capital inputs, combined with those obtained from family and friends, constitute by far the most important source of financial resources for new and aspiring ventures (Minniti *et al.*, 2006). Financial capital inputs enable the entrepreneur to acquire other resources necessary to pursue entrepreneurial growth, such as human and intellectual capital. Greater ability to acquire resources from resource markets should translate into faster growth expectations. Summarizing, we predict:

H2 *An individual's household income will be associated positively with her aspiration to grow her venture.*

Intellectual Property Protection, Education, and Growth Aspiration

We propose that the strength of a country's intellectual property protection regime will have a different moderating influence on how a given individual's education and household income, respectively, influence her entrepreneurial growth aspirations. This is primarily because of the way well-functioning markets for technology influence the choices available for individuals who are making strategic resource allocation decisions concerning their own human capital and that of others. For household income, an additional argument concerns the effect of IPR protection on power relationships between innovators and complementary asset holders.

Education influences two distinct forms of 'human intellectual capital' (Moen, 2005:84). The basic form of human intellectual capital is expressed in the form of cognitive and intellectual ability and skills carried by individuals. Such human capital is often characterized by "natural excludability and appropriability" (Zucker *et al.*, 2002), by virtue of its being embedded in individuals, as well as its inalienability from these. Another form of human capital is expressed in the form of its products – i.e., the intellectual property produced by individuals. To the extent that it can be codified and protected,

this latter form of human capital can be separated from individuals and traded in the marketplace. This duality gives rise to different moderating effects of intellectual property on the education – growth aspiration and household income – growth aspiration relationship, respectively.

In order to grow their ventures, entrepreneurs seek to exploit various forms of human intellectual capital, mostly their own (Hellmann, 2007b; Moen, 2005) or that of others. To the extent that human intellectual capital is embedded in individuals, it may operate as a source of monopoly rent because the knowledge is not publicly available or easily copied. Thus, human intellectual ability and skills enhanced by education may be less sensitive to deficiencies in intellectual property protection regimes than more codified forms of human capital. Well-educated individuals should be able to guard against misappropriation of their embedded human capital even when the IPR protection regime is weak, and thus, grow their ventures even in the presence of weak IPR protection. One the other hand, as argued above, the opportunity costs associated with the allocation of one's valuable skills and intellectual ability would guarantee that educated individuals would be more likely to seek to grow their ventures even under conditions of weak IPR protection.

Another important aspect of human intellectual capital is made up by the intellectual property produced by high-human capital individuals. Here, the effect of IPR regime on the education – growth aspiration relationship should operate differently. When the IPR protection regime is weak, well-educated individuals may not have other choices than to rely on their embedded human capital and leverage its inalienability to protect their intellectual property when seeking to grow their ventures. On the other hand, when the IPR protection regime is strong, intellectual property can be protected and traded in markets for technology, thereby offering an alternative route for well-educated individuals to benefit from their intellectual property.

Summarizing, when intellectual property is weakly protected in a given country, the options available for high-human capital individuals to exploit their human intellectual capital are reduced due

to insufficient safeguards against misappropriation by opportunistic others. In such a situation, innovators cannot rely on the market for technology and need to exploit their own human intellectual capital by starting their own growth firms. On the other hand, if the IPR protection regime is strong, highly educated individuals can also use the market to exploit their human intellectual capital and its fruits, in addition to starting their own growth ventures. Because of this effect, the relationship between education and growth aspiration will grow weaker in strong IPR protection regimes, not because educated individuals will be dis-incentivized to grow their ventures, but because they will have more alternatives for taking advantage of their human intellectual capital.

H3 *The strength of IPR protection regime will moderate negatively the relationship between an individual's education and her growth aspirations such that at under weak IPR protection, the relationship between education and entrepreneurial growth aspiration will be stronger.*

The same technical appropriability considerations suggest different moderating influences for the relationship between household income and entrepreneurial growth aspirations. This is because of the way national IPR protection regimes facilitate the functioning of markets for technology (Shane, 2002). When the markets of technology operate well (i.e., when the intellectual property protection regime is strong), high-income individuals can use their financial resources to use the market for technology to buy the intellectual inputs required by their ventures. In addition to exploiting their own human capital, high-income individuals can use their financial resources to exploit the intellectual property produced by others. Under conditions of weak IPR protection, the possibilities of high-income individuals for doing so are diminished, because the markets for technology will not work properly. Thus, individuals form high-income households will be better able to leverage their financial resources for the pursuit of growth opportunities in countries where the IPR protection regime is strong.

Another consideration has to do with the dependence of new, innovative ventures on external resources. To implement their business model, entrepreneurial firms often need to rely on complementary assets (Teece, 1998). The need to access and draw on complementary business assets creates a dependency relationship, which may expose the firm to potential opportunism by either external resource holders or third parties (Casciaro *et al.*, 2005; Teece, 1986). This places new firms at a disadvantage relative to incumbents, who have had more time to accumulate resources and establish themselves as fully functional business concerns. If the entrepreneurial firm's intellectual property is well protected, it may overcome this disadvantage either by developing the necessary complementary assets by itself, or by negotiating advantageous terms with external resource holders (Casciaro *et al.*, 2005; Shane, 2001; Teece, 1998). However, under conditions of weak IPR protection, the attractiveness to start new ventures is reduced, because there is a greater danger that returns to invention may leak to complementary asset holders (Foss *et al.*, 2008; Schendel *et al.*, 2007). In such situations, individuals from high-income households would be less incentivized to invest their financial resources for the pursuit of entrepreneurial opportunities.

Summarizing, IPR protection should have a positive moderating influence on the relationship betweenhousehold income and growth aspiration, because of how a functioning market for technology has different effects on individuals seeking to exploit their *own* human capital, on the one hand, and on individuals seeking to exploit the intellectual capital produced by others, on the other. We therefore hypothesize:

H4 *The strength of IPR protection regime will moderate positively the relationship between an individual's household income and her growth aspirations such that under strong IPR protection, the relationship between household income and entrepreneurial growth aspiration will be stronger.*

We should note that the above arguments do not explicitly distinguish between selection effects and behavioral effects. In the case of strong intellectual property protection, our arguments regarding a negative moderation influence on the education – growth aspiration relationship imply a selection effect: well-functioning markets for technology mean that educated individuals have more alternative ways to benefit from their human intellectual capital. On the other hand, when the IPR protection regime is weak, educated individuals are pushed to pursue their own entrepreneurial ventures, suggesting a behavioral effect. For the positive moderating relationship between household income and growth aspiration, both behavioral and selection effects are similarly implied. When IPR protection is weak, individuals from high-income households have little incentive to invest significant financial resources to new ventures, suggesting a selection effect. When the IPR protection is strong, our arguments suggest a combined selection and behavioral effect: ex ante, there are more opportunities available, an ex post, wealthy entrepreneurs would have greater confidence to invest in building their business. Thus, distinguishing between selection and behavioral effects is tricky, both theoretically and in practice. In the empirical analysis, we control for the self-selection of individuals into entrepreneurship, but this does not provide a strict test of the selection vs behavioral effect[1].

VARIABLES AND METHOD

To test the above hypotheses, we combined nine years of adult-population survey data from the Global Entrepreneurship Monitor GEM survey to form an initial database of over 902 000 interviews with adult-age individuals from 16 to 64 years old. This data provided our base sample, as shown in Table 1. The Global Entrepreneurship Monitor carries out annual interviews of at least 2 000 adult-age individuals in each of its participating countries, collecting data on the entrepreneurial activities and

[1] This is not a strict test of the selection vs behavioural effect, however. A strict test of this effect would be to follow individuals over time, introducing variance in external IPR conditions. To our knowledge, such datasets are not currently available.

attitudes of these, in addition to extensive demographic data[2]. We used the GEM dataset as our source of individual-level data on entrepreneurial growth aspirations and its individual-level predictors. This individual-level data was complemented with country-level data on IPR protection taken from the Index of Economic Freedom (IEF) dataset.

Since its inception in 1998, the GEM adult population survey dataset has expanded to cover more than 50 countries by 2008 (Minniti et al., 2006; Reynolds et al., 2005). The adult-population surveys are carried out once per year for each participating country, and at least 2 000 random interviews are carried out annually in each of the participating countries. All data are weighted based on relevant demographic variables so as to ensure that the data is as fully representative of a given country's adult-age population as possible[3].

In addition to its widespread use by economic policy-makers, the quality of GEM data is also widely recognized by both economists and management researchers (e.g., Ardagna *et al.*, 2008; Bowen *et al.*, 2008; Dreher *et al.*, 2007; Uhlaner *et al.*, 2007)[4]. High quality data is ensured by strictly harmonized and closely supervised data collection across the participating countries. In each participating country, a team of respected entrepreneurship academics from a well-established national university supervises the data collection. The data is collected annually by national survey vendors under the supervision of national teams, with core measures unchanged since 1998. Over 70% of all country-year samples of adult population survey data have been collected by means of telephone surveys, using stratified random sampling and multiple weighting procedures. In some countries, where telephone surveys are not feasible, face-to-face interviews have been carried out using multi-stage randomized cluster sampling designs[4]. Average response rates to the adult-population surveys are over

[2] For a full explanation of the content and procedures of the GEM study, please refer to Reynolds et al (2005).
[3] Basic weights for each country include gender and age. Depending on country, additional weights can be used, such as ethnic or religious affiliation as well as region of domicile.
[4] See www.gemconsortium.org for recent academic biography of GEM.

70%, and non-response rates to individual questions average less than 3%[5]. Confidence in GEM data's high quality is further strengthened by independent validation tests, including the following: a comparison by Reynolds et al. (2005) of GEM's estimates of firm birth rates against US New Firm Census and Eurostat data; Acs, Desai and Klapper's (2009) comparison of GEM's indices of nascent and new entrepreneurship against the World Bank's Entrepreneurship Survey dataset; and Ardagna and Lusardi's (2008) comparison of GEM data against the Flash Eurobarometer Surveys from 2002 to 2004.

GEM identifies three types of entrepreneurs with a battery of up to four filter questions. Nascent entrepreneurs are individuals who are in the process of trying to start a firm. New (or early-stage) entrepreneurs are owner-managers of entrepreneurial firms which have been in existence for less than 42 months. Established entrepreneurs are owner-managers of entrepreneurial firms which have been in existence for longer than 42 months. Because our analysis focused on the strategic decision to allocate one's human and financial resources in the presence of trade-offs, we chose to limit our analysis to nascent and new entrepreneurs only. Established entrepreneurs have already established themselves in their entrepreneurial career paths and are thus not likely to face acute career trade-offs. The career trade-offs faced by nascent and new entrepeneurs will be very real, because the majority of them still have a full-time job (Autio, 2007). In total, the GEM 2000 – 2008 dataset contained 37 382 nascent and new entrepreneurs, for whom complete data was available.

Variables

The dependent variable (GROASP) in our study measures entrepreneurial growth aspirations of identified nascent and new entrepreneurs. Each individual was asked to estimate their expected number of employees within 5 years' time. Because our theory centers on trade-offs and opportunity costs associated with initial allocations of human and financial capital to new ventures, we argue that growth

[5] Based on GEM data quality analysis carried out by Jeff Seaman of Babson College, presented January 18, 2008.

aspirations provide a better test of our theory than eventual realized growth. Our focus is on initial resource allocations by individuals, as well as on the conditions in which those initial resource allocations are committed. Such commitments are influenced by rational expectations regarding the entrepreneurial opportunity, formed through considerations of the likelihood of success. Growth aspiration thus reflects a 'best guess', under uncertainty, regarding both expected and required success of the new ventures, as influenced by both individual and contextual factors. Although our measure does not reflect actual growth, and most guesses are likely to be optimistic, our measure nevertheless provides a good reflection of considerations driving strategic resource allocations to entrepreneurship.

The weighted average of GROASP was 11.18 expected jobs. Because the distribution was biased, a natural logarithm of expected jobs was used after removing and re-setting extreme cases[6]. To minimize the effect of idiosyncratic variation in individual contexts on our dependent variable (e.g., in terms of resource access), we controlled for the number of current jobs held by the ventures.

The predictor variables in our analysis were education (EDU: primary, secondary, post-secondary, and graduate experience), household income (HHINC: three tiers in national distribution – lowest, middle and highest third), and IPR protection (IPR – from the Index of Economic Freedom data). IEF's IPR protection index combines various aspects of the degree to which private property is protected in a given country, intellectual property rights respected, and citizens protected against extralegal seizure of property.

As control variables in our analysis we used the age of the individual (AGE); mean-centred and squared term of age (AGE_SQ); and gender (SEX). In the GEM data, age and gender are statistically significantly associated with high-growth aspirations, with younger individuals and men typically indicating higher growth aspirations than older individuals and women (Autio, 2007). In addition, when

[6] The data was examined closely for any outliers or inconsistencies. All entrepreneurs expecting 0 jobs in five years were removed from the analysis. The removal of these, as well as the extreme cases, did not affect the results reported here.

predicting GROASP, we controlled for the entrepreneurial firm's current number of employees. Furthermore, we controlled for fear of failure (FEARFAIL), measured with the statement: "Fear of failure would prevent me from starting a new business". This statement measures an individual's lack of confidence in her ability to cope with endogenous or exogenous uncertainty associated with new business ventures, as well as the fear of anticipated consequences of such failure, thus providing an inverse proxy of self-efficacy.

We also used country-level control variables. A country's level of economic development has been shown to be associated with the nature of entrepreneurial activity within the country (Bosma *et al.*, 2009; Levie *et al.*, 2008). We therefore controlled for the country's GDP per capita (ppp), as well as the mean-centred squared term of it so as to capture any curvilinear effects.

An individual's entrepreneurial growth aspiration (GROASP) can be observed only for those individuals who first self-select into entrepreneurship. The distribution of GROASP is therefore left-truncated, and individuals' growth aspiration can be influenced by some of the same factors that also influence the self-selection of individuals into entrepreneurship, causing biased estimates if not controlled (Heckman, 1979). We therefore performed the analysis in two stages . In the first stage, we performed a selection equation that sought to predict the self-selection of individuals into entrepreneurship. This selection equation was performed as panel probit equation (Kyriazidou, 1997; Wooldridge, 1995). Consistent with recommended practice, in addition to variables in the eventual regression equation, we also used additional instruments to predict an individual's status as an early-stage entrepreneur in the GEM data. The omission of instruments might cause inverse Mill's distribution to be flat, thereby reducing its efficacy as a selection control. The residuals from this equation were then used to compute an inverse Mill's ratio (INVMILLS), which was included as a control in the eventual regression equation predicting an individual's growth aspiration.

The instruments in the selection equation were obtained from the GEM dataset. First, GEM contains data on whether or not a given individual personally knows other people who have started new firms (1=yes). Such vicarious exposure has been shown to influence the predilection of individuals to become entrepreneurs themselves. As an additional instrument, we used the individual's perception of skills required to start a new company (1=yes). This question addressed specifically the act of starting a new company and not on the growth of the company.

Method

As explained above, we controlled for the self-selection of individuals into entrepreneurship. Our dataset was cross-sectional panel data, grouped by country and year, and combining observations at the individual level. We thus had hierarchical and clustered data, in which the assumption of independence of observations is violated. This increases the possibility of 'false positives' in ordinary OLS analysis due to under-estimation of standard errors because of their non-normal distribution (Hofmann *et al.*, 2000). For this reason, we applied hierarchical linear modelling, using a generalized least squares (GLS) procedure to estimate fixed parameters and maximum-likelihood estimates of variance components (Raudenbush, 1988) with an unstructured covariance specification (Kozlowski *et al.*, 2000; Rabe-Hesketh *et al.*, 2005). Random-effects multi-level analysis allows regression coefficients and intercepts to vary across countries, and it also makes it possible to test cross-level moderation effects (Martin *et al.*, 2007). The GLS approach allows the standard errors to vary across groups and provides a weighted level-2 regression so that groups with more reliable level-1 estimates are given greater weights and therefore exercise greater influence in the level-2 regression (Hofmann et al., 2000: 478). This results in more accurate estimates of cross-level effects. In our data, we had both individual-level predictors of entrepreneurial growth aspirations (AGE, AGE_SQ, SEX, FEARFAIL, NOWJOB, EDU, HHINC), as well as country-level controls and direct and moderation effects

(GDPCAP, GDPCAP_SQ, IPR, IPR*EDU, IPR*HHINC). Because we are interested in cross-level effects, the eventual regression model to be estimated takes the following form (Snijders *et al.*, 2004: 68-75):

$$GROASP = \gamma_{00} + \sum_{j=1}^{n} \begin{pmatrix} \gamma_{01} IPR_j + \gamma_{02} GDPCAP_j + \gamma_{03} GDPCAP\_SQ_j + \gamma_{10} HHINC_{ij} + \gamma_{20} EDUC_{ij} \\ + \gamma_{11} IPR_j * EDUC_{ij} + \gamma_{21} IPR_j * HHINC_{ij} + \gamma_{30} AGE_{ij} + \gamma_{40} AGE\_SQ_{ij} \\ + \gamma_{50} SEX_{ij} + \gamma_{60} FEARFAIL_{ij} + \gamma_{70} NOWJOB_{ij} + \gamma_{80} INVMILLS_{ij} + U_{0j} + U_{1j} x_{ij} + R_{ij} \end{pmatrix} \quad (1)$$

where variables are as above and γ_{00} = intercept, γ_{n0} = main effect coefficients of individual-level predictors, γ_{01} = main effect coefficient of country-level predictor (IPR), γ_{02} and γ_{03} = main effect coefficients of country-level controls, γ_{n0} = main effect coefficients of individual-level controls, and γ_{n1} = main effect coefficients of cross-level interaction terms. The combination ($U_{0j} + U_{1j}x_{ij} + R_{ij}$) represents the random part of the equation, where U_{0j} and U_{1j} are country-level residuals, R_{ij} represents individual-level residuals, and x_{ij} represent individual-level direct effects. As we are interested in grand-level interactions rather than between-group interactions, the interaction terms (IPR*EDU and IPR*HHINC) were formed using grand mean centred variables to test the moderation effects (Hofmann, 1997; Hofmann *et al.*, 1998).

Because the software and techniques to conduct multi-level analyses are still evolving, we used two different approaches, using different software packages, to conduct the analysis. The results reported in tables 3-4 were computed using Stata's (v. 9.0) *xtmixed* command, with robust standard error specification, maximum-likelihood estimation, the EM estimation algorithm, and year-country clustering to account for time effects. We then replicated the analysis using the HLM (v. 6.0.6) software package for hierarchical linear and nonlinear modeling (Raudenbush *et al.*, 2008), as well as the R package. The different approaches produced effectively identical results.

Our objective was to examine the existence and magnitude of possible cross-level moderating effects between national appropriability conditions (IPR), individual-level predictors, and an individual-level dependent variable. This objective implied a four-step testing strategy, given the multi-level character of our data (Hofmann et al., 2000). First, we estimated the amount of between-group variance in the data. The absence of between-group variance would mean that there are no meaningful differences between groups in the data, suggesting absence of any institutional effects on the dependent variable. Second, we tested a random-coefficient regression model to determine whether significant variance resided in intercepts and slopes across year-country groups. This was a significant precondition for testing hypotheses 3-4. Third, we tested an intercepts-as-outcomes model to see if country-level appropriability conditions were statistically significantly associated with the dependent variable[7]. This step provided an 'acid test' of the general importance of IPR, and it also allowed us to check whether significant variance remained in the data to justify the inspection of cross-level interaction terms. Fourth, we tested a slopes-as-outcomes model as a direct test of cross-level moderation effects. As the final, confirmatory step of our analysis, we performed a median-split analysis by splitting the data into low-IPR and high-IPR country groups, on the basis of their index values of national-level IPR protection. We then checked whether the slope coefficients for the direct effects of household income (HHINC) and education (EDUC) on growth aspiration (GROASP) differed significantly among low-IPR and high-IPR countries, as suggested by the cross-level interaction terms.

RESULTS AND IMPLICATIONS

Table 1 shows sample descriptives, and table 2 shows the correlation matrix. A precondition for running a hierarchical linear model is that significant between-group variance exists for the dependent

[7] Although we did not directly hypothesize for a direct effect of national-level appropriability conditions on individual-level growth aspirations, an intercepts-as-outcomes model was used as an 'acid test' to determine, whether it was meaningful to proceed to a more detailed analysis of cross-level moderation effects.

variable (Bliese, 2000; Hofmann, 1997; Hofmann et al., 2000). To check this we performed an ANOVA with individual-level growth aspiration (GROASP) as the dependent variable and country group membership as the predictor. The model included no predictor variables, as our interest was purely on checking the existence of between-groups variance. Consequently, the model tested was of the form (Hofmann et al., 2000: 479):

$$\textit{Level 1: } GROASP = \beta_{0j} + r_{ij}$$

$$\textit{Level 2: } \beta_{0j} = \gamma_{00} + U_{0j}, \qquad (2)$$

where β_{0j} = mean of GROASP for group j; γ_{00} = grand mean of GROASP, and variance in (r_{ij}) = σ^2 = within-group variance in GROASP, and variance in (U_{oj}) = τ_{00} = between-group variance in GROASP. In HLM, this test indicated significant between-groups variance within the data, with $\chi^2(147) = 2\,223.80$ ($p<0{,}000$). The test was thus strongly supportive of the existence of between-groups variance in the data, thereby supporting the use of a hierarchical linear model to perform the hypothesis tests. The intra-class correlation (ICC), calculated as $\tau_{00}/(\tau_{00} + \sigma^2)$, was 0.0969, indicating that 9.7% of the total variance within the data resided between groups (95% confidence interval: 8.1% - 11.3%). This is within the normal range that can be expected of grouped data of this nature. For example, Bliese (2000: 361) indicated that one should expect ICC values to range between 5% and 20% in grouped empirical data. The size if ICC suggests that individual-level growth aspirations tend to be dominated by individual-level factors rather than country-level factors[8]. This, as such, is consistent with the emphasis of received entrepreneurship research, which has emphasized individual-level influences on entrepreneurial behaviors. Nevertheless, the country-level variance was both non-trivial and highly significant, thereby allowing us to move to the next phase of our analysis.

[8] Note that there are other group-level factors, such as social peer effects, that might explain greater portions of variance than country-level institutions.

In the next stage, we tested a random-coefficient GLS model, using only level-1 variables as predictors. The GLS model (random effects, robust standard errors) was estimated to check the significance of level-1 slopes (direct 1-level effects on GROASP), as well as to determine, whether significant enough variance existed in level-1 intercepts and slopes to test cross-level effects. The equations tested were as follows:

Level 1:

$$GROASP = \beta_{0j} + \beta_{1j}(HHINC) + \beta_{2j}(EDUC) + \beta_{3j}(AGE) + \beta_{4j}(AGE\_SQ) + \beta_{5j}(SEX) + r_{ij} \quad (3)$$

$$\text{Level 2: } \begin{aligned} \beta_{0j} &= \gamma_{00} + U_{0j} \\ \beta_{1j} &= \gamma_{10} + U_{1j} \\ \beta_{2j} &= \gamma_{20} + U_{2j} \end{aligned},$$

where γ_{00} = mean of the intercepts across groups; γ_{10} and γ_{20} = means of the slopes across groups for household income (HHINC) and education (EDUC), respectively, and $U_{0j} - U_{2j}$ are country-level residuals[9]. The HLM analysis showed that there was significant variance in intercepts across year-country groups ($\tau_{00} = 0.054$; $\chi^2(8) = 2\,745.54$ ($p<0.000$)). Also, the LR test indicated that the random-coefficients specification provided a significantly better fit than fixed-coefficients specification ($\chi^2 = 2222.83$ ($p<0.000$)), indicating highly significant between-groups variance in slopes. Combined, these observations strongly supported the preconditions for hypotheses 3-4 (Hofmann et al., 2000).

As the next step, we tested an intercepts-as-outcomes model to check whether country-level conditions were statistically significantly associated with individual-level growth aspirations. Although not directly hypothesized, this test provided a precondition for the testing of moderation effects. In practice, this involved using the same level-1 specification as in the random coefficient model above,

[9] As such, γ_{10} and γ_{20} provide direct tests of H1 and H2, but we report only full equations with cross-level variables so as to save space. Both coefficients were positive and highly significant, as also reported in Tables 3-4.

while adding the terms: $\beta_{0j} = \gamma_{00} + \gamma_{02}(IPR) + U_{0j}; \beta_{2j} = \gamma_{20} + U_{2j}$, for the separate level-2 models testing the direct cross-level effect of HHINC and EDUC. The intellectual property protection index (IPR) was a statistically significant predictor of the level-1intercept terms (γ_{01} = -0.0056; z = -5.94; p=0.000). National-level IPR protection was negatively associated with higher country-level mean of individual-level growth aspirations, perhaps suggesting a specialization effect under which small firms specialize in innovation, and successful ones are acquired by incumbents rather than growing organically. Also, the chi-square tests associated with the residual variance in the intercept across groups indicated that there remained significant variance in the data to be explained by additional level-2 variables, allowing us to proceed to testing the cross-level moderation hypotheses 3-4 (τ_{00} = 0.0514, $\chi^2(9)$ = 2786.66, p<0.000).

As the final step of our analysis, and as the test of hypotheses 3-4, we tested a slopes-as-outcomes model, as specified in equation (1) above. This test is shown in Table 3. As expected, the moderation effect of IPR protection on education is negative and statistically highly significant (p< 0.000; 1-tailed significance), indicating that when the intellectual property protection is stronger, education indeed is a weaker predictor of entrepreneurial growth aspirations. When IPR protection regime is weak, the effect of education on entrepreneurial growth aspiration is strengthened. H3 therefore receives support in our data. We can also observe a positive, statistically significant moderation effect of IPR on the household income – growth aspiration relationship (p<0.05). When the IPR protection regime is strong, household income is a stronger predictor of entrepreneurial growth aspirations. H4 is therefore supported in our data. Note, however, that the direct effect of both education and household income on growth aspirations is stronger than the moderation effects.

The inverse Mill's ratio is shown as statistically significant and positive influence on GROASP in Table 3, suggesting that unobserved variables have indeed influenced the self-selection of individuals into entrepreneurship, and that the effect of unobservables on GROASP is positive.

As a final, confirmatory step of our analysis, we performed a median split within the clustered sample and performed the regressions separately for 'high- IPR' and 'low- IPR' countries. These tests are shown in Table 4. Consistent with the interaction effect, the GLS regression coefficient for the education variable decreased from the value of 0.175 in weak-IPR countries to 0.052 in strong-IPR countries. Thus, the effect of education on growth aspiration grew weaker as a function of the strength of a country's IPR protection regime, but it remained positive and statistically significant throughout. Also, the effect of household income on growth aspiration increase from the value of 0.208 in weak-IPR countries to 0.253 in strong-IPR countries. These patterns confirm the results of the cross-level moderation analysis shown in Table 3. As such, the moderating effect appears particularly strong for education, as the value of the average GLS coefficient more than tripled when moving from strong-IPR to weak-IPR countries, indicating that education was three times as strong a predictor of growth aspirations in weak-IPR countries as it was in strong-IPR ones. For household income, the effect of national-level IPR protection regime was much smaller, as the difference in mean slopes was only 22%.

DISCUSSION AND CONCLUSIONS

In spite of the well-established recognition of the multi-level character and consequent context dependency of entrepreneurial behaviour (Aldrich *et al.*, 1994; Low *et al.*, 1988) and in spite of repeated calls, multi-level analyses of entrepreneurial behaviour remain rare (Busenitz *et al.*, 2003; Davidsson *et al.*, 2001; Phan, 2004). This is deplorable, given the potential of multi-level theoretical and empirical designs to provide for a more robust and generalized understanding of why and under

which conditions some individuals and not others seek to pursue entrepreneurial growth (Klein *et al.*, 1999). As Phan (2004: 620) observed: "One cannot fully understand, for example, opportunity recognition as an emergence phenomenon, without being sensitive to its higher contexts – culture, institutional arrangements, and political-economic exigencies." Study designs limited to a single level only imply often unreasonable assumptions regarding, in particular, the homogeneity of individual-level behaviors, as well as the independence of entrepreneurial decisions from the higher-level contexts in which those decisions are made (Klein *et al.*, 1994). This may give rise to erroneous empirical inferences, especially in situations where higher-order contingencies moderate the effect of individual-level characteristics on individual-level behaviors (House *et al.*, 1995; Klein *et al.*, 2000).

In this study we applied a multi-level research design to address the question: Why do some individuals choose to seek growth with their entrepreneurial ventures, while others do not? In spite of extensive evidence pointing to the importance of high-growth firms for economic development (Acs, 2008; Henrekson *et al.*, 2008), the literature is virtually silent about the determinants of entrepreneurial growth aspirations in young firms. This is an important gap, given the multitude of studies that point to the important role of entrepreneurial entry for job creation[10]. Depending on the phase of the economic cycle, new firms may be responsible for anything from one third to up to the totality of net job creation in different economies, with growth-oriented entrepreneurs generating up to 75-80% of this impact (Henrekson *et al.*, 2008). The study of entrepreneurial growth aspirations is therefore important. In this study, we have sought to shed light on this phenomenon, focusing specifically on how environmental and institutional contingencies moderate the propensity of individuals to pursue entrepreneurial growth. By so doing, our study responds to the numerous calls for multi-level approaches to the study of entrepreneurship in general and for the study of the effect of IPR regimes on strategic entrepreneurship

[10] For a survey of the literature see Magnus Henrekson (2008).

in particular, thereby contributing toward a more robust, context-independent understanding of entrepreneurial behaviors (Busenitz *et al.*, 2003; Phan, 2004; Schendel *et al.*, 2007).

In this study we tested whether national-level appropriability conditions have an influence on how different individuals choose to exploit their human and financial capital for the pursuit of entrepreneurial growth. In building the theoretical model, we mixed individual-level explanations of entrepreneurial behaviors with macro-level insights on how national-level appropriability conditions regulate economic activity. Although human and financial capital are central influences on entrepreneurial outcomes, and technical appropriability conditions exercise an important influence on entrepreneurial choice, the interactions between these two sets of variables have not been examined in prior research. Our findings add new, counterintuitive insight into the phenomenon studied. Contrary to claims that poor IPR protection will reduce efforts to take advantage of human intellectual capital, we found the opposite to be true: education was found to be a stronger predictor of growth orientation in countries with weak IPR regimes, because the absence of IPR protections weakens the possibilities of well-educated individuals to profit from their human intellectual capital through the market mechanism. When the IPR protection regime is weak, well-educated individuals may have to exploit their intellectual assets by setting up their own growth firms. On the other hand, under conditions of strong IPR protection, individuals from high-income households were more likely to want to grow their firms, because they can rely on the market for intellectual capital to supply them with the intellectual assets required to sustain new firm growth. This observation is consistent with agency-theoretic considerations of the effectiveness of patent protection and spin-off decisions (Shane, 2001). Although only some 9% of the total variance resided between groups, thus being attributable to institutional factors, the effect at the individual level was significant, as the effect of education on individual-level growth aspiration was twice as strong in low-IPR contexts as it was in high-IPR contexts. Strong

moderation effects were also observed for the relationship between household income and growth aspirations.

While this is one of the first studies to demonstrate the effect of national-level moderators on individual-level growth aspirations, country-level moderation effects were weaker than the direct effect of individual-level direct predictors of entrepreneurial growth aspirations. Age, gender, fear of failure, education, and household income each exhibited strong, direct influences on growth aspirations, stronger than any moderation influences. This pattern shows that, although contextual influences cannot be ignored, the individual remains the central agent in entrepreneurial endeavors. This, as such, is consistent with the emphasis of the entrepreneurship research tradition. Of individual-level characteristics, household income and gender exhibited clearly the strongest influences on entrepreneurial growth aspirations. The direct effect of education, while highly significant, was slightly less strong.

The significant influence of household income on growth aspirations may indicate that entrepreneurial growth opportunities may be, to some extent, socially stratified. Household income is an important determinant of one's social class. High-income households may have better social connections, and they therefore may get to see better growth opportunities. Another possible mechanism may concern resource acquisition. It may be that high-income households are simply better able to act on the opportunities that they see, by mobilizing their household wealth for the pursuit of entrepreneurial growth. A high household income may also create an expectation for a certain lifestyle, the pursuit of which could then be reflected on entrepreneurial growth aspirations.

Even though individual-level predictors are important, intellectual property protection does moderate the effect of household income and education on growth aspirations beyond the direct effect of these. As such, this finding highlights the influence that institutional conditions may exercise on strategic entrepreneurial behaviors. Thus far, entrepreneurship theory has been mostly preoccupied

with one external influence on entrepreneurial behaviors, the distribution of knowledge regarding 'means' and 'ends' in socioeconomic systems (Companys *et al.*, 2007; Kirzner, 1997; Peter, 2008; Shane *et al.*, 2000). Our study shows that individuals may not react similarly to opportunities in all contexts, but rather, their reactions may be conditioned by the institutional context within which the individuals find themselves. Thus, our findings support the need, highlighted by Hitt et al (2007), for multilevel research designs to address the complexities on context-dependent individual and organizational behaviors. In addition to providing a way to re-introduce context into the study of important phenomena, multi-level designs also provide a mechanism for cross-pollination among specialized subfields addressing different levels of research in the field of management (Hitt et al., 2007). We suggest that future research on strategic entrepreneurial behaviors could be well advised to pay greater attention to the context within which those behaviors are observed.

Our findings also have implications for policy. From a policy perspective, the story emerging from our analysis is one of the effect of IPR protection on specialization. A strong IPR protection regime offers well-educated individuals more choice when they seek to exploit their human intellectual capital. The negative moderation of IPR on the effect of education does not signal that IPR protection would somehow make well-educated entrepreneurs less motivated to grow their firms. Instead, a strong IPR protection regime allows well-educated individuals to specialize on the production of human intellectual capital and use the markets for technology as one additional mechanism for its exploitation. Similarly, functioning markets for technology may enable some high-income individuals to focus on exploitation of human intellectual capital rather than its production. Both of these findings can thus be read as beneficial effects of strong IPR protection.

This study has a number of limitations. Our measure of growth aspiration was based on expected employment within five years. While better suited for the study of factors driving initial resource allocations into strategic entrepreneurship, most aspirations are likely to turn out optimistic.

While aspirations are a necessary precondition of growth (growth seldom occurs without aspiration), they are not a sufficient condition. However, in our theoretical framework, data on eventual growth is not even necessary, as our interest is on factors that trigger resource allocations into strategic entrepreneurship. Second, we tested the effect of only one country-level moderating effect on strategic entrepreneurial behaviors, the strength of the national IPR regime. While IPR protection has been recognized as a central influence on strategic entrepreneurship, also other country-level influences exist, such as the national governance regime (e.g., rule of law, predictability of regulations, regulations imposed upon firms), national culture, and national fiscal regime. Third, our theoretical framework has emphasized the rational aspects of the decision to allocate resources into strategic entrepreneurship. While we think that this is a justified decision, given our focus on how IPR impacts the distribution of profits among different stakeholders, it is well known that entrepreneurs are also motivated by many other forces that have less to do with economic rationality. Finally, our theoretical framework has evoked both selection effects and behavioral effects for the cross-level moderation influence of IPR protection on the education (household income) – growth aspiration relationship. The dataset available for our analysis was cross-sectional panel data, which prevented us from providing a strict test between the two effects. Our control of the self-selection of individuals provided only a partial answer to this dilemma. More research is needed to more clearly distinguish between the two effects.

Summarizing, our study has demonstrated that national conditions can have a significant effect on strategic entrepreneurial behaviors. We hope that our initial foray into this area will inspire further investigations into individual- and country-level determinants of strategic entrepreneurship.

REFERENCES

Acs ZJ. 2008. Foundations of High Impact Entrepreneurship. *Foundations and Trends in Entrepreneurship* **4**(6): 535-620

Acs ZJ, Braunerhjelm P, Audretsch DB, Carlsson B. 2009. A Knowledge Spillover Theory of Entrepreneurship. *Small Business Economics* **32**(1): 15-30

Aldrich HE. 1999. *Organizations Evolving*. SAGE: Newbury Park, CA

Aldrich HE, Fiol CM. 1994. Fools Rush in - the Institutional Context of Industry Creation. *Academy of Management Review* **19**(4): 645-670

Ardagna S, Lusardi A. 2008. Explaining International Differences in Entrepreneurship: The Role of Individual Characteristics and Regulatory Constraints. Harvard University Department of Economics: Boston

Arora A, Fosfuri A, Gambardella A. 2001. Markets for technology and their implications for corporate strategy. *Industrial and Corporate Change* **10**(2): 419-451

Åstbro T, Bernhardt I. 2005. The Winner's Curse of Human Capital. *Small Business Economics* **24**(1): 63-78

Autio E. 2007. GEM 2007 Report on High-Growth Entrepreneurship, *GEM Global Reports*. GERA: London

Bates T. 1990. Entrepreneur Human Capital Inputs and Small Business Longevity. *Review of Economics and Statistics* **72**(551-559)

Baumol WJ. 1993. Formal entrepreneurship theory in economics: Existence and bounds. *Journal of Business Venturing* **8**: 197-210

Baumol WJ. 1996. Entrepreneurship: Productive, Unproductive, and Destructive. *Journal of Business Venturing* **11**(1): 3-22

Blanchflower DG, Oswald AJ. 1998. What Makes an Entrepreneur? *Journal of Labor Economics* **16**(1): 26-60

Bliese PD. 2000. Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In KJ Klein, SWJ Kozlowski (Eds.), *Multilevel Theory, Research, and Methods in Organizations: Foundations, Extensions, and New Directions*: 349-381. Jossey-Bass: San Francisco

Bosma N, Acs Z, Autio E, Coduras A, Levie J. 2009. Global Entrepreneurship Monitor 2008 Executive Report: 65. GERA: London

Bosma N, Van Praag CM, Thurik R, De Wit G. 2004a. The Value of Human and Social Capital Investments for the Business Performance of Start-Ups. *Small Business Economics* **23**: 227-236

Bosma N, van Praag M, Thurik R, de Wit G. 2004b. The Value of Human and Social Capital Investments for the Business Performance of Startups. *Small Business Economics* **23**(3): 227-236

Bowen HP, De Clercq D. 2008. Institutional Context and the Allocation of Entrepreneurial Effort. *Journal of International Business Studies* **39**(1): 1-21

Bruderl J, Preisendorfer P, Ziegler R. 1992. Survival Chances of Newly Founded Business Organizations. *American Sociological Review* **57**(2): 227-242

Busenitz LW, West III GP, Shepherd D, Nelson T, Chandler GN, Zacharakis A. 2003. Entrepreneurship Research in Emergence: Past Trends and Future Directions. *Journal of Management* **29**(3): 285-308

Casciaro T, Piskorski MJ. 2005. Power imbalance, mutual dependence, and constraint absorption: A closer look at resource-dependence theory. *Administrative Science Quarterly* **50**(June): 167-199

Cassar G. 2006. Entrepreneur opportunity costs and intended venture growth. *Journal of Business Venturing* **21**(610-632)

Cassar G. 2007. Money, money, money? A longitudinal investigation of entrepreneur career reasons, growth preferences and achieved growth. *Entrepreneurship & Regional Development* **19**(1): 89-107

Companys YE, McMullen JS. 2007. Strategic entrepreneurs at work: The nature, discovery, and exploitation of entrepreneurial opportunities. *Small Business Economics* **28**(4): 301-322

Cooper AC, Gimeno-Gascon FJ, Woo CY. 1994. Initial Human Capital as Predictor of New Venture Performance. *Journal of Business Venturing* **9**(5): 371-395

Davidsson P. 1989. Entrepreneurship - and After? A Study of Growth Willingness in Small Firms. *Journal of Business Venturing* **4**(3): 211-226

Davidsson P, Delmar F, Wiklund J. 2002. Entrepreneurship as growth: Growth as entrepreneurship. In MA Hitt, RD Ireland, SM Camp, DL Sexton (Eds.), *Strategic Entrepreneurship, Creating a New Mindset*: 26-44. Blackwell Publishers: Oxford

Davidsson P, Honig B. 2003. The Role of Social and Human Capital Among Nascent Entrepreneurs. *Journal of Business Venturing* **18**: 301-331

Davidsson P, Wiklund J. 2001. Levels of Analysis in Entrepreneurship Research: Current Research Practice and Suggestions for the Future. *Entrepreneurship: Theory & Practice* **25**(4): 81

Delmar F, Wiklund J. 2008. The Effect of Small Business Managers' Growth Motivation on Firm Growth: A Longitudinal Study. *Entrepreneurship Theory & Practice* **32**(3): 437-457

Dominitz J, Manski CF. 1996. Eliciting Student Expectations of the Returns to Schooling. *The Journal of Human Resources* **31**(1): 1-26

Dreher A, Gassebner M. 2007. *Greasing the Wheels of Entrepreneurship? Impact of Regulations and Corruption on Firm Entry*. SSRN

Dunn T, Holtz-Eakin D. 2000. Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Intergenerational Links. *Journal of Labor Economics* **18**(2): 282-305

Evans D, Jovanovic B. 1989. An estimated model of entrepreneurial choice under liquidity constraints. *Journal of Political Economy* **97**(4): 808-827

Feldman M, Feller I, Bercovitz J, Burton R. 2002. Equity and the Technology Transfer Strategies of American Research Universities. *Management Science* **48**(1): 105-121

Foss K, Foss NJ. 2008. Understanding opportunity discovery and sustainable advantage: the role of transaction costs and property rights. *Strategic Entrepreneurship Journal* **2**(3): 191-207

Gartner WB. 1988. "Who is an Entrepreneur?" is the wrong Question. *American Journal of Small Business* **12**(1): 39-54

Gerber TP, Cheung SY. 2008. Horizontal stratification in postsecondary education: Forms, explanations, and implications. *Annual Review of Sociology* **34**: 299-318

Hellmann T. 2007a. Entrepreneurs and the Process of Obtaining Resources. *Journal of Economics & Management Strategy* **16**(1): 81-109

Hellmann T. 2007b. When Do Employees Become Entrepreneurs? *Management Science* **53**(6): 919-933

Henrekson M, Johansson D. 2008. Gazelles as Job Creators—A Survey and Interpretation of the Evidence. *Small Business Economics* **in press**

Hitt MA, Beamish PW, Jackson SE, Mathieu JE. 2007. Bulding theoretical and empirical bridges across levels: Multilevel research in management. *Academy of Management Journal* **50**(6): 1385-1399

Hitt MA, Ireland RD, Camp SM, Sexton DL. 2001. Guest editors' introduction to the special issue - Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. *Strategic Management Journal* **22**(6-7): 479-491

Hofmann DA. 1997. An overview of the logic and rationale of hierarchical linear models. *Journal of Management* **23**: 723-744

Hofmann DA, Griffin MA, Gavin MB. 2000. The application of hierarchical linear modeling to organizational research. In KJ Klein, SWJ Kozlowski (Eds.), *Multilevel Theory, Research, and Methods in Organizations: Foundations, Extensions, and New Directions*: 467-511. Jossey-Bass: San Francisco

Hofmann DAD, Gavin MBM. 1998. Centering Decisions in Hierarchical Linear Models: Implications for Research in Organizations. *Journal of Management* **24**(5): 623

Honig B. 2004. Entrepreneurship Education: Toward a Model of Contingency-Based Business Planning. *Academy of Management Learning & Education* **3**(3): 258-273

House R, Rousseau DM, Thomas-Hunt MC. 1995. The meso paradigm: A framework for integration of micro and macro organizational. In LL Cummings, B Staw (Eds.), *Research in Organizational Behavior*, Vol. 17. JAI: Greenwich, CT

Ireland RD, Hitt MA, Sirmon DG. 2003. A model of strategic entrepreneurship: The construct and its dimensions. *Journal of Management* **29**(6): 963-989

Kane TJ, Rouse CE. 1995. Labor-Market Returns to Two- and Four-Year College. *The American Economic Review* **85**(3): 600-614

Kim PH, Aldrich HE, Keister LA. 2006. Access (Not) Denied: The Impact of Financial, Human, and Cultural Capital on Entrepreneurial Entry in the United States. *Small Business Economics* **27**(1): 5-22

Kirzner L. 1973. *Competition and Entrepreneurship*. University of Chicago Press: Chicago, IL

Kirzner L. 1997. Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of Economic Literature* **35**: 60-85

Klein KJ, Dansereau F, Hall RJ. 1994. Levels Issues in Theory Development, Data Collection, and Analysis. *Academy of Management Review* **19**(2): 195-229

Klein KJ, Kozlowski SW. 2000. From micro to meso: Critical steps in conceptualizing and conducting multilevel research. *Organizational Research Methods* **3**(3): 211-236

Klein KJ, Tosi H, Cannella AA, Jr. 1999. Introduction to Special Topic Forum: Multilevel Theory Building: Benefits, Barriers, and New Developments. *Academy of Management Review* **24**(2): 243-248

Kozlowski SWJ, Klein KJ. 2000. A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent issues. In KJ Klein, SWJ Kozlowski (Eds.), *Multilevel Theory, Research, and Methods in Organizations: Foundations, Extensions, and New Directions*: 3-91. Jossey-Bass: San Francisco

Kyriazidou E. 1997. Estimation of a Panel Data Sample Selection Model. *Econometrica* **65**(6): 1335-1364

Lazear E. 2004. Balanced Skills and Entrepreneurship. *American Economic Review* **94**(2): 208-211

Lazear E. 2005. Entrepreneurship. *Journal of Labor Economics* **23**(4): 649-680

Levie J, Autio E. 2008. A Theoretical Grounding and Test of the GEM Model. *Small Business Economics* **31**(3): 235-263

Low MB, MacMillan IC. 1988. Entrepreneurship: Past Research and Future Challenges. *Journal of Management* **14**(2): 139-161

Lumpkin GT, Dess GG. 1996. Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review* **21**(1): 135-172

Martin KD, Cullen JB, Johnson JL, Parboteeah KP. 2007. Deciding to bribe: A cross-level analysis of firm and home country influences on bribery activity. *Academy of Management Journal* **50**(6): 1401-1422

McMullen JS, Shepherd DA. 2006. Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review* **31**(1): 132-152

Minniti M, Bygrave WD, Autio E. 2006. Global Entrepreneurship Monitor GEM 2005 Executive Report. In M Minniti (Ed.). Global Entrepreneurship Research Association GERA: London

Moen J. 2005. Is Mobility of Technical Personnel a Source of R&D Spillovers? *Journal of Labor Economics* **23**(1): 81-114

Murphy KM, Schleifer A, Vishny RW. 1991a. The allocation of talent: Implications for growth. *The Quarterly Journal of Economics* **106**(2): 503-530

Murphy KM, Shleifer A, Vishny RW. 1991b. The Allocation of Talent: Implications for Growth. *The Quarterly Journal of Economics* **106**(2): 503-530

Peter GK. 2008. Opportunity discovery, entrepreneurial action, and economic organization. *Strategic Entrepreneurship Journal* **2**(3): 175-190

Phan PH. 2004. Entrepreneurship theory: possibilities and future directions. *Journal of Business Venturing* **19**(5): 617-620

Rabe-Hesketh S, Skrondal A. 2005. *Multilevel and longitudinal modeling using Stata*. Stata Press

Raudenbush SW. 1988. Educational applications of hierarchical linear models: A review. *Journal of Educational Statistics* **13**: 85-116

Raudenbush SW, Bryk A, Congdon R. 2008. HLM 6 Hierarchical Linear and Nonlinear Modeling Software, 6.0.6 ed. SSI Scientific Software International: Lincolnwood, IL

Reynolds PP, Bosma N, Autio E. 2005. Global Entrepreneurship Monitor: Data Collection Design and Implementation 1998–2003. *Small Business Economics* **24**(3): 205-231

Sarason Y, Dean T, Dillard JF. 2006. Entrepreneurship as the nexus of individual and opportunity: A structuration view. *Journal of Business Venturing* **21**(3): 286-305

Schendel D, Hitt MA. 2007. Introduction to volume 1. *Strategic Entrepreneurship Journal* **1**(1): 1-6

Schumpeter JA. 1996. *The Theory of Economic Development*. Transaction Publishers: London, UK

Shane S. 2000. Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science* **11**(4): 448-469

Shane S. 2001. Technology Regimes and New Firm Formation. *Management Science* **47**(9): 1173-1190

Shane S. 2002. Selling University Technology: Patterns from MIT. *Management Science* **48**(1): 122-137

Shane S, Venkataraman S. 2000. The Promise of Entrepreneurship as a Field of Research. *Academy of Management Review* **25**(1): 217-226

Shrader R, Siegel DS. 2007. Assessing the Relationship between Human Capital and Firm Performance: Evidence from Technology-Based New Ventures. *Entrepreneurship Theory and Practice* **31**(6): 893-908

Smith HL, Powell B. 1990. Great Expectations: Variations in Income Expectations Among College Seniors. *Sociology of Education* **63**(3): 194-207

Snijders TAB, Bosker RJ. 2004. *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. SAGE: London

Sorensen JB. 2007a. Bureaucracy and Entrepreneurship: Workplace Effects on Entrepreneurial Entry. *Administrative Science Quarterly* **52**(3): 387-412

Sorensen JB. 2007b. Bureaucracy and Entrepreneurship: Workplace Effects on Entrepreneurial Entry. *Administrative Science Quarterly* **52**: 387-412

Sparrowe RT, Liden RC, Wayne SJ, Kraimer ML. 2001. Social Networks and the Performance of Iindividuals and Groups. *Academy of Management Journal* **44**(2): 316-325

Stevens ML, Armstrong EA, Arum R. 2008. Sieve, incubator, temple, hub: Empirical and theoretical advances in the sociology of higher education. *Annual Review of Sociology* **34**: 127-151

Stevenson HH, Gumpert DE. 1985. The Heart of Entrepreneurship. *Harvard Business Review* **63**(2): 85-94

Teece DJ. 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy* **15**(6): 285-305

Teece DJ. 1998. Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets. *California Management Review* **40**(3): 55-79

Ucbasaran D, Westhead P, Wright M. 2008. Opportunity Identification and Pursuit: Does an Entrepreneur's Human Capital Matter? *Small Business Economics* **30**(2): 153-173

Uhlaner LL, Thurik RR. 2007. Postmaterialism influencing total entrepreneurial activity across nations. *Journal of evolutionary economics* **17**(2): 161

Uusitalo R. 2001. Homo entreprenaurus? *Applied Economics* **33**(13): 1631 - 1638

Wiklund J, Davidsson P. 2003a. What do they think and feel about growth? An expectancy-value approach to small business managers' attitudes towards growth. *Entrepreneurship Theory & Practice* **27**(3): 247-269

Wiklund J, Shepherd D. 2003b. Aspiring for, and achieving growth: the moderating role of resources and opportunities. *Journal of Management Studies* **40**(8): 1911-1941

Wooldridge J. 1995. Selection Corrections for Panel Data Models under Conditional Mean Independence Assumptions. *Journal of Econometrics* **68**: 115-132

Wright M, Hmieleski KM, Siegel DS, Ensley MD. 2007. The Role of Human Capital in Technological Entrepreneurship. *Entrepreneurship Theory and Practice* **31**(6): 791-806

Wright M, Lockett A, Clarysse B, Binks M. 2006. University spin-out companies and venture capital. *Research Policy* **35**(4): 481-501

Zucker LG, Darby MR, Torero M. 2002. Labor mobility from academe to commerce. *Journal of Labor Economics* **20**(3): 629-659

Figure 1 Theoretical Model of the Study

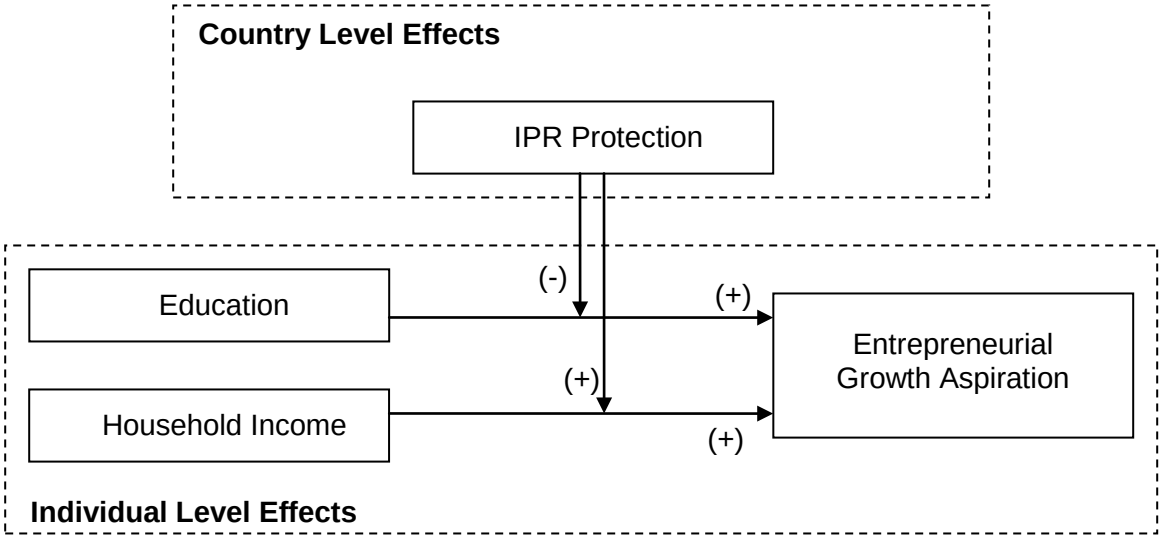

Table 1 **Countries in the sample, adult-population prevalence of nascent and new entrepreneurs (unweighted)**

Country	Obs	% nascent or new entreps	Country	Obs	% nascent or new entreps
Angola	1 491	23.9%	Jordan	1 989	19.2%
Argentina	15 578	13.6%	Kazakhstan	2 000	9.2%
Australia	10 230	10.2%	Latvia	7 933	5.5%
Austria	4 191	4.2%	Macedonia	1 746	13.5%
Belgium	22 352	3.3%	Malaysia	2 005	11.5%
Bolivia	1 879	30.0%	Mexico	9 118	11.7%
Bosnia & Herzegovina	1 586	8.8%	Netherlands	20 197	5.1%
Brazil	19 837	13.3%	New Zealand	7 572	14.8%
Canada	6 660	8.3%	Norway	14 175	7.8%
Chile	15 315	13.0%	Peru	7 560	33.0%
China (PR)	10 835	14.3%	Philippines	2 000	21.3%
Colombia	6 082	22.4%	Poland	5 396	7.3%
Croatia	12 778	7.7%	Portugal	4 981	7.0%
Czech Republic	1 628	7.4%	Puerto Rico	1 830	2.7%
Denmark	24 934	5.5%	Romania	3 406	3.3%
Dominican Republic	4 094	17.5%	Russia	7 288	3.2%
Ecuador	5 860	22.7%	Serbia	3 580	7.2%
Egypt	2 603	13.3%	Singapore	19 212	5.6%
Finland	24 538	5.1%	Slovenia	17 116	4.5%
France	14 089	4.1%	South Africa	21 298	6.7%
Germany	44 865	6.0%	South Korea	7 530	13.4%
Greece	11 970	7.0%	Spain	134 888	6.4%
Hong Kong	6 599	4.8%	Sweden	36 805	3.6%
Hungary	15 701	5.9%	Switzerland	11 040	6.1%
Iceland	13 417	11.2%	Taiwan	1 977	4.4%
India	12 368	12.1%	Thailand	6 985	17.2%
Indonesia	1 998	19.3%	Turkey	7 217	5.4%
Iran	3 119	9.2%	Uganda	2 957	29.7%
Ireland	15 327	7.4%	UAE	2 857	6.9%
Israel	10 875	5.9%	United Kingdom	113 604	5.2%
Italy	17 726	4.7%	Uruguay	4 897	11.5%
Jamaica	7 992	18.5%	USA	27 168	10.8%
Japan	15 689	2.8%			
			Total	**902 533**	**7.8%**

Table 2 Correlation matrix (grand correlations)

		1	2	3	4	5	6	7	8
1	Age								
2	Age_sq	0.0308							
3	Sex	0.026	-0.026						
4	Education level	-0.0789	-0.1018	-0.0124					
5	Household income	-0.0243	-0.0981	-0.087	0.2353				
6	Fear of failure	-0.0028	-0.0353	0.0664	-0.0428	-0.0544			
7	GDP per capita	0.0845	-0.0082	0.0084	0.1531	-0.0076	0.0156		
8	GDP per cap squared	-0.0133	0.0019	0.007	0.0078	-0.0012	-0.019	0.396	
9	IPR protection index	0.1057	-0.0177	0.0161	0.1215	0.0149	-0.0016	0.5266	-0.0261

Table 3 Multi-level effects on entrepreneurial growth aspirations

Mixed-effects ML regression	Number of obs		37,328
	Number of groups		270
	Obs per group	min	4
		avg	138.3
		max	1264
	Wald chi2(12)		2794.42
Log likelihood = -55086.367	Prob > chi2		0.000

	Coef.	Std. Err.	z	
inverse Mill's ratio	0.6320	0.1178	5.36	***
Current jobs	0.0029	0.0001	24.91	***
Age	-0.0104	0.0010	-10.77	***
Age_sq	-0.0004	0.0001	-4.13	***
Sex	-0.4544	0.0305	-14.89	***
Fear of failure	-0.1186	0.0130	-9.09	***
GDP per capita	-2.5E-06	2.3E-06	-1.06	
GDP per cap squared	6.1E-11	6.3E-11	0.96	
IPR protection index	-0.0045	0.0011	-4.16	***
Education (H1)	**0.0839**	**0.0089**	**9.48**	*******
Household income (H2)	**0.2297**	**0.0143**	**16.08**	*******
IPR*EDUC (H3)	**-0.0013**	**0.0004**	**-3.50**	*******
IPR*HHINC (H4)	**0.0009**	**0.0005**	**1.71**	*****
cons.	1.1184	0.1789	6.25	
LR test vs. linear regression:	chi2(6) = 2092.61	Prob > chi2 = 0.0000		

Note: p < 0.001***; p < 0.01**; p < 0.05*; p < 0.10+
2-tailed significances, hypothesis tests one-tailed
GLS regression coefficients

Table 4 Regressions in strong- and weak-IPR countries

Mixed-effects ML regression	Number of obs	24542	
(Strong-IPR countries)	Number of groups	172	
	Obs per group: min	4	
	avg	142.7	
	max	1264	
	Coef.	Std. Err.	z
inverse Mill's ratio	0.3514	0.1963	1.79 +
Current jobs	0.0036	0.0002	23.82 ***
Age	-0.0103	0.0015	-6.82 ***
Age_sq	-0.0001	0.0001	-0.65
Sex	-0.4009	0.0501	-8.01 ***
Fear of failure	-0.1219	0.0170	-7.17 ***
GDP per capita	-4.31E-06	2.68E-06	-1.61
GDP per cap squared	1.00E-10	6.95E-11	1.45
Education (H1)	**0.0528**	**0.0119**	**4.43 *** **
Household income (H2)	**0.2082**	**0.0204**	**10.19 *** **
cons.	1.3497	0.2985	4.52
LR test vs. linear regression: chibar2(01) =	690.36 Prob >= chibar2 = 0.0000		

Mixed-effects ML regression	Number of obs	12786	
(Weak-IPR countries)	Number of groups	98	
	Obs per group: min	8	
	avg	130.5	
	max	547	
	Coef.	Std. Err.	z
inverse Mill's ratio	0.7979	0.1722	4.63 ***
Current jobs	0.0017	0.0002	9.21 ***
Age	-0.0085	0.0015	-5.85 ***
Age_sq	-0.0005	0.0001	-3.91 ***
Sex	-0.4646	0.0441	-10.54 ***
Fear of failure	-0.1168	0.0199	-5.87 ***
GDP per capita	4.30E-06	1.29E-05	0.33
GDP per cap squared	3.75E-10	7.01E-10	0.54
Education (H1)	**0.1753**	**0.0122**	**14.4 *** **
Household income (H2)	**0.2535**	**0.0194**	**13.09 *** **
cons.	0.2089	0.4212	0.50
LR test vs. linear regression: chibar2(01) =	1388.56 Prob >= chibar2 = 0.0000		

Note: p < 0.001***; p < 0.01**; p < 0.05*; p < 0.10+
2-tailed significances, hypothesis tests one-tailed
GLS regression coefficients