ENTREPRENEURIAL SKILLS, TRUST AND JOBS: THREE ESSAYS ON ENTREPRENEURIAL SKILLS OF SELF-EMPLOYED AND EMPLOYEES

Jaume Teodoro Sadurní

Universitat de Girona

DOCTORAL THESIS

Entrepreneurial skills, trust and jobs: Three essays on entrepreneurial skills of self-employed and employees.

Jaume Teodoro Sadurní

2017

DOCTORAL PROGRAMME IN LAW, ECONOMICS AND BUSINESS

Directed by: Dr. Aleksander Kucel & Dr. Ignacio Silva

Tutor: Esther Martínez

Memòria presentada per optar el títol de Doctor de la Universitat de Girona

List of contents

List of tables

List of figures

Acknowledgments

Some years ago, when I completed my degree in Telecommunications Engineering, I entered the world of academia by taking part in a research project, in an applied research centre in the European Union's 5th Framework Programme, which served as my degree final project. Continuing with the project, I joined the doctoral programme of the Applied Mathematics and Telematics Department at the UPC, and from there took a post at the Polytechnic University of Mataró as a full-time lecturer. A few years later, while I was still working on my doctorate, the Internet boom and the emergence of a new, knowledge-based economy persuaded me to leave the University and launch a business career, first as a company director and then as an entrepreneur, in companies working in audiovisual media and interactivity. The last ten years of my professional life have been spent in this entrepreneurial environment, enabling me to experience the world of business in the new economy during a frenetic phase that, for me at least, will probably not be repeated. This period came to an end with the sale of the company I had to helped to grow over the years and, although I had never imagined it happening, this brought me back to academia, as the director of the Tecnocampus Foundation, which I had helped to create during my previous stint at the University. Tecnocampus is a university environment in which we place a special emphasis on bringing the university, business and entrepreneurship together, to create a kind of virtuous circle that promotes the development of the region and the growth of individuals. In this new chapter of my career, I decided to begin teaching in the field of economics, particularly entrepreneurship, and thanks to Alek Kucel I discovered a whole new area of research and study, in which I attempt to bring together theory and practice. So I would like to thank everyone who – in the course of a career which has turned out to be circular – has helped me enter this world, which I now hope to validate via a scientific approach: Alek Kucel, Ignacio Silva, Esther Martínez, Marcos Faundez, Esther Cabrera, Montserrat Vilalta, Miquel Rey, Dolors Guillem, Pedro Gomez, Joan Colomer, Josep M. Solanas, Manel Pons, Pilar González-Agápito, Sebastià Sallent, Carles Fradera, Antoni Esteve, Quim Cardona and Albert García.

And of course, for their patience and support throughout my life, my wife Nuria Masriera, my children Guillem, Mar and Roger, my parents, Emili and Magdalena, and my wife's parents, Josep and Maria Teresa.

Summary

This thesis is an empirical study that sets out to explain entrepreneurial activity, based on a broad concept of entrepreneurship. The study is based on the development of logistic regression models for a dichotomous variable of entrepreneurship, which we attempt to explain, always working from observational data from third party sources, basically GEM and REFLEX.

In the course of the thesis, we set out to explain entrepreneurial activity, starting with an initial approach that looks at institutional context and moving immediately to a second approach based on human capital. The study also incorporates both a closed-spectrum concept associated with self-employment as an occupational choice and a broad concept based on the behavioural approach, in other words, on the entrepreneur as an agent of change in an economic environment based on innovation.

Thus in the first chapter entrepreneurship is explained at a micro level, based on the GEM study, which places particular emphasis on the type of context that favours this activity, in other words, considering the institutional environment as an asset that potentially acts as a facilitator of entrepreneurial activity. To implement this first empirical approach we use levels of trust at various levels within institutions, establishing a parallel with the institutional theory of NIE (Williamson). We succeed in showing the influence of the institutional environment at various levels, with robust results in each of the different models employed.

With this first finding, our next aim was to explain entrepreneurship in the broader sense, by observing the entrepreneur as an agent of change, or intrapreneur. In this case, the REFLEX study offers a database focused on university students, which provides information about occupation, skills and career path, and which constitutes a good starting point from which to explain intrapreneurship, looking at a group of individuals and taking as a variable specific entrepreneurial skills. We succeed in showing the relevance of alertness in an explanation of corporate entrepreneurship, in a model within which different variables, such as company size or academic spheres, have been used, adding robustness to the model. Our reference, in this case, has been Kirzner's work.

Finally, in the concluding part of the study, we maintain our focus on human capital and once more take a more restrictive definition of the dependent variable with the aim of focusing on entrepreneurship as self-employment. Again, in this case, we make use of the REFLEX database, focusing on entrepreneurship training to empirically prove the jack-of-all-trades theory (Lazear)

as it relates to the balancing of multiple skills as the decisive factor in the explanation of entrepreneurship.

This study offers a succinct tour of current topics in the academic community working on entrepreneurship, contributing to the creation of knowledge that is useful both at an academic level and in supporting the design and implementation of policies for economic growth that are based on entrepreneurial activity.

Resum

Aquesta tesi és un treball de caràcter empíric que cerca explicar l'activitat emprenedora a partir d'un concepte ampli d'emprenedoria. El treball queda suportat a partir del desenvolupament de models de regressió logística per una variable dicotòmica d'emprenedoria que volem explicar a partir dades observades en treballs de tercers, essencialment GEM i REFLEX.

Al llarg de la tesi es cerca explicar l'activitat emprenedora a partir d'una aproximació inicial al voltant del context institucional per passar tot seguit a una altra aproximació basada en el capital humà. Alhora el treball incorpora tant un concepte d'emprenedoria d'aspecte tancat associat a l'opció ocupacional de l'auto-ocupació com un concepte ampli d'emprenedoria basada en l'aproximació conductual, és a dir l'emprenedor com un agent de canvi en un entorn d'economia basada en el coneixement.

D'aquesta manera en el primer capítol l'emprenedoria s'explica a nivell micro partint del treball GEM on es posa especial èmfasi en el context que propicia activitat emprenedora. És a dir a partir de l'entorn institucional com actiu que potencialment actua com a facilitador de l'activitat emprenedora. Per dur a terme aquesta primer aproximació empírica farem ús dels nivells de confiança a diferents capes institucionals, establint un paral·lelisme amb la teoria institucional de NIE (Williamson). Aconseguim demostrar que la influència de l'entorn institucional a diferents nivells amb resultats robustos pels models construïts.

Amb aquesta primera troballa el nostre següent propòsit ha estat explicar l'emprenedoria en sentit ampli a partir d'observar l'emprenedor com un agent de canvi o intraemprenedor. En aquest cas el treball REFLEX ens ofereix una base de dades centrada en universitaris on podem tenir coneixement sobre ocupació, habilitats i trajectòria, que constitueix una bona base per a explicar la intra-emprenedoria a partir d'una agrupació d'individus prenent la variable d'habilitats específiques en emprenedoria. Hem aconseguit demostrar la rellevància d'*alertness* en l'explicació de l'emprenedoria corporativa en un modelo on s'han utilitzat variables com la mida d'empresa o els àmbits acadèmics que donen consistència al model creat. La nostra referència en aquest cas ha estat el treball de Kirzner.

Finalment a la darrera part de la recerca conservem l'enfocament del capital humà i de nou tanquem la variable depenent en el sentit d'identificar emprenedoria amb auto-ocupació. En aquest cas tornem a utilitzar la base de dades REFLEX i fixem la formació en emprenedoria per a demostrar empíricament la teoria de jack-of-all-trades (Lazear) relativa a l'equilibri de múltiples habilitats com factor determinant en l'explicació de l'emprenedor.

Aquesta recerca ofereix un recorregut compacte entorn als temes més candents en la comunitat acadèmica que treballa l'emprenedoria i contribueix amb això a la creació de coneixement útil tan a nivell acadèmic com coneixement de suport de base pel disseny i establiment de polítiques econòmiques que quedin suportades per l'activitat emprenedora.

Resumen

La presente tesis es un trabajo de carácter empírico que busca explicar la actividad emprendedora a partir de un concepto amplio de emprendimiento. El trabajo se soporta a partir del desarrollo de modelos de regresión logística para una variable dicotómica de emprendimiento que buscamos explicar partiendo siempre de datos observados a partir de trabajos de terceros, esencialmente GEM y REFLEX.

A lo largo de la tesis se busca explicar la actividad emprendedora a partir de una aproximación inicial alrededor del contexto institucional para pasar acto seguido a otra aproximación basada en el capital humano. Además el trabajo incorpora tanto un concepto de emprendimiento de espectro cerrado asociado a la opción ocupacional de auto-empleo como un concepto amplio de emprendimiento basado en la aproximación conductual, es decir el emprendedor como agente de cambio en un entorno economía basada en la innovación.

Así en el primer capítulo el emprendimiento se explica a nivel micro partiendo del trabajo GEM donde se pone especial énfasis en el contexto que propicia esta actividad, es decir a partir del entorno institucional como activo que potencialmente actúa como facilitador de la actividad emprendedora. Para lleva a cabo esta primera aproximación empírica hacemos uso de los niveles de confianza a diversos niveles institucionales estableciendo un paralelismo con la teoría institucional de NIE (Williamson). Conseguimos demostrar la influencia del entorno institucional a diversos niveles con resultados robustos en los distintos modelos utilizados.

Con este primer hallazgo nuestro siguiente propósito ha sido explicar el emprendimiento en sentido amplio, a partir de observar el emprendedor como agente de cambio, o intraemprendedor. En este caso el trabajo REFELX nos ofrece una base de datos centrada en universitarios donde podemos tener conocimiento sobre ocupación, habilidades y trayectoria, que constituye una buena base para explicar el intraempredimiento a partir de una agrupación de individuos tomando la variable de habilidades específicas en emprendimiento. Hemos conseguido demostrar la relevancia de *alertness* en la explicación del emprendimiento corporativo en un modelo donde se han utilizado variables como el tamaño de empresa o los ámbitos académicos que dan robustez al modelo creado. Nuestra referencia en este caso ha sido el trabajo de Kirzner.

Finalmente en la última parte de la investigación conservamos el enfoque de capital humano y cerramos de nuevo la variable dependiente en el sentido de focalizarnos en emprendimiento como auto-empleo. En este caso volvemos a usar la base de datos REFLEX y fijamos la formación

en emprendimiento para demostrar empíricamente la teoría de jack-of-all-trades (Lazear) relativa al balanceo de múltiples skills como factor determinante en la explicación del emprendimiento.

Esta investigación ofrece un recorrido compacto entorno a los temas más candentes en la comunidad académica que trabaja el emprendimiento y contribuye con ello a la creación de conocimiento útil tanto a nivel académico como conocimiento de soporte de base para el diseño y establecimiento de políticas de crecimiento económico que se soporten en la actividad emprendedora.

Introduction

This thesis is an empirical work about entrepreneurship that contributes by means of the research with data from third party surveys to test different theories on entrepreneurship. The thesis addresses an important but fairly empirically understudied questions about both, what determines the entrepreneurial activity in a more aggregate level, and what determines the probability of becoming an entrepreneur at an individual level. We pursue the idea of what factors, apart from the typically studied (Simoes et al., 2015), determine the entrepreneurial activity (Parker, 2009). Notwithstanding, apart from the entrepreneurship understood as starting up a new company, we also study the entrepreneurial skills (Ardichvili et al., 2003, Kaish and Gilad, 1991, Kirzner, 1973, Kirzner, 1999a, Tang et al., 2012) as a motor of intrapreneurship (entrepreneurship within already existing organizations).

The title "Entrepreneur Skills, Trust and Jobs: three essays on entrepreneurial skills of self-employment and employees" indicates the theme of our work here. On the one hand we study the context where entrepreneurship occurs; and on the other we focus on the person, paying a particular attention to their skills. Entrepreneurship may occur spontaneously through necessity or opportunity (Poschke, 2013), but it can also be trained and taught (Bae et al., 2014, von Graevenitz et al., 2010, von Graevenitz and Weber, 2011). Both issues are continuously mixed in this work. As in the chicken-egg question it is not possible to separate the individual and the context.

When one decides to study entrepreneurship the first problem that one encounters is the definition of entrepreneurship as such. It is, actually, a very diverse phenomenon entailing many different economic activities, sometimes difficult to measure and observe empirically. Entrepreneurship understood in the simplest terms is an occupational choice. However, it also may be the attitude of a worker in front of an innovation within an existing organization. We study these issues through the following chapters of the thesis.

In Chapter 1 we start our analysis using data from the Global Entrepreneurship Monitor (GEM). We use a pooled sample of GEM from years 2001 to 2009. The Global Entrepreneurship Monitor contains variable called the Total Entrepreneurial Activity (TEA). It is defined as "an involvement in starting up a business within last 42 months" (Estrin et al., 2013). From this point, in chapter 1 the entrepreneur is associated with the self-employed person, employer and/or own-account. This definition is the most general characterization of entrepreneurship entailing all own-account workers.

In chapter 2 we employ a radically different definition of an entrepreneur. We resort to the Research into Employment and professional FLEXibility (REFLEX) Survey[1] conducted in 2005, which interviewed individuals with university degrees who graduated in the year 2000. Highly alert individuals are thought to be agents of innovative change within the existing enterprizes. This turns them into so called intrapreneurs or corporate entrepreneurs. This definition does not expand the previous model assumed in GEM but specifies the circumstances under which individuals innovate in their jobs.

Chapter 3 resorts once again to the REFLEX data. This time we test the hypothesis whether the entrepreneurs (in our case self-employed individuals with tertiary education) are the ones with wider set of skills than employees. This definition of the entrepreneurs is once again specific due to the fact that our sample is limited to tertiary educated individuals only.

The relevance of entrepreneurship as an economic variable

Entrepreneurship is commonly considered a motor of economic growth nowadays (Acemoglu et al., 2002, Aghion et al., 2013, Aghion and Howitt, 1992, Audretsch, 2007, Audretsch et al., 2008, Audretsch et al., 2007, Audretsch et al., 2011, Michelacci, 2003, Michelacci and Silva, 2007). It has been shown to have a strong positive association with the economic growth across various countries, markets, and industries (Carlsson et al., 2009). One of the major building blocks for the theory of economic growth based on entrepreneurship comes from Aghion and Howitt (1992).[2] Drawing on and extending the previous work by Lucas (1988), Aghion and Howitt's model extended the Schumpeterian creative destruction setup, by showing which factors determine a sustained economic growth through innovation and entrepreneurship. The paper analyzes the so called "creative destruction" where future research-based innovation is seen as threat to the rents from the present research-driven innovation. Firms take decisions every period on how much to invest in research which will produce innovation, which in turn, will yield monopolistic rents. Those rents will be forgone, however, when the new innovation appears and repeals the previous one. This way, Aghion and Howitt's model provides for a creative destruction within a neo-classical endogenous growth setup. Aghion and Howitt's work has not only attracted scholar attention but also served as a basis for entrepreneurship enhancing reforms across countries. Governments across the industrialized countries strive to foster the

---

[1] A full description of the survey is provided in the report by Allen and Van der Velden (2009). More information is also available in http://www.reflexproject.org.
[2] More recently Aghion and Howitt revised their previous model and adapted it to the new wave of technological innovation (Aghion et al., 2013).

entrepreneurial activity (Acs et al., 2011, Baumol and Strom, 2007, Estrin et al., 2013, Kuratko, 2005). European Commission see the entrepreneurship as a possible solution to the persistence of unemployment and social exclusion (European Commission, 2009, European Commission, 2013). There is a large pressure on embedding the entrepreneurial education within the current educational curricula (European Commission, 2006, European Commission, 2009). In the same vein the European Commission calls for better use of human capital through innovation in the European economies (Quintini, 2011, Quintini and Martin, 2006). This demonstrates the chief role of higher education in the process of entrepreneurial training which in turn creates the fertile ground for innovation. The central stage of this discussion is occupied by the question whether the entrepreneurial education can be taught (Tang et al., 2012, von Graevenitz et al., 2010, von Graevenitz and Weber, 2011). Not only can entrepreneurs be taught their entrepreneurial skills through formal education but also through social contact with other entrepreneurs (Guiso et al., 2015).

On the other hand, it is clear that political and economic institutions have a decisive role in the setting up of a fertile environment for the growth, in a way that they establish the incentive structure for individuals in companies to innovate and create value (North, 1990). It is however necessary to exert more effort in order to popularize and explain the concept of entrepreneurship in societies (Kucel et al., 2016). Along with this policy, there is also a need to devise and implement ways of teaching entrepreneurship within the existing educational systems. This way, entrepreneurship has more chances to become embedded within the societies rendering the public policies aimed at entrepreneurial activity more successful (Quintana et al., 2016).

Entrepreneurship means different things in different economies. In the developing countries, entrepreneurship is frequently a means to achieve economic independence and thus is considered as a "necessity entrepreneurship". Necessity entrepreneurs set up their businesses in order to gain money for living (Naude, 2010, Naudé, 2009, Van der Sluis et al., 2005). The entrepreneurial activity in such countries amounts to almost a third of the economy (e.g. the case of Mexico). In contrast, in efficiency-driven economies (Porter, 1990, Porter et al., 2001), where governments focus their efforts on providing affordable higher education and efficient infrastructure, the entrepreneurship comes as a result of opportunities provided by the economic development. Finally, in innovation-driven economies, entrepreneurship becomes the cornerstone of growth since it is the entrepreneurs who generate innovation and foster development on new products and services (Acs et al., 2008). Following the definitions accepted by the World Economic Forum, Spain classifies as the innovation-driven economy. This gives the economic validity to our focus on university graduates in Spain in chapters two and three.

The macro context for entrepreneurship

In order to design the entrepreneurship fostering policies, we need to identify the key factors that affect it at the individual as well as the aggregate level (local or national). At the individual level the access to capital (both physical and human) are the key determinants (Simoes et al., 2015). However, at the macro level, there are many surfaces where institutional factors intervene. Social, cultural and political factors all affect the climate for doing business in countries (Reynolds et al., 1999). The Global Entrepreneurship Monitor (GEM) takes into account the government policies, national finance, education policies aimed at fostering entrepreneurship, R&D spending, social and cultural norms among others. Apart from the GEM reports, there are other sources of information on the entrepreneurial conditions of countries. A good example is the Global Competitiveness Index from World Economic Forum, or the Doing Business Report published by the World Bank. All those indices concentrate on the institutional side of the business environment. In order to tackle these macro structures' effects on the individual entrepreneurial activity, we combine the data from the Global Entrepreneurship Monitor with the aggregate data from the World Value Survey. Our theoretical framework in the first chapter is based on the theory of institutions described by Williamson (2000). This type of focus permits us to include in our empirical models variables specific to the macro level factors, such as political and social trust in institutions and people. There is no doubt that entrepreneurs need to be sure about rules of the game in order to engage in what Schumpeter (1934) would have called a "creative destruction". New products or services must enjoy a fertile environment in a country in order to flourish. No entrepreneur will engage in value creation if this value may be, for instance, stolen by a non-democratic regime. Countless examples around the world show how important is the trust in political institutions for the entrepreneurial activity to emerge. Another, not less important facet of trust is the social trust. Most of the transactions in the economy are possible chiefly because parties involved trust that the rules of the game will be respected entrepreneurship (Estrin et al., 2013, Stenholm et al., 2013, Welter, 2012). Following that, one should expect the cultural setups of the countries to affect the entrepreneurial activity (DiMaggio, 1994). While large economic cycles are prone to influence the global economy as a whole and impact the entrepreneurship uniformly across the globe (Parker, 2009), the particular differences across countries are rather a product of the cultural and institutional settings that differ between them (Audretsch et al., 2007, Verheul et al., 2002,

Wennekers et al., 2002). In the long run all those factors play a role in the entrepreneurship within and across countries (Acemoglu, 2003).

We hypothesize in Chapter 1, that the macro-level, institutional setup plays an important role in the process of enterprising. For that, the New Institutional Economics, cited before and advanced by Williamson (2000) comes as a natural setup. We resort to Williamson's theory in order to structure our argument in Chapter 1. We show, that social trust among people and trust in the judiciary system enhance the probability of starting a new business across 27 countries. Our results are robust to individual factors, as well as,

The micro context for entrepreneurship

In the Schumpeterian economy, the new value is created through a "creative destruction" where the entrepreneur plays a key role. This brings us to the micro level of the individual entrepreneur who detects opportunities and undertakes the risk to tackle them in a creative new way (McMullen and Shepherd, 2006). It has been hypothesized that entrepreneurs have to possess a certain type of skills to be considered as such. Kirzner (1973) was the first to propose alertness to new opportunities to be the key entrepreneurial characteristic that individuals must have in order to succeed in setting up of new ventures. It is well know that entrepreneurial activity is determined by both the human capital (Unger et al., 2011) and ascribed individual characteristics (Levesque and Minniti, 2006). In Becker's model, individuals accumulate education, experience and knowledge, which in turn can be productively applied in new business creation (Davidsson and Honig, 2003, Haber and Reichel, 2007, Martin et al., 2013, Ucbasaran et al., 2008). Certainly, there are ascribed characteristics, which condition the entrepreneurial activity such as age (Dunn and Holtz-Eakin, 2000, Levesque and Minniti, 2006), gender (Leoni and Falk, 2008), marital status (Özcan, 2011, Parker, 2008) as well as family background (Dunn and Holtz-Eakin, 2000). Individuals from more affluent families enjoy better education opportunities (thus higher human capital); have more access to capital markets through parents, and have wider social networks. Given the marital homogamy, the more affluent individuals marry among themselves augmenting yet further their possibilities of starting a new venture. On the other hand, we find the necessity self-employed whose possibilities in the labor market come limited due to their low education and limited access to capital. These two types of entrepreneurship require us to control in all our models for the education of the individuals (Simoes et al., 2015).

Notwithstanding, entrepreneurship can also be taught and thus enhanced among the employed and inactive parts of the society. Entrepreneurial education aims at teaching individuals basic business skills and enhancing their alertness and creativity (Bae et al., 2014). There is no clear consensus how to teach entrepreneurship in order to achieve most efficient outcomes (von Graevenitz et al., 2010, von Graevenitz and Weber, 2011). However, as recent research shows, the university-business collaboration on the curricula and efficient business training are the necessary building blocks for the entrepreneurial education (Quintana et al., 2016). In general terms, entrepreneurship is mostly measured through self-employment of individuals (Blanchflower, 2000, Blanchflower and Oswald, 1998, Hamilton, 2000). Self-employment does not measure the entrepreneurship in a correct way. It rather imperfectly proxies the general

tendencies about the entrepreneur. It is so, because all entrepreneurs are by definition self-employed, but not all self-employed are necessarily entrepreneurs. The chief difference between self-employed and the entrepreneurs is the opportunity pursuit among the latter as compared to income pursuit among the first. As Binder and Coad (2013) show, both the necessity and opportunity self-employed exhibit higher life satisfaction than their employed peers. It is so, because the necessity self-employed escape unemployment and the opportunity self-employed develop their ventures escaping from the routine employment. This is a chief factor which permits us to merge these two groups in our research in the first chapter. Study of pure entrepreneurship is possible only with use of specialized data such as Global Entrepreneurship Monitor (GEM). With GEM, we are able to distinguish the real pursuers of the business opportunities from the rest of the self-employed population (Estrin et al., 2013). Even though, our focus in this chapter is on the macro institutions that shape the entrepreneurship, we select individuals with at most 42 months of entrepreneurial activity with a chief focus on nascent entrepreneurs (Wennekers et al., 2005).

In the consecutive chapters we concentrate on the opportunity self-employment as we study a group of university graduates. The second chapter treats about the entrepreneurial skills of university graduates as employees. In this chapter we test whether the, so called, entrepreneurial skills are relevant for the intrapreneurship, otherwise understood as corporate entrepreneurship (Martiarena, 2013, Parker, 2011). Our results demonstrate that higher levels of business alertness and higher creative aspirations are positively associated with the probability that individuals who possess them are going to initiate innovation within their jobs. In our sample of university graduates employed 5 years after their graduation we see that alertness and creativity are significantly associated with innovation through introduction of new knowledge, new processes and technology as well as new products in the existing organizations. This shows, that not only are the entrepreneurial skills important for starting a new business (Tang et al., 2012) but that they also serve as source of intrapreneurship.

The third chapter of this thesis takes up on the idea of the entrepreneurial skills (Kucel and Vilalta-Bufi, 2016) by challenging their definition reserved to alertness and creativity. Following the theory of balanced skills of Lazear (2004) we test whether university graduates with more (self-reported) skills are more likely to be entrepreneurs (self-employed) compared to their less widely skilled peers. We study if having a bigger menu of skills (even without excelling in any of them) could serve as a good predictor of self-employment. Our results suggest that indeed having more skills is positively associated with being self-employed as proposed by Lazear (2005).

Chapter 1.   (Dis)trustful Entrepreneurs

Abstract

In this first chapter we analyses the impact of aggregate levels of trust on the individual decisions to enterprise. Basing on the micro data from the Global Entrepreneurship Monitor and merging them with the aggregate values of trust for 27 countries extracted from the World Value Survey we find that social trust and trust in the judicial system increment significantly the likelihood to start up a new company for the years 2001-2009. Using multilevel econometric modelling allows us to relax the parallel regression assumptions and hence adds to the robustness of our results.

1.1. Introduction

This work studies the influence of macro institutional settings on the personal, individual decisions to enterprise. This topic although not new, has not been much studied combining the micro and macro perspectives in the same framework (Estrin et al., 2013). However, it can be posited that cultural norms, institutions and customs shape not only the macro policies of countries, but also influence the micro, individual decisions of people (Audretsch et al., 2007, Verheul et al., 2002).

The formulation of policies and programs that aim to stimulate the creation of companies is an objective of the public administration of roughly every country focused on the economic development (Acs et al., 2011, Baumol and Strom, 2007, Estrin et al., 2013, Kuratko, 2005). In this way the entrepreneurial activity is a useful tool for reaching specific objectives of economic policy.

At the same time, the political and economic institutions have a decisive influence on the growth, in a way that they establish the incentive structure that motivates the individual effort aimed at the entrepreneurship and the investment in fixed capital, human capital, and new technologies (North, 1990). From a long-term vision the level of economic development can be explained throughout the evolutionary analysis of the institutional framework of each country (Acemoglu, 2003). The entrepreneurship in this framework can be seen as yet another production factor in a at the country level (Baumol and Strom, 2007). It is known that entrepreneurial activity is determined by both the human capital (Unger et al., 2011) and ascribed individual characteristics such as sex or age (Levesque and Minniti, 2006). However, there is also well documented influence of institutional environment on both the individual and the aggregate levels of entrepreneurship (Estrin et al., 2013, Stenholm et al., 2013, Welter, 2012).

Concerning the human capital (Becker, 1993) several arguments suggest a positive relationship between human capital and entrepreneurial success. The human capital increases the detection of opportunities (Chandler and Hanks, 1998), as well as the ability to mobilize resources (Kirzner, 1999a). Therefore, people try to maximize the economic benefit of a certain level of human capital as a way to obtain the compensation to its investment (Cassar, 2006).

In the same way concerning the effect of age on the entrepreneurial activity there is empirical evidence (Levesque and Minniti, 2006) that shows that young people have a greater likelihood to start a business than older people, and therefore, the age pyramid in a given society determines the rate of establishment of new businesses. This evidence, along with the evidence

relative to gender that indicates a greater probability to enterprise for men than for women in developed countries (Evans and Leighton, 1989) sets the basic framework for our model.

Apart from human capital and ascribed characteristics, the individual entrepreneurial activity comes determined through the access to capital. Individuals in this respect may possess the capital themselves, making the access question straightforward, or may rely upon other ways of raising it. Usually, individuals who raise capital for their new ventures, rely on their social networks in order to gain access to capital (Granovetter, 1985). Hence, we use a variable expressed as "knowledge of business angels" as a proxy in relation to individual financial capacity. Personal wealth, although useful as a leverage for raising capital, is less indicative of entrepreneurship than access to capital through business angels (Hurst and Lusardi, 2004). For this reason factors like the knowledge of, or access to, business angels seem to be a better proxy of individual financial capacity necessary to start a new venture.

However, not only the micro-level, individual factors affect the decision to enterprise. We claim that the macro-level, institutional setup plays a role in the individual decisions to set up a new business. The New Institutional Economics (NIE) (Williamson, 2000) constitutes a natural framework for the empirical analysis of the determinants of entrepreneurship that we undertake in this work. The seminal work of Williamson (2000) establishes a hierarchical structure for analysis of economic institutions within and across countries. In particular the NIE distinguishes four institutional levels: (1) Informal institutions (customs, traditions, religion), (2) Institutional environment (formal constitutional setup: judiciary, executive, legislative institutions), (3) Governance (transaction costs) and (4) Resource allocation (individual incentives). Each of those levels receives influences of the previous one, the same way that the first level has it origin in the mechanisms that slowly shape the minds of people (North, 1990, Putnam, 1993).

Using a unique combination of micro-level data from Global Entrepreneurship Monitor merged with the macro aggregated variables describing different facets of institutional trust extracted from the World Value Survey, we estimate whether these trust facets affect individual decisions to enterprise.

1.2.   Theoretical background

It is a well-documented fact, that the differences in the entrepreneurial activity throughout time are dominated by economic cycles (Parker, 2009), whereas the differences across countries seem to be more affected by the cultural (DiMaggio, 1994) and institutional settings (Audretsch et al., 2007, Verheul et al., 2002, Wennekers et al., 2002). Evidence shows that the level of entrepreneurial activity follows a U form in relation to the degree of country's economic development (Freytag and Thurik, 2006). In this work, we hold the time dimension constant and analyse the influence of institutions on the individual propensity to enterprise. In order to analyse the effect of institutions on the individual decisions it is, however, necessary to shed some light on the underlying theoretical background. The new institutional economics defined by Williamson (2000) defines, as mentioned before, four basic levels of analysis of institutions' impact on the economic activity, and in particular on the entrepreneurial activity as is in our case.

The second level of NIE, related to formal institutions, is where the rules of the game are defined, i.e. the normative framework that defines the economic incentives which shape individual decision (for instance a decision to enterprise). Trust is being generated at this level. Political theory shows that trust and all its aggregated facets stem from slow moving political institutions (Pierson, 2004).

This level receives the influence of informal framework (first level of institutional setup defined by Williamson) and at the same time it also influences in the evolution of this informal framework, thus mutually shaping each other. The customs, traditions or the religion generate a certain culture (Audretsch et al., 2007, Verheul et al., 2002), which is palpable through social norms and certain established conventions generating social trust, that is explained trough the social theory (Delhey, 2005, Delhey and Newton, 2003, Newton, 2001). This applies also to entrepreneurial activity (Baumol and Strom, 2007) in that trust reduces transaction costs.

The third level concerns the governance as institutional framework that emerges from any organizational system and that can be explained through the economics of the transaction cost (Gibbons, 2010). The lower the transaction costs the smoother the transactions and the more of the transactions is to be expected in the market. That translated into our setup means that transaction costs located at the third level of Williamson's scheme foster or mitigate the amount of entrepreneurship observed in a country. In our model, we take these level for constant.

Finally there is a fourth level entails all the resource allocating mechanisms of standard economic setups defining the immediate incentive structure for economic agents (Acemoglu et

al., 1996). It is at this level that individuals decide to enterprise given the influences from all the previously described remaining three levels of institutional economics.

In line with the Williamson's argument about the fourth level of institutional theory, De Wit and Van Winden (1989) demonstrate empirically the relevance of the starting labor situation for the choice between self-employment and a gainful employment. In the same vein, Mortensen (1986) summarizes the occupational choice perspective of entrepreneurship. Research on occupational choice posits that individuals choose to enterprise if their expected utility from starting up a business exceeds their expected utility from a paid employment (Banerjee and Newman, 1993, Siow, 1984). Empirically, this research concentrates on a comparison between wages from self-employment and a being an employee and merge them with other characteristics typically stated in as predictors of entrepreneurship (De Wit and Van Winden, 1989, Earle and Sakova, 2000, Freytag and Thurik, 2006).

In this work, we use the Total Entrepreneurial Activity (TEA) variable defined as involvement in starting up a business within last 42 months (Estrin et al., 2013) as a measure of individual propensity to enterprise. This decision situates us immediately at the fourth level of Williamson's structure, since we concentrate our empirical effort at the individual level. Notwithstanding, we hypothesize that entrepreneurship at the individual level comes influenced by macro factors stemming from higher level institutions. In particular, we are interested in the impact that different types of trust have on the individual decisions to start a company.

A careful analysis of entrepreneurship across countries shows that it does not experiment significant changes over time (van Der Sluis et al., 2008, van Stel, 2005). This, in turn, suggests that other factors beyond the economic ones have a prominent role. We approximate different types of trust using aggregated levels of self-reported trust drawn from the World Value Survey. We consider that trust at macro levels informs us about the context, in which the entrepreneurial activity is developed in each country, and for this reason it explains the entrepreneurial activity. We assume that aggregate levels of trust influence the individual willingness to enterprise.

In general terms it is know that high level of trust has beneficial effects on people, institutions and nations (Newton, 2001). Indeed understanding the social context is extremely important if we understand entrepreneurship as a socio-economic process where the economic action is conditioned by social relations (Casson and Giusta, 2007, Delhey, 2005, Delhey and Newton, 2003, Levi and Stoker, 2000, Welter, 2012). Entrepreneurship, as we claim, cannot be fully understood without taking into account different facets of trust that influence human relations. As Granovetter (1985 p. 487) puts it:

"Actors do not behave or decide as atoms outside a social context, nor do they adhere slavishly to a script written for them by the particular intersection of social categories that they happen to occupy. Their attempts at purposive action are instead embedded in concrete, ongoing systems of social relations."

The use of trust as an explanatory variable forces to specify briefly the meaning of trust that we assume in this work. Although the definition of trust is a controversial issue, there exist a consensus to understand trust as a relational concept, where individuals become vulnerable to each other exposing themselves at the harm (Levi and Stoker, 2000).

Different types of trust permit us to re-create the institutional environment where the entrepreneurship is being exercised. This institutional context generates incentives to create new businesses through the legal, political and social systems. We intend to approximate these influences through aggregate measures of trust across countries. Merging so many different countries and economic systems permits us to achieve a very heterogeneous sample where trust types, if important at the highest levels, should persist important also at the micro level. In the next steps we define each of the trust types that we employ in our analysis following the four level system defined by Williamson (2000) within the new institutional economics school (NIE). We start with the variable "social trust", which informs us about the context of informal institutions in the highest level of the hierarchical model of institutions within NIE. Also at this level "trust in democracy" serves us as a proxy variable of trust in the lower informal level. The variable "trust in judicial system" informs us about the context of formal institutions (constitutional level) pertaining to the second level of hierarchical model of institutions. The variables "trust in government" and "trust in political parties" provide information about the practical implementation of the formal institutions and therefore fall closer to governance level at the third level. We use also "trust in major companies" in an attempt to approximate the functioning of the incentives at the third level.

Using these definitions, we form several hypotheses that express our expectations about the results of this analysis.

Hypothesis 1: Aggregate social trust affects positively the individual propensity to enterprise across countries.

Social trust is a feature of social systems that is created from informal institutions that configure a determined context of development and of relations. The levels of trust that are obtained on social surveys are a good indicator of the trustworthiness of societies. Therefore the trust levels obtained inform us about the society and about social system beyond personality or feeling of the individuals (Ioannides and Loury, 2004, Putnam, 1993). Using the World Value Survey, Knack

and Keefer (1997) show that higher levels of social trust generate more honest citizens and thus, reduce the aggregate corruption levels in the country. Estrin et al. (2013) analyze the influence of corruption on the entrepreneurial intentions basing their argument on the high transaction costs in the countries with elevated levels of corruption (Anokhin and Schulze, 2009). Our approach differs from Estrin and colleagues in that we introduce social trust as a measure of honesty among the citizens of a country. In this work, social trust is measured with the following question asked in the World Value Survey: "Generally speaking, would you say that most people can be trusted, or you cannot be too careful?"

Hypothesis 2: Trust in judicial system enhances the entrepreneurial activity in a country.

The constitutional foundations of the formal institutional framework are particularly relevant for the entrepreneurial activity because entrepreneurs need to rely on the rights arising from the performance of its business project. Entrepreneurial activity requires "transactional trust" in the long term (Fogel et al., 2008) and this depends on a reliable legal framework. The judicial system is an essential part of the formal institutions and so the trust in judicial system determines the influence on the institutional context in which the entrepreneurial activity is developed. Our definition of trust in the judiciary system is based on the following question asked in the World Value Survey: "Generally speaking, what is the level of your trust in the judicial system?"

Hypothesis 3: Political trust (Trust in Government/ trust in political parties) determines the enterprising activity, in a cross-country model.

From the data of the World Value survey, we can say that the social confidence between citizens of the same social environment is not related with the political trust between citizens and politicians or political organizations. The data shows that, starting from the same set of social conditions, social trust and political trust have quite different origins. We find the sources of political trust in variables that measure data as the interest in politics or in political parties, and therefore we can assume that the object of this variable is the governance, i.e. the specific rules that implement the correct structure of government in the level 3 of the hierarchical model of the NIE, in a lower position than the formal constitutional environment described previously.

The consequences of political trust as an explanatory variable are associated with the active involvement of citizens in their community, in the exercise of their right to vote, in the participation in movements of institutional reform and in the self-confidence among citizens (Levi and Stoker, 2000). We assume that the political trust helps to construct the institutional trust, and therefore the entrepreneurial activity will be affected positively by the political trust.

The definition of political trust is based on the following questions from the World Value Survey: "Generally speaking, which is the level of your trust in the political parties (the government)?", respectively.

1.3. Data and Methodology

This work uses pooled data from the Global Entrepreneurship Monitor (GEM) and aggregate variables (at the country level) from the World Value Survey (WVS). Our final sample entails 27 countries from the OECD together with China, Russia, India, Brazil, Argentina, Peru and Romania. We choose these countries for their relative economic and political stability which ensures homogeneity of our sample. We merge into one dataset consecutive samples from Adult Population Survey from the Global Entrepreneurship Monitor for waves from 2001 through 2009. We do so, in order to augment the sample size and keep our results as robust as possible. Given the cross sectional nature of each wave of GEM our combined dataset remains cross section. We assume that trust is a factor which does not change significantly across a decade and thus, we can merge the data into one pooled sample. Apart from this merge, we add the macro variables measuring trust in the 34 sampled counties coming from waves 4 (1999-2004) and 5 (2005-2009) of World Value Survey. Again the same assumption as above was employed, namely that trust is a stable parameter over a decade. Our dependent variable is entrepreneurship and it is regressed over a range of micro-level explanatory variables as well as macro-aggregate measures of trust.

Dependent variable:

As a proxy of the dependent variable "Entrepreneurship" we use the TEA variable (Total Entrepreneurship Activity) included in the GEM. Total entrepreneurial activity is measured as an answer to a question whether an individual has been involved in an entrepreneurial activity (starting a business alone or helping others to start it) during last 42 months. In the affirmative case the variable takes a value 1 and 0 otherwise.

Independent variables:

We use standard demographic controls such as gender and age (Levesque and Minniti, 2006). Gender is codified as 1 for females and 0 for males. Age ranges from 18 years old to 82 years old. It is well known that women are in a disadvantage when it comes to entrepreneurial activity (van Der Sluis et al., 2008). We control for human capital level through education dummies for each level of education, from primary, through lower and higher secondary, post-secondary non-tertiary and to tertiary. It has been widely demonstrated that education has an important impact on entrepreneurial activity (Rees and Shah, 1986). Furthermore, we control for entrepreneurship-specific skills through a self-reported dummy variables, codified as 1 when an

individual reported high level of skill and 0 otherwise (Kaish and Gilad, 1991, Kirzner, 1973, Kirzner, 1999a, Valliere, 2013).

Further, we include a dummy for having acted as a business angel (*Business_angel*) as a high level experience of new start up creation. This variable comes coupled with another proxy of high business skills embodied in the business owner dummy (*Business_owner*). Possible influence on starting up a new business venture may come from social networks of an individual. In order to capture this possibility we include a variable, which indicates whether an individual knows other entrepreneurs (*Knows_entrepreneurs*).

Finally, as described before we introduce aggregate measure of trust. We introduce separately *Social trust* dummy, *Political trust* measured as trust in the government and *Legal trust* captured through a question whether individuals trusted in the judicial systems of their respective countries. These aggregate variables come from World Value Survey and are introduced as averages per country for all countries included in our sample and averaged across both waves of the survey. Table 1 presents definitions of all explanatory variables. Descriptive statistics of the explanatory variables are presented in Table 2. Next, we describe the methodology of our multilevel modelling strategy.

Methodology:

Let EM stand for the entrepreneurial involvement taking only positive values ($EM \in \mathbf{R}^+$). If an individual $i \in \{1, 2, ..., n\}$ decides to enterprise then: $EM > 0$ and, $EM = 0$ otherwise. Therefore, we treat the entrepreneurial activity as a latent variable. We can only observe that individuals decided to enterprise without knowing "how much" of this entrepreneurial activity, they undertake. We define Total Entrepreneurial Activity following the GEM definition as all activity related to new ventures younger than 42 months. Hence, we obtain that:

$$EM_i^* = \begin{cases} 1 \text{ if } EM > 0 \\ 0 \text{ otherwise.} \end{cases}$$

Furthermore, following the definition in de De Wit and Van Winden (1989), we define the entrepreneurial activity as: $EM_i = \alpha_1 \left(\ln w_i^S - \ln w_i^E \right) + \alpha_2 X_i + \varepsilon_i$, where w_i^S, w_i^E stand for salaries from self-employment and gainful employment, respectively. In the present analysis we assume that individuals are myopic in terms of predicting their future incomes from both sources and therefore: $E\left(\ln w_i^S - \ln w_i^E \right) = 0$. This leads us to the following re-formulation of our problem:

$$EM_i = \theta' X_i + \xi_i.$$

We estimate the following empirical model derived from the above formulation:

$$\Pr(EM_i > 0|X) = \Pr(EM_i^* = 1|X) = F(\boldsymbol{\beta}'X_i + u_i)$$

Where F(·) stands for cumulative distribution function of the logistic distribution.

A multilevel model is a type of econometric technique, which permits to add a random factor to the intercepts of regression lines and, if needed, it is also possible to add random slopes to certain coefficients of interest – entrepreneurship in our case. A random slope model[3] applied in our analysis can be defined as follows:

We define a two-level random intercept model for entrepreneurship decision as:

$$EM_{ij}^* = \beta_0 + \zeta_j + \boldsymbol{\gamma}X_{ij} + \boldsymbol{\varphi}T_j + \upsilon_{ij}$$

where: ζ_j stands for the random part of the country intercept, X_{ij} denotes a vector of the individual characteristics accompanied by $\boldsymbol{\gamma}$ vector of their respective coefficients; $\mathbf{T_j}$ is the vector of country level trust variables with its coefficients vector $\boldsymbol{\varphi}$; and υ_{ij} is an error term of individual characteristics which vary by country. The above equation can be estimated by means of a logistic model which is expressed as follows:

$$\log\left(\frac{\pi_{ij}}{1-\pi_{ij}}\right) = \beta_0 + \zeta_j + \boldsymbol{\gamma}X_{ij} + \boldsymbol{\varphi}T_j + \upsilon_{ij}$$

with the error term $\upsilon_{ij} \quad MVN(\mathbf{0}, \boldsymbol{\Omega}_u)$ following multivariate normal distribution, where $\mathbf{0}$ is a vector of zeros and $\boldsymbol{\Omega}_u$ is the covariance matrix of the random effects.[4] Equation (1.2) can be consistently estimated using maximum likelihood method with adaptive Gauss-Hermite quadrature approximation (Skrondal and Rabe-Hesketh, 2008).

---

[3] We refer to "random slope" models for short but we understand them as a sub-family of the general multilevel random intercept and random slope models in this work.

[4] The π_{ij} is the probability of success in a random experiment.

Table 1.Definitions of explanatory variables

Variable	Description
Female	Female gender
Age	Age of the individual
Lower secondary	Lower secondary level of education
Upper secondary	Upper secondary level of education
Post-secondary n.t.	Post-secondary non-tertiary level of education
Tertiary	Tertiary level of education
Knows entrep.	Individual knows another entrepreneur
Business owner	Respondent is a business owner
Entrep. Skills	High level of entrepreneurial skills indicator
Business angel	Has acted during last 3 years as a business angel
Trust in judicial system	Trust in the judicial system of the country (country average)
Trust in government	Trust in government in general regardless of the government in power (country average)
Social trust	Trust in newly met people [weak ties] (country average)

Table 2 Descriptive statistics

Variable	Mean	Standard dev.	Min	Max
Female	0,518	0,500	0,000	1,000
Age	43,755	15,202	18,000	99,000
Lower secondary	0,316	0,465	0,000	1,000
Upper secondary	0,309	0,462	0,000	1,000
Post-secondary n.t.	0,219	0,413	0,000	1,000
Tertiary	0,141	0,348	0,000	1,000
Knows entrep.	0,360	0,480	0,000	1,000
Business owner	0,118	0,323	0,000	1,000
Entrep. skills	0,479	0,499	0,000	1,000
Business angel	0,035	0,185	0,000	1,000
Trust in judicial system	2,438	0,256	1,936	3,376
Trust in government	2,720	0,239	1,684	3,257
Social trust	1,754	0,247	1,380	2,567

1.4. Results

Our empirical strategy is based on a model building strategy. We have estimated six models (see. Table 3) gradually introducing explanatory variable. In model 1, we estimate the random intercept model without any controls in order to compare later other models' fit to this basic model. In model 2 basic controls for gender, age and education levels are introduced. It can be readily observed, as expected, that both female gender (Cowling and Taylor, 2001) and older age decrease the probability to become an entrepreneur (Levesque and Minniti, 2006, Robinson and Sexton, 1994). Furthermore, we can also appreciate that, higher levels of education increase the likelihood of setting up a new company (Rees and Shah, 1986, Taylor, 1996).

In the next step, we introduce specific controls for entrepreneurial competencies (Entrepreneurial Skills) and access to capital (Business Angel and Business Owner). These variables have been previously shown in the literature to increase significantly the individual propensity to enterprise. Holtz-Eakin et al. (1994) show, that access to capital increases significantly the likelihood of entrepreneurial decisions. In our case Business Owner along with Business Angel have significantly positive impact on the probability to enterprise. Apart from that, knowing another entrepreneurs as well as having a high level of entrepreneurial skills increase yet further the likelihood to start a new company for individuals across all sampled countries. Models 4 to 6 include the controls for aggregate levels of trust. In model 4, we introduce social trust. It proves significant and its impact on the probability to enterprise is positive. This confirms our earlier hypothesis (**H1**) that aggregate social trust in a country increases the individual propensity to start a new business. This result confirms then, that higher level trust placed at the first level of Williamson's institutions ladder, plays an important role in the micro-level mercantile decisions of individuals. Individuals need to feel proximity with other people in the society for many reasons. Principally, companies need clients and providers. All business relations, be it with clients, or suppliers, are based on social trust. If individuals do not share similar values, their relations may be much more

costly than in the opposite situation. This result is an underlying assumption of models of social diffusion as noted in Guiso et al. (2015) where entrepreneurs learn about business opportunities from other entrepreneurs through social contacts. These contacts create an environment where the so called "entrepreneurial culture" may emerge. Spillovers from interacting with other entrepreneurs are behind the modern models of business incubators. In this sense, our results give certain validity to these business models.

In the next step, we test whether trust in judicial system affects the entrepreneurial activity at the micro level. As can be observed from Table 3, Model 5 trust in judiciary system fosters entrepreneurial activity. This confirms our second hypothesis (**H2**) that stable rules of the market game influence positively individual entrepreneurial activity. This result is again a quite transcendental to the proper functioning of the economy. If individuals can trust the judicial system (trust in the formal institutions of the State), then they can embark on business activities being sure that any disputes arising from business relations will be impartially resolved by an independent judiciary. This empowers entrepreneurs in their endeavors rendering them more predictable and decreasing the costs of coordination in the economy.

As regards the trust in the politics, it does not seem to increase the entrepreneurial decisions of individuals in our sample. It may be that political disaffection cause this result (Torcal and Montero, 2006). Thus, we cannot confirm our third hypothesis whereby the aggregate trust in the government increased the propensity to enterprise. Political systems although all democratic, are subject to frequent changes due to elections. Shifts of power, political conflicts and disappointment with unfulfilled promises from political campaigns may diminish or even destroy temporarily trust in the politicians. Our results are robust to fixed country effects and therefore meet the criteria of institutional analysis.

Table 3 Multilevel regression results for the decision to enterprise

	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Female		-0.531***	-0.103***	-0.102***	-0.103***	-0.103***
		(0.0100)	(0.0113)	(0.0113)	(0.0113)	(0.0113)
Age		-0.0189***	-0.0282***	-0.0282***	-0.0282***	-0.0282***
		(0.000357)	(0.000445)	(0.000445)	(0.000445)	(0.000445)
Lower secondary		0.0960**	-0.0252	-0.0251	-0.0253	-0.0252
		(0.0466)	(0.0522)	(0.0522)	(0.0522)	(0.0522)
Upper secondary		0.267***	0.0302	0.0304	0.0300	0.0302
		(0.0468)	(0.0524)	(0.0524)	(0.0524)	(0.0524)
Post-secondary n.t.		0.434***	0.0866	0.0869*	0.0864	0.0866
		(0.0470)	(0.0527)	(0.0527)	(0.0527)	(0.0527)
Tertiary		0.662***	0.202***	0.203***	0.202***	0.202***
		(0.0473)	(0.0531)	(0.0531)	(0.0531)	(0.0531)
Knows entrep.			0.575***	0.575***	0.575***	0.575***
			(0.0116)	(0.0116)	(0.0116)	(0.0116)
Business owner			2.134***	2.134***	2.134***	2.134***
			(0.0117)	(0.0117)	(0.0117)	(0.0117)
Entrep. Skills			1.386***	1.386***	1.386***	1.386***
			(0.0152)	(0.0152)	(0.0152)	(0.0152)
Business angel			0.455***	0.455***	0.455***	0.455***
			(0.0210)	(0.0210)	(0.0210)	(0.0210)
Social trust				0.567**		
				(0.259)		
Trust in judicial system					0.479**	
					(0.212)	
Trust in government						0.0117
						(0.261)
_cons	-2.306***	-1.607***	-2.988***	-4.045***	-4.182***	-3.020***
	(0.120)	(0.129)	(0.101)	(0.492)	(0.537)	(0.707)
N	572010	572010	572010	572010	572010	572010

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

1.5. Conclusions

This work addresses an important, but fairly understudied question, of how different facets of aggregate trust affect the individual propensity to start a new business. Using Global Entrepreneurship Monitor merged with aggregate data on trust from World Value Survey, we estimate for a sample of over 520 thousand of individuals from 34 countries the propensity of becoming an entrepreneur. Controlling for factors such as entrepreneurial experience, skills and access to capital, we show that social trust and trust in the judiciary system augment significantly the probability of starting up a new business. This work shows, that institutional factors which are largely stable across decades, have a significant influence on the individual decisions in particular moments in time. It is a new light on entrepreneurship decisions, since majority of the economics literature on entrepreneurial decisions in the micro scale concentrates on the individual factors such as gender, human capital, or access to financial capital without taking into account the non-negligible, as we show here, institutional factors which affect these decisions as well. This work goes beyond other work also by using standard social surveys questions, which opens a wide avenue for new research in empirical institutional economics of entrepreneurship. Controlling for the individual factors, we show that individuals need to trust each other to engage in business relations. Moreover, this trust requirement extends on any possible disputes through the trust in the judiciary system. Similarly as in Estrin et al. (2013), we show that not only the individual factors determine the individual decisions to start a new business. In fact, there are important institutional factors, such as social and legal trust in our case, which determine individual propensities to enterprise.

Notwithstanding, we are also well aware of all the limitations of this work. Firstly, we use cross-section data and thus it is beyond our capacity to control for unobservable individual characteristics. Secondly, we measure only some aspects of access to financial capital, but we do not take into account the housing of individuals, possible intergenerational bequests and the like. In order to claim causality in our analysis, we would also need to introduce some strictly exogenous element, which would instrument our endogeneity between high human capital and being a manager or a business owner.

Chapter 2.   Entrepreneurial alertness of university graduates and firm innovation

Abstract

This work investigates the impact of entrepreneurial alertness defined by Kirzner (1973) among university graduates from the year 2000 on their likelihood of being agents of innovation in their jobs in the year 2005. Resorting to REFLEX survey the results indicate that even after controlling for explicit entrepreneurial education, graduates' alertness affects very strongly and very positively the probability of them being the ones who introduce innovation within the firms. The strongest impact is observed on the product innovation, followed by the introduction of new knowledge and these followed by the innovation through technology. These results shed a new light on both, the entrepreneurial alertness and the entrepreneurial education as a whole.

Keywords: entrepreneurial alertness, agents of change, innovation, conditional logit model

2.1.   Introduction

The entrepreneurial activity plays a relevant role in the economic growth of countries through job creation in modern societies (Acs et al., 2011, Carlsson et al., 2009, Grossmann, 2009, Volker, 2009). Therefore, fostering entrepreneurial activity occupies the center of the political stage as regards policy planning (European Commission, 2009, European Commission, 2013, Quintini, 2011).

Entrepreneurship has attracted much attention since Schumpeter's (1950) seminal work on "creative destruction". In his view individuals embark on entrepreneurial action given the opportunities of the interplay of demand and supply forces in the market that create a fertile ground for opportunity recognition. On the other hand the neoclassical economic theory posits that markets are in equilibrium and any shocks to this equilibrium are being instantaneously corrected by the market forces. In this view, entrepreneurs appear not so much as equilibrium-destroying agents but rather as equilibrium-seeking agents (Kirzner, 1973, Kirzner, 1999a, Kirzner, 2009), agents that by recognizing opportunities arising from economic shocks seek to create value on their basis (Pittaway, 2005). Valliere (2013) systematizes the differences between Schumpeterian and Kirznerian views of entrepreneurship offering, what he calls, endogenous entrepreneurial process, which stems from the proper market functioning. In this view, entrepreneurs do not have to be owners of the companies but rather "creators of new knowledge, products or methods of work". This view, goes in line with the developments in the formal economic theory. Baumol (1993) has long recognized and described the space for entrepreneurship in general equilibrium theory. Accordingly, entrepreneurs are producers of innovation within and across business setups within a given economy.

Our exercise in this work puts to test these theories. We hypothesize that alert individuals are more prone to be agents of change within their organizations. The idea is not entirely new in the literature. On the one hand, it comes from the entrepreneurial education research (Haase and Lautenschläger, 2011, Martin et al., 2013), which seeks validation of entrepreneurial training within the economic markets. On the other, it derives from the analysis of corporate entrepreneurship (Kuratko and Audretsch, 2013) or entrepreneurial employees (Stam, 2013). Furthermore, our research falls into the domain of intrapreneurship, whereby workers become co-creators of added value within the companies without explicit responsibility to do that (Martiarena, 2013).

Using a very rich data from the REFLEX Survery[5] conducted in 2005, which interviewed individuals with university degrees who graduated in the year 2000. Rich retrospective information included in the survey permits us to control for individual ability and parental background, adding this way to the reliability and robustness of our results.

Our hypothesis claims that more alert individuals, controlling for their entrepreneurial education, are thought to be more prone to act as agents of change in their respective companies. We rely on the self-reported information where individuals responded whether they were the ones to introduce: (i) new knowledge, (ii) new technology, or (iii) new product in their companies five years after graduation. If we can prove that higher levels of alertness induce more intrapreneurial individuals, then policies directed at fostering entrepreneurial education would be productive also in the wage employment, rendering them much more robust and, thus, more socially desirable.

The research is defined as follows. The next Section describes the theoretical background for our research. Following that we describe our sample in Section 3 and explain the results of the analysis in Section 4. Finally, Section 5 concludes the work and offers some policy-relevant suggestions.

---

[5] A full description of the survey is provided in the report by Allen and Van der Velden (2009). More information is also available in http://www.reflexproject.org.

2.2. Theoretical discussion

Entrepreneurship has been attracting continuously more and more attention in advanced societies nowadays. European Commission directly calls for enhancing the entrepreneurship in the societies in order to tackle the persistent problem of unemployment and poverty (European Commission, 2009, European Commission, 2013). Initiatives such as fostering the entrepreneurial education occupy the central stage of political agenda (European Commission, 2006, European Commission, 2009). It may well seem that entrepreneurship becomes a panacea for all the failures of the economy. However, it is important to see whether all the programs aimed at promotion of entrepreneurship really make an impact on the real economy particularly in what Castells (2000) and others call knowledge and information society. The following questions arise:

- Does the entrepreneurial education play any important role beyond its narrowly defined aim as training programs for some entrepreneurs?
- Is there any gain from being entrepreneurial without establishing one's own business?

This work intends to reunite these questions in looking at how individual alertness affects the workers' propensity to be the ones who initiate and introduce productive changes in their jobs. Specifically, we study whether more alert individuals, despite their possible entrepreneurial training within the tertiary education, bring about new products, knowledge or technologies in their jobs five years after graduation. We do that, controlling for the size of the organization where they work, its innovativeness level, and most importantly controlling for the type of market competition that their companies face.

It is not an entirely new question to look at the entrepreneurial skills applied within existing organizations. Creating a new added value through innovation within the existing organization has been described previously as intrapreneurship (Martiarena, 2013, Parker, 2011). Individuals who embark on creating new products or services while in wage employment are frequently referred to as entrepreneurial employees (Stam, 2013).

We define our dependent variable as the probability that an individual initiates a change in their company where they are employed (as opposed to self-employed). This situates us within the field of intrapreneurship. As Martiarena (2013) describes, an intrapreneur as opposed to an entrepreneur, exhibits major risk aversion, has lower level of opportunity recognition and believes that his/her skills are lower than if they were entrepreneurs.[6] Intrapreneurs, otherwise called corporate entrepreneurs, are thought to be necessary for the growth of organizations (Kuratko and Audretsch, 2013). Corporate entrepreneurs have been proven crucial for company's internationalization, new product development, new business models definition and the like (Ireland et al., 2009). In our case, graduates who embark on introduction of a change in their companies, might be thought of as corporate entrepreneurs. Furthermore, Parker (2011) shows that intrapreneurs (corporate entrepreneurs) concentrate on development of their already existing companies, while entrepreneurs are more concerned with development of their social networks in order to be able to introduce their new product or service through these networks. Following that, Parker (2011) draws attention to the age of intrapreneurs vs. entrepreneurs. While entrepreneurs are predominantly middle-aged individuals, intrapreneurs are either quite young or very senior within their organizations. This is particularly important for our present research as we analyze mostly young individuals, with (at most) five years of market experience after their graduation.

Alertness

We operationalize the opportunity recognition as alertness to new opportunities as defined by Kirzner (1999a). Alert individuals are those, who can recognize opportunities in domains, where others do not notice anything interesting from the business point of view. Tang et al. (2012) explore Kirzner's (1973, 1999a, 2009) alertness theory and define it as "scanning and searching for information, connecting previously-disparate information and making evaluations of the existence of profitable business information". Individuals by comparing schemas use alertness in order to distinguish differences to schemas surrounding them. Alert individuals detect eagerly differences in these schemas while non-alert individuals do not notice any difference and this

---

[6] Other than risk aversion issues are also present when analyzing intrapreneurs vs. entrepreneurs (independent entrepreneurs). Particularly over-confidence plays an important role in defining the entrepreneurial mindset (Arenius and Minniti, 2005) Genetic traits (Nicolaou and Shane, 2009) and image of "a capable self" vs. "a vulnerable self" (Mitchell and Shepherd, 2010) are proposed in the entrepreneurship literature as explanations for the heightened predisposition toward opportunity recognition. Finally, Baron (2008) points towards affect and moods' on the opportunity recognition. Accordingly, individuals may exhibit different levels of alertness in different circumstances.

way possibly overlook opportunities. Alertness has become the chief tool for explaining opportunity recognition (Valliere, 2013).

Entrepreneurial education

It has been shown in the literature that entrepreneurs tend to be more successful the higher their human capital (van der Sluis and van Praag, 2004, van der Sluis et al., 2007). Following the human capital model of Becker (1993) it has been shown that individuals that acquire more productive skills should be more successful as entrepreneurs, since they can control more areas of their new start-ups and thus perform better in the market (Lazear, 2004). Given this result it becomes interesting to pose the following question: Can entrepreneurial skills be learnt? The evidence within the literature on entrepreneurial education is mixed but tending towards a positive answer for this question (Bae et al., 2014, Martin et al., 2013). In order to account for this possibility we build a conditional logit model where the conditioning criteria is precisely whether individuals have attended a program good for developing entrepreneurial skills. If one assumes that entrepreneurial programs enhance entrepreneurial skills then attending such program should have a positive influence on the entrepreneurial alertness. Unaccounted for, participation in entrepreneurial education would thus distort our results.

Family background

Family background makes an important impact on the learning process of individuals. It has been shown that skills acquisition comes largely determined by the family of origin's economic and social position (Hanushek and Woessmann, 2008). Not accounting for this influence would possibly bias our results upward creating a spurious impression of importance of alertness for intrapreneurship. It is, thus, necessary to include some proxy of individuals' family background in our model in order to avoid the bias (Morgan and Winship, 2007). We include a dummy indicating father's tertiary education. It has been shown that education is a much better predictor of economic and social standing than income as it is much less volatile than education across time (Blanden et al., 2007). Furthermore, individuals may not only benefit from parental economic resources while deciding about their education. Matlay (2008) points towards another source of endogeneity whereby individuals follow their parents' traits according to role models. In our case that would mean that it is not alertness but an inherited entrepreneurial mindset, which drives the results had we not accounted for parental influence, explicitly.

Type of company: Size, market competitiveness and sectors

Lastly, we have to consider the demand-side factor, which is the company. The size of the company as well as the market type where it operates, play an important role for the very existence of intrapreneurship (Stam, 2013). Basing on the knowledge spillover theory of entrepreneurship (KSTE) developed by Acs et al. (2009), Stam (2013) shows that knowledge diffusion is the primary source of intrapreneurship. Innovative markets flourish with new knowledge and this in turn motivates intrapreneurial activity within firms. Contrary, the more innovative the market the less, apparently, entrepreneurial activity within it. This implies that we need to control explicitly for competitiveness of the market within which operates the company, where graduates from our sample work.

We expect, therefore, that individuals who graduated from universities are firstly to be considered opportunity entrepreneurs and if employed opportunity intrapreneurs. We controls in all our models for the entrepreneurial education rendering our results free from biases stemming from clustering of more entrepreneurially skilled individuals around more entrepreneurial university programs. Due to the cross sectional nature of our data (described in the next section) our clustering technique removes only part of unobserved heterogeneity. We account for the unobserved ability through the inclusion of the higher secondary GPA of each graduate but still, we do not control for self-selection of more able individuals to better schools and the posterior effects of this process.

2.3.   Data and methods

In the present work we use REFLEX (Research into Employment and professional FLEXibility) Survey data. The REFLEX survey has been conducted on a representative sample of graduates from the year 2000 who were retrospectively interviewed in the year 2005. We use the sample for Spain in order to simplify the analysis. Using all the sample for all available countries we would have to embark on explaining all the specificities of their respective labor markets, education systems, and self-employment conditions. It would extend the scope of this project. The response rate of Spain was 22%, which corresponds to 3,912 respondents (Allen and Van der Velden, 2009). This is possibly the greatest limitation to this research. It could impact our results in multiple ways. Primarily, the non-response may signify selection bias for the results due to self-selection of particular types of individuals into the REFLEX sample. Other possible flaws may come from small sample size which may impede in certain situations a coherent analysis. While the previous case could be present in our results, the latter is unlikely given the final sample consisting of roughly 2000 individuals. Nonetheless, this is to date, the only data for Spain which includes such detailed information on individual attributes such as alertness, creativity or a role in the firm's innovation processes.

The data contains detailed information on their education, school-to-work transition and present job five years after graduation from a university (Allen and Van der Velden, 2007).[7] For the purpose of this study we resort to three self-reported variables which allow us to operationalize the change induced or participated with by the graduate in the sample:

> Do you play a role in *introducing* (these) innovations in your organization? (Yes or not?)

- Technology, tools or instruments.
- Knowledge or methods.
- Product or service.

The original variable has been pre-coded as a dummy indicating 1 if an individual considers that she/he played an active role in introduction of one of the above changes and 0 otherwise. After excluding all individuals who were older than 67 years of age or were missing some of the explanatory variables (detailed below) we have obtained a final sample of 1923 individuals. Using this sample we estimate a series of conditional logit models. We condition the models on the fact whether graduates consider that their university program could be considered as developing entrepreneurial skills or not. Since the literature on the entrepreneurial education

---

[7] A full description of the survey is provided in the report by Allen and Van der Velden (2009). More information is also available in http://www.reflexproject.org.

suggests that entrepreneurial skills could be taught (Bae et al., 2014, van der Sluis and van Praag, 2004, van Der Sluis et al., 2008) we find it useful to control for this fact in our modelling strategy. All models contain therefore cluster robust standard errors.

Table 4 describes the definitions of the variables used in the analysis.

Table 4 Definitions of variables

Variable	
Highly alert individual	How do you rate your own level of competence in terms of alertness? Recoded from 7-point Likert scale into a dummy with 1 for values 5-7 and 0 otherwise.
Innovation in product	Did you play a role in introducing a new product in your organization?
Innovation in knowledge	Did you play a role in introducing new knowledge in your organization?
Innovation in technology	Did you play a role in introducing new technology in your organization?
Female	Female gender
Age	Age of the graduate
Long program	Long vs. Short university program (licenciatura/diplomatura)
Grade secondary educ.	Grade point average in the secondary education
Experience	Labor market experience in months
Fields of study	
Education	
Humanities	
Social science	
Science & math	
Engineering	
Agriculture & vet	
Health	
Services	
Public	Public firm
Small firm	<50 employees
Medium firm	50-250
Large firm	>250
Innovative firm	Innovative firm (self-responded in a 5-level Likert scale)
Hard market competition	Hard market competition where the firm operates (self-responded 5-level Likert scale)
Father with tertiary education	Father with tertiary education

We analyze the probability using a model building strategy, adding gradually controls to the models. In the first models in Tables 6 to 8, we control for the basic ascribed characteristics such

as age, gender and level of education, along with father's education level. In the next step we introduce controls for the public sector workers and firm size. The following block of variables is comprised of firm's environment controls self-reported by the worker: whether the firm is considered as innovative in its sector and whether there is a hard competition in the firm's sector. Following that, we test whether fields of study from which the workers graduated matter for their intrapreneurial activity. We repeat this modeling strategy for the three aforementioned facets of innovation: technology, knowledge and products.

Our main explanatory variable is alertness to new opportunities. This variable has been suggested first by Kirzner (1973) and stands for capacity of recognizing business opportunities where others do not detect such. In our case, alertness is measured through a self-responded variable which limits its robustness. Notwithstanding, in another research Kucel and Vilalta-Bufi (2016) using the same data show that alertness is the sole variable which predicts self-selection into self-employment from the whole battery of 19 different individual attributes available in the REFLEX survey.

Table 5 Sample descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Highly alert individual	1923	0.620	0.485	0	1
Innovation in product	1923	0,404	0,491	0	1
Innovation in knowledge	1923	0,549	0,498	0	1
Innovation in technology	1923	0,375	0,484	0	1
Female	1923	0,592	0,492	0	1
Age	1923	2,983	2,797	26	59
Long program	1923	4,217	0,976	3	5
Grade secondary educ.	1923	2,881	0,905	1	5
Experience	1923	5,140	1,540	0	84
Education	1923	0,087	0,282	0	1
Humanities	1923	0,072	0,258	0	1
Social science	1923	0,354	0,478	0	1
Science & math	1923	0,145	0,352	0	1
Engineering	1923	0,191	0,393	0	1
Agriculture & vet	1923	0,034	0,182	0	1
Health	1923	0,109	0,311	0	1
Services	1923	0,008	0,088	0	1
Public	1923	0,171	0,377	0	1
Small firm	1923	0,366	0,482	0	1
Medium firm	1923	0,181	0,386	0	1
Large firm	1923	0,452	0,498	0	1
Innovative firm	1923	0,384	0,486	0	1
Hard market competition	1923	0,748	0,434	0	1
Father with tertiary education	1923	0,253	0,435	0	1

2.4. Results

Individual alertness affects strongly the probability that a graduate becomes an intrapreneur five years after graduation if he/she has attended a university program that could be considered good for enhancing the entrepreneurial skills. This is the major result that stems from the empirical analysis in this work. Results in Tables 6, 7 and 8 prove clearly that individual alertness, even after controlling for fields of study, cognitive ability and firm characteristics, contributes significantly to the probability of intrapreneurship in technology, knowledge or product in Spain in the year 2005. In all the empirical analyses we have followed a model building strategy, gradually adding explanatory variables. This exercise should in principle remove any noise from the coefficient of alertness, should the other explanatory variables be collinear with it.

Table 6, depicts results for intrapreneurship in new technology within the company. Individuals were asked if they were the agents who were responsible for introduction of new technology in their organizations. Looking at the Akaike Information Criteria (AIC) we can readily observe that the model which fits the data best is the T4 (full model). In that model the exponentiated coefficient for alertness (expressed as odds ratio) shows that highly alert individuals are 50% more likely to be intrapreneurs in their companies five years after graduation (compared to graduates with low alertness level). Furthermore, working in an innovative firm augments the probability of intrapreneurship by another 94.1%. Moreover, fields of education such as Sciences and Engineering contribute even more to the positive chances for intrapreneurship by 245% and 277% respectively. On the other hand, female gender diminishes the probability of intrapreneurship by 26.6%. Interestingly, as Stam (2013), we observe that the larger the firm the lower the probability for intrapreneurship. It is so, as Stam (2013) proposes, because larger firms enjoy economies of scale from standardization of tasks and work routines. Conversely, workers in smaller firms are exposed to more opportunities for changing their routines, thus giving way to possible intrapreneurial activity.

Moving on to Table 7 we observe again that the full model is the one that explains the most of the data variability. In Model K4, we observe that highly alert individuals are 63.5% more likely to innovate through knowledge within their wage employment than their non-alert peers. Again, women are less likely to participate in the intrapreneurial activity. Cognitive ability plays a very moderate role with one unit increase in the secondary grade point average increasing the probability of intrapreneurship by 12.6%. It comes as no surprise that innovative firms are the ones which foster intrapreneurship, increasing it by more than 200% compared with non-

innovative firms. From the fields of study it is again Sciences and Engineering that help attain jobs with high intrapreneurial component, along with (somewhat surprising) Education studies. Finally, Table 8 shows results for the analysis of innovation through product for our sample. Model P4 is again the preferred one given its significantly lowest AIC statistic. As regards alertness, individuals who score high on this characteristic are 94.2% more likely to be involved in introduction of new products than their non-alert colleagues. Other results behave exactly the same as before with the difference that secondary level grade (which surrogates the cognitive ability) does not increase the likelihood of intrapreneurship.

Our results show a very clear cut picture of graduate intrapreneurship in Spain. Figure 1 shows the comparison of odds ratios of intrapreneurship by type of innovation among university graduates, five years after their graduation. It is evident that product innovation is the prime source of intrapreneurship. This is followed by knowledge innovation and finally by technological innovation. Our tentative explanation is that product innovation is the cheapest way to innovate while knowledge and especially technology requires much higher capital investment rendering it more difficult to achieve for small companies where majority of intrapreneurship seems to occur.

Table 6 Probability of introducing new technology

DV: Innovation in technology	Model T1	Model T2	Model T3	Model T4
Highly alert individual	1.557***	1.594***	1.484***	1.499***
	(0.159)	(0.165)	(0.157)	(0.161)
Female	0.563***	0.512***	0.529***	0.634***
	(0.056)	(0.052)	(0.055)	(0.070)
Age	1.026	1.024	1.026	1.004
	(0.019)	(0.019)	(0.019)	(0.020)
Long program	0.980	0.999	0.982	1.036
	(0.050)	(0.052)	(0.052)	(0.063)
Grade secondary education	1.190***	1.221***	1.210***	1.145**
	(0.066)	(0.069)	(0.069)	(0.069)
Experience	1.007**	1.010***	1.009***	1.008**
	(0.003)	(0.003)	(0.003)	(0.004)
Father with tertiary educ.	1.152	1.162	1.154	1.102
	(0.128)	(0.132)	(0.133)	(0.129)
Public sector		1.556***	1.801***	1.839***
		(0.206)	(0.251)	(0.274)
Medium firm		0.784*	0.737**	0.687***
		(0.108)	(0.103)	(0.098)
Large firm		0.436***	0.362***	0.345***
		(0.050)	(0.043)	(0.042)
Innovative firm			2.053***	1.941***
			(0.217)	(0.209)
Hard competition			1.151	1.136
			(0.138)	(0.139)
Education				1.736***
				(0.356)
Humanities				1.390
				(0.299)
Science & Math				2.459***
				(0.390)
Engineering				2.769***
				(0.431)
Agriculture & Vet				1.726**
				(0.480)
Health				1.282
				(0.249)
Services				0.854
				(0.525)
Observations	1923	1923	1923	1923
Pseudo R^2	0.032	0.056	0.076	0.100
AIC	2459.2	2404.5	2357.8	2310.7

Odds ratios presented. Reference field of study: Social sciences.

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

Table 7 Probability of introducing new knowledge

DV: Innovation in knowledge	Model K1	Model K2	Model K3	Model K4
Highly alert individual	1.689***	1.740***	1.646***	1.635***
	(0.163)	(0.172)	(0.165)	(0.165)
Female	0.764***	0.700***	0.731***	0.756***
	(0.074)	(0.070)	(0.074)	(0.081)
Age	1.016	1.015	1.017	1.012
	(0.018)	(0.019)	(0.019)	(0.019)
Long program	1.068	1.091*	1.076	1.124**
	(0.053)	(0.055)	(0.055)	(0.065)
Grade secondary education	1.140**	1.164***	1.150**	1.126**
	(0.062)	(0.064)	(0.064)	(0.065)
Experience	1.003	1.006*	1.006*	1.006*
	(0.003)	(0.003)	(0.003)	(0.003)
Father with tertiary educ.	1.311**	1.329**	1.339***	1.321**
	(0.144)	(0.148)	(0.151)	(0.151)
Public sector		1.586***	1.716***	1.546***
		(0.208)	(0.236)	(0.225)
Medium firm		0.689***	0.657***	0.646***
		(0.094)	(0.091)	(0.091)
Large firm		0.437***	0.380***	0.379***
		(0.048)	(0.044)	(0.044)
Innovative firm			2.089***	2.046***
			(0.219)	(0.216)
Hard competition			0.874	0.879
			(0.102)	(0.104)
Education				1.782***
				(0.357)
Humanities				1.524**
				(0.308)
Science&Maths				1.619***
				(0.251)
Engineering				1.525***
				(0.231)
Agriculture&Vet				1.503
				(0.417)
Health				1.541**
				(0.283)
Services				0.631
				(0.352)
Observations	1923	1923	1923	1923
Pseudo R^2	0.023	0.047	0.067	0.075
AIC	2577.0	2519.8	2472.6	2464.8

Odds ratios presented.

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8 Probability of introducing a new product

DV: Innovation in product	Model P1	Model P2	Model P3	Model P4
Highly alert individual	2.063***	2.087***	1.959***	1.942***
	(0.209)	(0.213)	(0.204)	(0.203)
Female	0.682***	0.653***	0.683***	0.734***
	(0.067)	(0.065)	(0.069)	(0.078)
Age	1.011	1.010	1.011	1.003
	(0.018)	(0.018)	(0.019)	(0.019)
Long program	1.056	1.066	1.049	1.110*
	(0.053)	(0.054)	(0.054)	(0.065)
Grade secondary education	1.059	1.080	1.066	1.023
	(0.058)	(0.060)	(0.060)	(0.060)
Experience	1.001	1.002	1.002	1.001
	(0.003)	(0.003)	(0.003)	(0.003)
Father with tertiary educ.	1.148	1.167	1.168	1.133
	(0.126)	(0.129)	(0.131)	(0.129)
Public sector		1.024	1.163	1.075
		(0.135)	(0.160)	(0.157)
Medium firm		0.805	0.758**	0.752**
		(0.109)	(0.105)	(0.105)
Large firm		0.578***	0.482***	0.478***
		(0.063)	(0.056)	(0.056)
Innovative firm			2.168***	2.130***
			(0.223)	(0.222)
Hard competition			1.083	1.081
			(0.128)	(0.129)
Education				1.390
				(0.279)
Humanities				1.176
				(0.243)
Science&Maths				1.562***
				(0.242)
Engineering				1.666***
				(0.253)
Agriculture&Vet				1.695*
				(0.465)
Health				1.677***
				(0.311)
Services				0.491
				(0.328)
Observations	1923	1923	1923	1923
Pseudo R^2	0.030	0.040	0.063	0.072
AIC	2510.0	2489.8	2434.1	2426.8

Odds ratios presented.

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 1 Probability of intrapreneurship by types of innovation
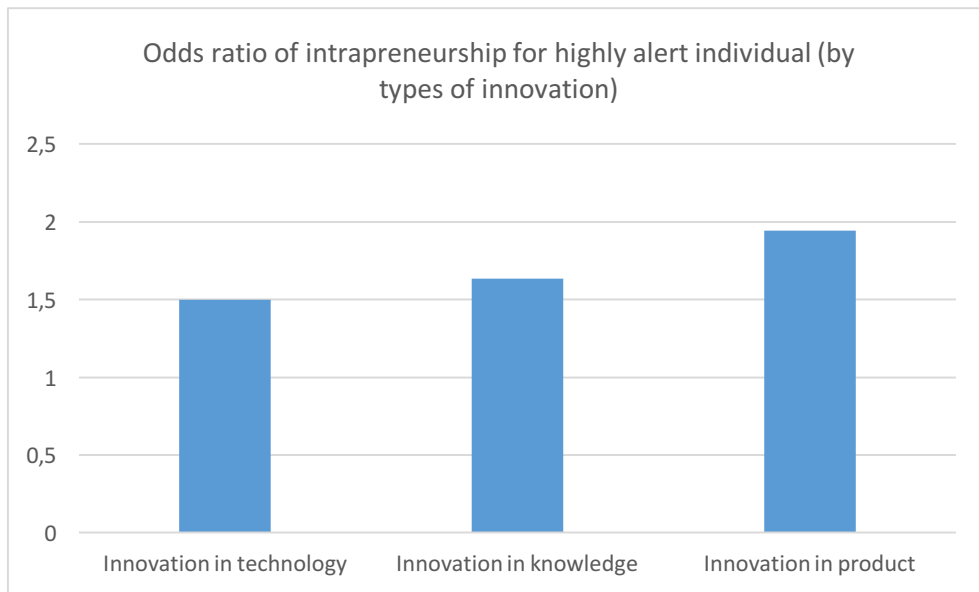

Odds ratio of intrapreneurship for highly alert individual (by types of innovation)

2.5. Conclusions

This work investigates the likelihood of intrapreneurship (Martiarena, 2013, Parker, 2011, Stam, 2013) of university graduates five years after their graduation in Spain. Using a particularly, contextually rich data from the REFLEX survey we investigate whether individual alertness affects the probability to be the agent of innovation within a paid employment in 2005. Through a series of conditional logistic regressions, which allow us to control for clustering of individuals within the entrepreneurial university programs we establish that alert individuals indeed are more likely to be intrapreneurs. Moreover, we achieve to establish an order of likelihood of intrapreneurship by type of innovation introduced. Innovation through product is the most likely type of innovative action that intrapreneurs may introduce. It is followed by innovation through knowledge and lastly comes the innovation through technology. We offer a tentative explanation that product innovation may be considered as the least capital-demanding type of innovation as compared to technological innovation, which is thought to be the most expensive. As mentioned before our results are robust with respect to clustering of individuals within entrepreneurial higher education programs. It is an important observation with possible far-reaching policy implications. If one accepts that the entrepreneurial education indeed enhances the entrepreneurial alertness (Martin et al., 2013), then investments in entrepreneurial education should pay off regardless if a graduate decides to start their own company or seeks a wage employment. While the first case is trivial from the economic point of view, the second situation seemed to be more ambiguous. Our work closes this gap by showing that even within the wage employment, alert individuals enterprise, creating new added value and thus provide for economic growth. In this light the European Commission's (2006) call for more entrepreneurial education seems by and large justified. Certainly, the results must be approached with caution and replicated on other data for different countries. Several issues limit the universality of our findings here. Firstly, we do not account for the selection of more able individuals to better school. This selection process may have far reaching consequences for our results. If more able individuals sort out towards the better schools, they may become more entrepreneurially skilled and thus become the aforementioned agents of change in their jobs. It would then be their innate ability that pushed them to these positions and not their entrepreneurial skill as such, rendering our result spurious. Some remedy to that is brought by controlling for the upper secondary GPA which we include in all our models. However, only a panel data would allow to fully controls for such unobserved individual heterogeneity. Another source of problems in our models comes from selectivity among the firms. Only sufficiently modern and innovative firms will benefit really from the intrapreneurial labor force. Selection

into such firms remains unobserved in our models. The only (weak) remedy is the size of the firm which we include in all our models. Introduction of industry sectors did not render any changes on our results. It, thus, appeared to us important to control for the innovativeness of the sector in which the firm operates. This variable, however, is self-reported by our individuals which removes significant part of its strength. More detailed controls for types of sector could, perhaps, alleviate the possible biases from the demand side factors. However, a much larger sample would be necessary in order to disaggregate the sectors sufficiently as to achieve some meaningful demand-side conditioning.

Chapter 3.   Skills variety and self-employment: The Case of Spain.

Abstract

This work analyses empirically the impact of so called balanced skills advanced by Lazear (2004). For this purpose we resort to the contextually rich data collected within the REFLEX survey and study a sample of Spanish university graduates from the year 2000, who were interviewed retrospectively in 2005. Using a clustered logit model we show that more skills are positively related with probability of self-employment. Additionally, we show that having changed jobs several times is not a determinant of self-employment as proposed by Silva (2007).

Keywords: entrepreneurship, trust, multilevel models

This chapter has been published in the International Review on Entrepreneurship and it's reproduced in this thesis by permission of Senate Hall Ltd.

http://www.senatehall.com/entrepreneurship?article=573

3.1. Introduction

This work studies the relationship between variety of skills and the probability to become self-employed. The major inspiration for the present analysis is the theory of balanced skills proposed by Lazear (2004).

The entrepreneurial activity requires a stable institutional framework with clear rules of the economic game (Williamson, 2000) so that economic agents can concentrate on value creation which is the core of entrepreneurship (Schumpeter, 1934). In the Schumpeterian economy, the new value is created through a "creative destruction" where the entrepreneur plays a key role. This brings us to the micro level of the individual entrepreneur who detects opportunities and undertakes the risk to tackle them in a creative new way (McMullen and Shepherd, 2006). It has been hypothesized that entrepreneurs have to possess a certain type of skills to be considered as such. Kirzner (1973) was the first to propose alertness to new opportunities to be the key entrepreneurial characteristic that individuals must have in order to succeed in setting up of new ventures. Kirzner's theory was further extended on skills such as creativity (Kirzner, 2009, Kirzner, 1999b) and self-awareness (Gaglio, 2004). In a recent work Tang et al. (2012) extend the previous theories on what could be called the entrepreneurial skills and propose alertness along with creativity and self-awareness to form the basic entrepreneurial skills setup. This has been further empirically tested as a coherent measure outside of the core entrepreneurship research domain (Kucel et al., 2016, Kucel and Vilalta-Bufi, 2016).

Another insight into entrepreneurial activity comes as a corollary of the human capital theory (Becker, 1993). In Becker's model, individuals accumulate education, experience and knowledge, which in turn can be productively applied in new business creation (Davidsson and Honig, 2003, Haber and Reichel, 2007, Martin et al., 2013, Ucbasaran et al., 2008). Notwithstanding, Unger et al. (2011) observes that higher levels of human capital are not necessarily a valid predictor of entrepreneurial success.

It is clear that thus far, there is no clear definition of what constitutes a true entrepreneur. On the one hand, as shown before, there is evidence that entrepreneurs have to be alert and creative with respect to their environment. On the other, there is a convincing body of evidence that higher stocks of human capital in general are positively associated with entrepreneurial action. However, there are also necessity entrepreneurs among which many have low human capital (Poschke, 2013).

Given this, Lazear (2004) proposes another approach to entrepreneurship determinants. According to Lazear's theory, entrepreneurs have to be possess a large menu of varied skills

instead of being specialists in any particular field. Entrepreneurs should be what Lazear calls "Jacks-of-all-trades" who have a balanced skills level either in-born or achieved through job experience. He proved his theory with a sample of Stanford MBA alumni, showing that those who were skilled in many disciplines without excelling in any were much more likely to establish a new venture than those who could be considered specialists in some field (Lazear, 2005). Furthermore, according to Lazear, even though entrepreneurs may be able to hire specialists from virtually any field for their ventures, they need to know enough from this field in order to hire the right people.

Lazear's theory has attracted some significant attention in the entrepreneurship literature (Åstebro and Thompson, 2011, Bublitz and Noseleit, 2014, Hyytinen and Ilmakunnas, 2007, Oberschachtsiek, 2012, Stuetzer et al., 2013a, Stuetzer et al., 2013b). Most of this evidence confirms Lazear's observation about the balanced skills pool being positively related with entrepreneurial action. Oberschachtsiek (2012) as well as Stuetzer et al. (2013a) stress the importance of the origin of the skills pool among entrepreneurs. According to them, previous work experience in business and sales mixed with knowledge of various fields could be considered the key to entrepreneurial success. This view comes questioned by Silva (2007), who claims that when unobserved heterogeneity in ability is accounted for, the balanced skills do not play any role in prediction of entrepreneurial action. This work aims at shedding some new light on this topic by employing a unique and contextually rich data from university graduates survey (REFLEX) from the year 2005. Using the graduates' sample has a twofold advantage. Firstly, we are able to control explicitly for their field of study, which may affect the entrepreneurial intentions. Secondly, we are able to determine at an individual level if a graduate attended an entrepreneurial university program (Bae et al., 2014, Hartog et al., 2010, van Der Sluis et al., 2008).

The remainder of the work is organized as follows. The next section reviews the literature, and forms the hypotheses. Section 3 describes the REFLEX survey[8] and specifies the econometric techniques used in the analysis. Results are presented and discussed in Section 5, while Section 6 concludes the analysis.

---

[8] For more information on the REFLEX survey see: http://www.fdewb.unimaas.nl/roa/reflex/ and Allen and Van der Velden (2007).

3.2. Theoretical background

The theory of balanced skills proposed by Lazear (2004) has gained significant importance in the entrepreneurship literature today. In the nutshell, the theory posits that entrepreneurs are expected to be "jacks-of-all-trades" in their companies (Åstebro and Thompson, 2011, Bublitz and Noseleit, 2014, Hyytinen and Ilmakunnas, 2007, Lazear, 2005, Oberschachtsiek, 2012, Stuetzer et al., 2013a, Stuetzer et al., 2013b). An entrepreneur has to be able to control all aspects of the company at its beginnings. Using a sample of Stanford MBA graduates Lazear (2005) showed that those who had more varied experience before joining the MBA were significantly more likely to establish their own businesses. Furthermore, according to Lazear the skills that entrepreneurs possess are only necessary but not sufficient in order to succeed. In light of the balanced skills theory the least developed skill of the entrepreneur is their major limitation. In contrast it is not important if the possible entrepreneur excels in any particular skill. Following the human capital model Lazear's theory claims that balanced (more varied) work experience, equips individuals with more varied, and thus more equilibrated, set of skills. Notwithstanding, Lazear's analysis does not have any explicit controls for the number of skills in which the graduates were equipped. Our data on the other hand permits us to address directly this issue. Through a set of 19 self-reported questions, graduates surveyed in REFLEX reported their levels of different skills. Apart, we have information, as proposed by Lazear about the number of previous jobs.

Notwithstanding, the recent literature shows some important caveats in Lazear's theory. Using Canadian data, Åstebro and Thompson (2011) demonstrate that even though the self-employed are more generally skilled than employees, their incomes are somewhat lower due to their self-employment. Their interpretation goes in line with that proposed by Silva (2007) for Italy, namely, that balanced skills signalize a taste for variety and not necessarily an opportunity entrepreneurship. In contrast, Stuetzer et al. (2012) show that more varied skills set is indeed indicative of higher probability to enterprise. Similar evidence corroborating Lazear's theory can be found in Lechmann and Schnabel (2014). Oberschachtsiek (2012) and Stuetzer et al. (2013a) refine the theory by suggesting that more business-related skills are the ones that entrepreneurs need. Accordingly, entrepreneurs even if they could hire someone else to perform for them certain tasks, which they cannot do themselves, they would still need to have enough knowledge of the task in question to hire the right person. Extending this view, Stuetzer et al. (2013b) claim that managerial experience and other relevant skills when balanced, affect positively the likelihood of entrepreneurship, net of the personality traits of the entrepreneur. The empirical evidence on the balanced skills theory suggests that even though the equilibrated set of skills

does increase the probability to start a new business (or become self-employed) it does not necessarily lead to better income or higher entrepreneurial success (Åstebro and Thompson, 2011, Silva, 2007). Contrary to that, Hartog et al. (2010) find that more balanced basic skills, such as mathematical or verbal ability are positively related with higher incomes for entrepreneurs. Despite the mixed evidence about the income effects of balanced skills it remains clear that there is a large and important empirical support to Lazear's theory (Lechmann and Schnabel, 2014, Tegtmeier et al., 2016, Wagner, 2003, Wagner, 2006). We do not dispose of clear measures of numeracy nor literacy. However, we use a proxy for the general ability which is the grade point average in the secondary education (Arcidiacono, 2004). We also control for the heterogeneous distribution of ability across different fields of study by introducing, apart from the grade point average, also the fields of study controls (Bae et al., 2014, Martin et al., 2013). Following the methodology in Kucel and Vilalta-Bufi (2016), we use a battery of self-reported skill levels for 19 different skills.[9] Notwithstanding, there are the so called "soft skills" (Heckman and Kautz, 2012) which are also known to affect the probability and posterior success of an entrepreneurial action. Entrepreneurs confront daily a very dynamic social environment and their social skills play a key role here. Some of these skills are thought to be purely relational while others are on the border between cognitive and non-cognitive definition (Baron, 2000, Baron, 2004a, Baron, 2004b, Baron and Markman, 2003). The set of skills included in our analysis here, and explained at length in the next section, contains both, skills that are typically considered cognitive (e.g. knowledge of own field or related fields) along with skills which are often catalogued as non-cognitive (e.g. creativity, alertness).

Finally, there exists another source of influence on the probability of starting a company which comes through the so called "entrepreneurial education" (Bae et al., 2014, Martin et al., 2013). There are no clear results when it comes to entrepreneurial education. Some authors find a positive influence of teaching entrepreneurship courses at the secondary or tertiary level on the likelihood of starting a new company (Martin et al., 2013). In contrast, others find that there is no positive return to entrepreneurial education and sometimes it actually discourages graduates from trying to start a company (Bae et al., 2014, Oosterbeek et al., 2010, von Graevenitz et al., 2010). Whichever the final result in particular situation, the mere presence of these studies points towards the necessity for controlling for the entrepreneurial education in studies of university graduates like ours. Therefore we condition our analyses on the fact if individuals studied a program that could be considered entrepreneurial or not.

---

[9] See Finnie and Meng (2005) for analysis on the self-reported versus tested basic skills outcomes. In our case we only have self-reported skill levels and so we cannot contrast them with the same skills types through an external testing. This clearly is a limitation to our approach.

Given these theoretical premises we hypothesize that despite having participated in an entrepreneurial educational programs, graduates with wider menu of skills (following Lazear's balanced skills theory) are more likely to become self-employed than those who specialize in only some selected skills. In the second step, we repeat the same analyses taking into account if an individual changed jobs several times or not before. This accounts for the critics of Lazear's theory expressed by Silva (2007).

3.3. Data and methods

This work relies on the REFLEX survey. It is a survey of graduates from the year 2000 who have been interviewed in the year 2005. The data contain detailed information on the study program of the graduates, their background including their secondary education and the mean grade from that education, along with very detailed questions on levels of skills at the moment of the interview (Allen and Van der Velden, 2007). Apart from that, we have also good amount of observations on the types of jobs that graduates perform, particularly distinguishing between employees and the self-employed. This permits us to analyze the probability to become self-employed in the REFLEX sample for Spain. The dependent variable in our analysis is binary and defined as 0 for employees and 1 for the self-employed. There are two key explanatory variables in this analysis. Firstly, we count all those skills where an individual answered that they had at least level of 4 out of 7 levels of this skill. The skills that were measured in the survey are presented in detail below. Secondly, we know how many previous job posts each individual held in their past since graduation from the university, which permits us to address the second hypothesis, derived from Silva's (2007) research, which claims that individuals with more skills are merely more interested in variety. This hypothesis would suggest a positive association with self-employment probability for the number of previously held jobs, but not for the number of skills.

Our research controls for the major sources of unobserved heterogeneity, which plague all empirical economic work. The chief problem is the unobserved heterogeneity due to differences in cognitive ability among people. We do not dispose of clear measures of numeracy nor literacy, which would serve as the direct measures of cognitive ability. However, we use a proxy for the general ability which is the grade point average (GPA) in the secondary education (Arcidiacono, 2004). More cognitively able individuals should achieve higher GPA. Certainly, including the GPA may be troubling to an extent as more able individuals should be expected to acquire more skills than their less able peers. Notwithstanding, if GPA and the number of skills prove both significant then the skills variety does not stem entirely from the higher cognitive ability. Apart from these controls we also introduce age and its squared component to control for the age effects on self-employment (Levesque and Minniti, 2006), gender (Leoni and Falk, 2008) and the dummies for levels of education: professional 3-year degree vs. academic 5-year degree (Åstebro et al., 2011, Blanchflower, 2000, Iglesias et al., 2016).

We control for the heterogeneous distribution of entrepreneurial preference and ability across different fields of study by introducing the fields of study controls (Bae et al., 2014, Martin et

al., 2013). Following the methodology in Kucel and Vilalta-Bufi (2016), we use a battery of self-reported skill levels for 19 different skills. These skills include both analytical and "soft" skills (Heckman and Kautz, 2012) which are also known to affect the probability and posterior success of an entrepreneurial action. Entrepreneurs are daily confronted with a very dynamic social environment and their social skills play a key role here. Some of these skills are thought to be purely relational while others are on the border between cognitive and non-cognitive skills. The set of skills included in our analysis here, and explained in the next section, contains both skills that are typically considered cognitive (e.g. knowledge of own field or related fields) along with skills which are often catalogued as non-cognitive (e.g. relational skills, creativity, alertness).

It is easily observable from Table 9 that majority of the sample responded that their skills level for each particular type of skills is above 4. This levied on our decision to codify all those skills for each individual as high when the individual reported at least level 4 (out of 7).

Table 9 Skill types distribution

Skill type	Mean	Std. dev.	Min	Max
Mastery of own field	5,225	1,045	1	7
Knowledge other fields	4,373	1,201	1	7
Analytical thinking	5,112	1,212	1	7
Ability to learn	5,758	0,997	1	7
Ability to negotiate	4,553	1,443	1	7
Ability to work under pressure	5,479	1,250	1	7
Alertness to opportunities	4,764	1,312	1	7
Ability to coordinate	5,441	1,179	1	7
Ability to use time efficiently	5,533	1,145	1	7
Ability to work with others	5,801	1,168	1	7
Ability to mobilize others	4,804	1,308	1	7
Ability to make meaning clear	5,508	1,107	1	7
Ability to assert authority	4,757	1,354	1	7
Ability to use computers	5,639	1,229	1	7
Ability to come up with ideas	5,351	1,096	1	7
Willingness to question ideas	5,338	1,188	1	7
Ability to present	4,773	1,520	1	7
Ability to write	5,445	1,242	1	7
Foreign language	3,890	1,840	1	7

Table 10 shows the descriptive statistics for all variables. It is observable from Table 10 that majority of graduates have reported 16 different types of skills. The sample is slightly skewed towards the female population and the average age is 29 years. The average grade from the

secondary education is 2.9 out of 5. Mean experience level is 50 months which corresponds with graduates being interviewed 5 years after graduation.

In the following section we present results of the clustered logit models. We cluster the observation with respect to having participated in an entrepreneurial education program or not. We believe that having studied an entrepreneurial university program affects our results in a systematic way, which in turn would distort our conclusions (Bae et al., 2014, Martin et al., 2013).

Table 10 Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Self-employed	0,081	0,273	0	1
Main controls				
Number of previous jobs	2,982	3,494	0	98
Number of skills	16,299	3,699	0	19
Female	0,613	0,487	0	1
Age	29,875	3,117	26	59
Age squared	902,220	213,899	676	3481
Long program	0,420	0,979	0	1
Grade secondary education	2,890	0,931	1	5
Experience	50,997	15,327	0	84
Experience squared	2835,508	1366,905	0	7056
Entrepreneurial program	0,280	0,449	0	1
Fields of study				
Education	0,108	0,310	0	1
Humanities	0,067	0,250	0	1
Social science	0,340	0,474	0	1
Sciences	0,143	0,350	0	1
Engineering	0,168	0,374	0	1
Agriculture & vet.	0,039	0,194	0	1
Health	0,129	0,335	0	1
Services	0,007	0,085	0	1
Economic sectors				
Agriculture and fishing	0,048	0,215	0	1
Manufacturing	0,093	0,291	0	1
Construction	0,069	0,253	0	1
Distribution, hotels, repairs	0,067	0,250	0	1
Transport	0,058	0,233	0	1
Financial services	0,206	0,405	0	1
Other services	0,378	0,485	0	1
Public bodies	0,081	0,273	0	1

3.4. Results

We estimated two sets of models in order to test the two previously stated hypotheses. Firstly, we estimated the models which test the multiple skill hypothesis advanced by Lazear (2004). In both cases we apply the model building strategy. We start with a basic set of controls such as age, age squared, gender, grade point average from the secondary education, labor market experience and its squared component and a dummy indicating a long vs. short program (*licenciatura/diplomatura*). The dependent variable is a binary variable which takes value 1 when an individual is self-employed and 0 otherwise. Models in Table 11 are numbered from 1 to 4. Results in all models are transformed into odds ratios (ratios between the probability of success and the probability of failure of a random event, in our case the odds of being self-employed). The first model confirms the thesis of Lazear where individuals with more skills are more prone to be entrepreneurs (self-employed in our case). The odds ratio associated with number of skills is significant and higher than 1. This indicates that having more skills indeed provides for a higher probability of self-employment. Specifically, having 1 more skill increases the probability of becoming self-employed in our sample by 5%. The effect of gender is negative and the effect of a long program is insignificant. Women are on average about 30% less likely than men to start their own business in our Spanish sample. Moving onto the second model we introduce fields of study controls with Social science as a reference category. It is clear that fields of study are strongly predictive of self-employment among graduates in Spain. Humanities, Engineering and Health are especially more likely than Social sciences to lead to self-employment. Graduates from these fields are about twice as likely as those from Social sciences to start their own businesses in Spain in the year 2005. For robustness in the third model we skip the fields of study controls and introduce, instead, the economic sector dummies. It is clear that compared to Construction all other sectors are much less populated by the self-employed workers. In model 4 we repeat the exercise and show that results on the number of skills hold significant at 10% level even after controlling for fields of study and economic sectors.

Table 12 shows an extension of our results. In Table 12 we introduce a variable controlling for a number of previous jobs that graduate held before working for the present employer. This variable does not come significant in any model specification. This exercise was meant to test for the hypothesis advanced by Silva (2007) whereby entrepreneurs are more likely to possess varied skills not because of their entrepreneurial spirit but because of their taste for variety. By changing jobs frequently individuals gain on varied experiences which may be positively (but not necessarily causally) according to Silva (2007) related with entrepreneurship.

In model 5 to 8 results from the previous exercise hold unchanged. Number of skills is positively (though weakly) determinant to self-employment. Female gender is negatively related with self-employment while age has a positive effect on it. Finally, there are no significant changes with respect to economic sectors.

Both exercises confirm that the theory of balanced skills advanced by Lazear find some empirical confirmation among our sample of Spanish university graduates.

Table 11 Conditional logit regression for probability of self-employment

DV=Self-employed	Model 1	Model 2	Model 3	Model 4
Number of skills	1.053**	1.048*	1.051**	1.047*
	(0.026)	(0.025)	(0.026)	(0.026)
Female	0.689**	0.734*	0.652***	0.659**
	(0.103)	(0.118)	(0.101)	(0.107)
Age	1.889***	1.701**	1.557**	1.508**
	(0.405)	(0.366)	(0.313)	(0.297)
Age-squared	0.992***	0.993**	0.995*	0.995*
	(0.003)	(0.003)	(0.003)	(0.003)
Long program	1.101	1.202**	1.212**	1.310***
	(0.088)	(0.108)	(0.102)	(0.123)
Grade secondary education	0.974	0.892	0.985	0.934
	(0.082)	(0.079)	(0.085)	(0.085)
Experience	0.987	0.986	0.991	0.989
	(0.021)	(0.021)	(0.022)	(0.022)
Experience squared	1.000	1.000	1.000	1.000
	(0.000)	(0.000)	(0.000)	(0.000)
Education		1.387		1.715
		(0.446)		(0.598)
Humanities		2.481***		2.622***
		(0.698)		(0.761)
Science & Math		0.786		0.791
		(0.222)		(0.227)
Engineering		2.323***		1.886**
		(0.519)		(0.481)
Agriculture & Vet		2.022*		2.481**
		(0.730)		(0.942)
Health		2.014***		2.290***
		(0.526)		(0.676)
Services		3.198*		4.228**
		(2.097)		(2.798)
Agriculture and fishing			0.184***	0.194***
			(0.080)	(0.087)
Manufacturing			0.089***	0.095***
			(0.038)	(0.041)
Distribution, hotels and repairs			0.428***	0.459**
			(0.138)	(0.164)
Transport			0.184***	0.206***
			(0.073)	(0.083)
Financial services			0.292***	0.380***
			(0.072)	(0.105)
Other services			0.297***	0.276***
			(0.068)	(0.079)
Public bodies			0.132***	0.133***
			(0.055)	(0.058)
Observations	2582	2582	2582	2582

Pseudo R^2	0.038	0.060	0.082	0.101
AIC	1387.7	1369.3	1339.0	1325.2
BIC	1434.5	1457.2	1426.9	1454.0

Odds ratios
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Reference field of study: Social science
Reference economic sector: Construction

Table 12 Conditional logit regression for probability of self-employment – extended models

Self-employed	Model 5	Model 6	Model 7	Model 8
Number of skills	1.054**	1.049*	1.052**	1.048*
	(0.026)	(0.025)	(0.026)	(0.026)
Number of jobs	0.979	0.981	0.979	0.976
	(0.029)	(0.029)	(0.030)	(0.031)
Female	0.693**	0.736*	0.655***	0.661**
	(0.104)	(0.118)	(0.102)	(0.107)
Age	1.894***	1.708**	1.559**	1.512**
	(0.406)	(0.368)	(0.313)	(0.298)
Age-squared	0.992***	0.993**	0.995*	0.995*
	(0.003)	(0.003)	(0.003)	(0.003)
Long program	1.101	1.199**	1.212**	1.308***
	(0.088)	(0.107)	(0.102)	(0.123)
Grade secondary education	0.971	0.892	0.982	0.933
	(0.082)	(0.079)	(0.085)	(0.085)
Experience	0.986	0.986	0.991	0.989
	(0.021)	(0.021)	(0.022)	(0.022)
Experience squared	1.000	1.000	1.000	1.000
	(0.000)	(0.000)	(0.000)	(0.000)
Education		1.385		1.718
		(0.446)		(0.600)
Humanities		2.507***		2.661***
		(0.707)		(0.775)
Science & Maths		0.786		0.793
		(0.223)		(0.228)
Engineering		2.302***		1.868**
		(0.514)		(0.476)
Agriculture & Vet		2.018*		2.482**
		(0.729)		(0.943)
Health		2.024***		2.308***
		(0.529)		(0.681)
Services		3.180*		4.223**
		(2.085)		(2.794)
Agriculture and fishing			0.184***	0.193***
			(0.080)	(0.087)
Manufacturing			0.089***	0.094***
			(0.038)	(0.041)
Distribution, hotels and repairs			0.431***	0.461**
			(0.139)	(0.164)
Transport			0.185***	0.205***
			(0.073)	(0.083)
Financial services			0.294***	0.380***
			(0.072)	(0.105)
Other services			0.298***	0.274***
			(0.068)	(0.079)

Public bodies			0.132***	0.133***
			(0.055)	(0.058)
Observations	2582	2582	2582	2582
Pseudo R^2	0.038	0.061	0.082	0.102
AIC	1389.0	1370.7	1340.4	1326.4
BIC	1441.7	1464.4	1434.1	1461.1

Odds ratios
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Reference field of study: Social science
Reference economic sector: Construction

3.5. Conclusions

The aim of this research was to test empirically the theory of Jacks-of-all-trades advanced by Lazear (2004). The theory has attracted a significant level of attention in the economics literature (Åstebro and Thompson, 2011, Bublitz and Noseleit, 2014, Hyytinen and Ilmakunnas, 2007, Lazear, 2005, Oberschachtsiek, 2012, Stuetzer et al., 2013a, Stuetzer et al., 2013b).

Using a unique data set with rich contextual information we were able to observe 19 different types of skill for Spanish university graduates from the year 2000 and interviewed in 2005. For each type of skill respondents have evaluated in a Likert-type scale their own level with 1 being the lowest level and 7 being the highest. We have coded as having a certain type of skill if an individual claimed that he/she has answered at least level 4. This way we were able to construct an index recounting all skills that individual had with level at least 4. Using this variable we have specified clustered logit models with clusters defined as having studied an entrepreneurial program at the university. This way, we were able to test explicitly if higher number of skills was positively associated with the probability of self-employment. We used self-employment as a proxy of entrepreneurship for the lack of proper measure of entrepreneur in our data. Notwithstanding this is a common practice in the entrepreneurship literature (Parker, 2009).

Results suggest that having larger number of skills is positively associated with being self-employed. This finding is robust to controls for fields of study (Bae et al., 2014) and economic sectors (Simoes et al., 2015).

The theory of balanced skills by Lazear has also been criticized for being too general and not well grounded. Silva (2007) claimed that individuals with larger pool of skills are those who exhibit higher taste for variety. Accordingly, one should control for subsequent job changes of a respondent in order to capture their taste for variety. Changing jobs individuals learn new things constantly, meet new people constantly and keep up to date. This however, is their taste and not the mere means to become self-employed. Becoming self-employed may merely be a manifestation of a taste for more variety, rather than a result of having many skills. Therefore in the second exercise we have introduced a control for number of previous jobs held by the graduate. This variable approximates the taste for variety in our model. The estimated coefficient for this variable is insignificant in any model specification. Therefore we cannot affirm that it is the taste for variety that drives the graduates in our sample towards the self-employment.

Our results, though clear cut, should be approached with caution. The major limitation here is the subjective nature of the answers about the skills. In order to obtain a really reliable

information one should test the skills objectively. Another limitation, and probably not less important than the previous, is the cross-sectional nature of our data. In order to capture all unobserved individual heterogeneity we should have a panel of graduates and not just a snapshot of their lives (even retrospective). These limitations cause that the result presented here may not be as robust or secure as it may seem. If anything, we rather provide a useful evidence for the Lazear's theory, rather than prove its causality.

Final conclusions

This thesis analyzes the determinants of entrepreneurship. We do so, in several different ways, testing several different theories. We start, with the most ambitious program, testing whether large institutions such as political and social trust affect entrepreneurial activity at the individual level (Aidis et al., 2010, Estrin et al., 2013). Using a pooled sample for 27 countries from the Global Entrepreneurship Monitor between 2001 and 2009 we test whether the social and political trust determine significantly the probability of starting a new company in these countries. The social and political trust variables come from the World Value Survey pooled sample for the same period. We believe that pooling the samples does not alter our results since the social institutions such as trust change very slowly over time (North, 1990, Williamson, 2000). This gave us the opportunity of testing whether the trust in politics, judiciary system, the democracy and other people in the society matter for the individual decisions to enterprise. Such and endeavor on the aggregate level would be futile since the entrepreneurial decisions are strongly conditioned at the individual level. Therefore we resort in Chapter 1 to a multilevel modelling framework, where individual level predictors are introduced into the model along with the macro controls such as aggregates of trust in countries. Results show that apart from the standard human capital controls such as education and age (which surrogates the labor market experience) that increase the probability of starting up a new company, it is also social trust and trust in the judiciary system that positively affect it as well. The institutional economics interpretation of these findings is that trust in other people is necessary at the lowest level of transactions in order to keep them possible. However, trust in the judiciary systems warrants the stability of the trust at the micro level. If trust at the micro level is not well grounded, then the judiciary comes helpful to resolve any disputes between parties. Trust in both, the micro level rules of the game and the macro levels controls of those rules warrants a good functioning of markets, which in turns provides a fertile ground for entrepreneurship. Our results in this chapter are robust to fixed country effects and, therefore, meet the criteria of institutional analysis.

In the second Chapter we move on to analyze the so called entrepreneurial skills (Kirzner, 1999a, Tang et al., 2012, Valliere, 2013). While there is no clear agreement what the entrepreneurial skills should be, it is clear that most of the literature considers alertness to new opportunities to be one of the key entrepreneurial skills. In Chapter 2 we test whether more alter individuals are more likely to bring into their employers change through knowledge, process or product innovation. This is called intrapreneurship (Martiarena, 2013, Parker, 2011), or corporate entrepreneurship (Stam, 2013). Using data from the REFLEX survey, we test whether more alert

individuals actually are more likely to be intrapreneurs. Following the theoretical developments of Stam (2013), we show that more alert individuals are 50% more likely to be agents of innovative change in their jobs than their less alert peers. We condition our models on the participation in the entrepreneurial university program since as we know it may distort our results (Bae et al., 2014, Martin et al., 2013, Oosterbeek et al., 2010, Van der Sluis et al., 2005). Results show that product innovation is the most popular type of innovative action that intrapreneurial university graduates may introduce. It is followed by innovation through knowledge and the innovation through technology, respective. A tentative explanation that could be offered here is that product innovation could be the least capital-demanding type of innovation compared to technology or knowledge innovation. The last one apart from costly, is also probably difficult to observe since knowledge implementation may be slow and not directly observable. All models are robust to industry types and innovativeness and competition within each sector. In fact, the industry types did not prove to alter our results as much as the controls for the innovativeness and stength of competition in the sectors. Working in a firm that could be considered innovative multiplies the probability of introduction of new technology, knowledge or product by a factor of 2. Our results here are also robust with respect to fields of study at the tertiary level. The so called STEM fields (science, technolgy, enginnering and maths) are the fields where most intrapreneurial graduates are found. It is of no surprise that these are also the most innovation prone types of employments where such graduates are employed. Somewhat surprising is the effect of firm size on the intrapreneurship: the largest firms are less likely to enjoy innovation as compared to the middle and small ones. One tentative explanation could be that smaller firms are more often very innovative start ups where individuals create new products constantly in order to gain a competitive edge in the market, while the large established organizations do no need to innovate so much and do not exert such a stimulating role on their employees.

Concluding and as mentioned before our results are robust with respect to clustering of individuals within entrepreneurial higher education programs. Even if the entrepreneurial education failed to motivate individuals to start their own companies (von Graevenitz et al., 2010) then investments in entrepreneurial education that enhances the opportunity alertness should result efficient in a wage employment. More alert graduates initiate innovative change in innovative firms significantly more likely than their less alert colleagues. In this light the European Commission's (2006) call for more entrepreneurial education seems quite justified.

Finally, in the third Chapter we test the theory of balanced skills as a predictor of entrepreneurship advanced by Lazear (2004). Lazear advanced a theory where individuals who become entrepreneurs must possess a large menu of varied skills in order to start their

businesses. According to his test on Stanford MBA alumni, individuals who have more skills, even if they are not profficient in any of them are better equipped to start a new venture (Lazear, 2005). In the initial stages of the business development nascent entrepreneurs encounter a whole variety of obstacles that require not only alertness and creativity but also knowledge of other fields, business skills (management, accounting, marketing) among others. This view, has been confirmed by some other researchers placing Lazear's theory in the stage of theories predicting the entrepreneurship (Åstebro and Thompson, 2011, Bublitz and Noseleit, 2014, Hyytinen and Ilmakunnas, 2007, Oberschachtsiek, 2012, Stuetzer et al., 2013a, Stuetzer et al., 2013b). While many researchers found confirming evidence for Lazear's theory (Lechmann and Schnabel, 2014, Tegtmeier et al., 2016, Wagner, 2003, Wagner, 2006), Silva (2007) shows that when unobserved individual heterogeneity due to ability differences is accounted for, the balanced skills do not increase the probability of becoming an entrepreneur. Following this discussion, and in line with our main theme in this thesis on what predicts the entrepreneurship, we decided to test Lazear's theory in Chapter 3.

Using again the REFLEX survey for Spain we test whether having more skills (even at the average level) is positively and significantly associated with higher probability of becoming self-employed for university graduates. In our case, similarly as in Lazear's care, the sample is pre-selected. We study only university graduates and therefore their ability is probably less variable than if we studied the general population. Our results confirm the findings of Lazear. Controlling for ability through the secondary school GPA, unline Silva (2007) we find that having more skills is strongly and positively associated with probability of self-employment among Spanish graduates from the year 2000 interviewed in 2005. Even after controlling for fields of study and economic sectors our results remain significant. Our models, are also robust to clustering of individuals within the entrepreneurial university programs. Certianly, these results show only a correlation between factors and we cannot claim causality in this case. However, we add to the existent pool of evidence suggesting that Lazear's theory may in fact be valid.

This thesis aimed at showing different determinants of entrepreneurship. We started with the general view of entrepreneurial activity across 27 countries and tested whether different facets of trust affect the probability of starting a new company. In the following chapters we pursued the same objective of showing which factors help in becoming self-employed which is commonly known as a surrogate of entrepreneurship (Blanchflower, 2000). In Chapter 2 we show that entrepreneurial alertness is important not only, as the literature suggests for starting a new company, but actually it also fosters innovation within already existing firms. In Chapter 3, we test Lazear's theory of balanced skills, showing that individuals with larger pool of skills are more likely to become self-employed than their less versatile peers.

All these efforts by no means exhaust the factors that shape the entry into entrepreneurship. We are well aware that there are plenty of other unobserved or unaccounted factors which might distort or invalidate our findings.

We are also well aware of other limitations regarding the data itself. Firstly because we use cross-section data and thus it is beyond our capacity to control for unobservable individual characteristics. Secondly because we measure only some isolate aspects in our models not taking into account dozens of others. In order to claim causality in our analysis, we would also need to introduce some strictly exogenous elements, which would instrument our endogeneity with other elements. In chapter 2 and 3 the major limitation is the subjective nature of the self-reported answers. In order to obtain a really reliable information one should test the skills objectively. Another limitation, and probably not less important than the previous, is the cross-sectional nature of our data. In order to capture all unobserved individual heterogeneity we should have a panel of graduates and not just a snapshot of their lives (even retrospective). However, to our best knowledge, this thesis tests the state of the art questions from the frontier of the entrepreneurship research.

References

ACEMOGLU, D. 2003. *The Form of property rights : oligarchic vs. democratic societies,* Cambridge, Mass., National Bureau of Economic Research.

ACEMOGLU, D., AGHION, P., ZILIBOTTI, F. & CENTRE FOR ECONOMIC POLICY RESEARCH (REGNE UNIT). 2002. *Distance to frontier, selection, and economic growth,* London, Centre for Economic Policy Research.

ACEMOGLU, D., ZILIBOTTI, F. & STOCKHOLMS UNIVERSITET. INSTITUTET FÖR INTERNATIONELL EKONOMI. 1996. *Agency costs in the process of development,* Stockholm, Institute for International Economic Studies. Stockholm University.

ACS, Z., BRAUNERHJELM, P., AUDRETSCH, D. & CARLSSON, B. 2009. The knowledge spillover theory of entrepreneurship. *Small Business Economics,* 32**,** 15-30.

ACS, Z. J., AUDRETSCH, D. B., BRAUNERHJELM, P. & CARLSSON, B. 2011. Growth and entrepreneurship. *Small Business Economics,* 39**,** 289-300.

ACS, Z. J., DESAI, S. & HESSELS, J. 2008. Entrepreneurship, economic development and institutions. *Small business economics,* 31**,** 219-234.

AGHION, P., AKCIGIT, U. & HOWITT, P. 2013. What do we learn from Schumpeterian growth theory? : National Bureau of Economic Research.

AGHION, P. & HOWITT, P. 1992. A Model of Growth Through Creative Destruction. *Econometrica,* 60**,** 323-351.

AIDIS, R., ESTRIN, S. & MICKIEWICZ, T. M. 2010. Size matters: entrepreneurial entry and government. *Small Business Economics,* 39**,** 119-139.

ALLEN, J. & VAN DER VELDEN, R. (eds.) 2007. *The Flexible Professional in The Knowledge Society: General Results of the REFLEX Project*: Research Centre for Education and the Labour Market.

ALLEN, J. & VAN DER VELDEN, R. 2009. Competencies and Early Labour Market Careers of Higher Education Graduates. *Higher Education as a Generator of Strategic Competencies (HEGESCO).* Ljubljana: University of Ljubljana.

ANOKHIN, S. & SCHULZE, W. S. 2009. Entrepreneurship, innovation, and corruption. *Journal of Business Venturing,* 24**,** 465-476.

ARCIDIACONO, P. 2004. Ability sorting and the returns to college major. *Journal of Econometrics,* 121**,** 343.

ARDICHVILI, A., CARDOZO, R. & RAY, S. 2003. A theory of entrepreneurial opportunity identification and development. *Journal of Business Venturing,* 18**,** 105-123.

ARENIUS, P. & MINNITI, M. 2005. Perceptual Variables and Nascent Entrepreneurship. *Small Business Economics,* 24**,** 233-247.

ÅSTEBRO, T. & THOMPSON, P. 2011. Entrepreneurs, Jacks of all trades or Hobos? *Research Policy,* 40**,** 637-649.

AUDRETSCH, D. B. 2007. Entrepreneurship capital and economic growth. *Oxford Review of Economic Policy,* 23**,** 63-78.

AUDRETSCH, D. B., BÖNTE, W. & KEILBACH, M. 2008. Entrepreneurship capital and its impact on knowledge diffusion and economic performance. *Journal of Business Venturing,* 23**,** 687-698.

AUDRETSCH, D. B., GRILO, I. & THURIK, A. R. 2007. Explaining entrepreneurship and the role of policy: a framework. *The handbook of research on entrepreneurship policy***,** 1-17.

AUDRETSCH, D. B., HÜLSBECK, M. & LEHMANN, E. E. 2011. Regional competitiveness, university spillovers, and entrepreneurial activity. *Small Business Economics,* 39**,** 587-601.

BAE, T. J., QIAN, S., MIAO, C. & FIET, J. O. 2014. The Relationship Between Entrepreneurship Education and Entrepreneurial Intentions: A Meta-Analytic Review. *Entrepreneurship Theory and Practice,* 38**,** 217-254.

BANERJEE, A. V. & NEWMAN, A. F. 1993. Occupational choice and the process of development. *Journal of political economy***,** 274-298.

BARON, R. A. 2000. Psychological perspectives on entrepreneurship cognitive and social factors in entrepreneurs' success. *Current Directions in Psychological Science,* 9**,** 15-18.

BARON, R. A. 2004a. The cognitive perspective: a valuable tool for answering entrepreneurship's basic "why" questions. *Journal of Business Venturing,* 19**,** 221-239.

BARON, R. A. 2004b. Potential benefits of the cognitive perspective: expanding entrepreneurship's array of conceptual tools. *Journal of Business Venturing,* 19**,** 169-172.

BARON, R. A. 2008. The role of affect in the entrepreneurial process. *Academy of management Review,* 33**,** 328-340.

BARON, R. A. & MARKMAN, G. D. 2003. Beyond social capital: The role of entrepreneurs' social competence in their financial success. *Journal of Business Venturing,* 18**,** 41-60.

BAUMOL, W. J. 1993. Formal entrepreneurship theory in economics: Existence and bounds. *Journal of Business Venturing,* 8**,** 197-210.

BAUMOL, W. J. & STROM, R. J. 2007. Entrepreneurship and economic growth. *Strategic Entrepreneurship Journal,* 1**,** 233-237.

BECKER, G. 1993. *Human Capital. A Theoretical and Empirical Analysis with Special Reference to Education,* Chicago and London, The University of Chicago Press.

BINDER, M. & COAD, A. 2013. Life satisfaction and self-employment: a matching approach. *Small Business Economics,* 40**,** 1009-1033.

BLANCHFLOWER, D. G. 2000. Self-employment in OECD countries. *Labour economics,* 7**,** 471-505.

BLANCHFLOWER, D. G. & OSWALD, A. J. 1998. What Makes an Entrepreneur? *Journal of Labor Economics,* 16**,** 26-60.

BLANDEN, J., GREGG, P. & MACMILLAN, L. 2007. Accounting for Intergenerational Income Persistence: Noncognitive Skills, Ability and Education. *The Economic Journal,* 117**,** C43-C60.

BUBLITZ, E. & NOSELEIT, F. 2014. The skill balancing act: when does broad expertise pay off? *Small Business Economics,* 42**,** 17-32.

CARLSSON, B., ACS, Z. J., AUDRETSCH, D. B. & BRAUNERHJELM, P. 2009. Knowledge creation, entrepreneurship, and economic growth: a historical review. *Industrial and Corporate Change,* 18**,** 1193-1229.

CASSAR, G. 2006. Entrepreneur opportunity costs and intended venture growth. *Journal of Business Venturing,* 21**,** 610-632.

CASSON, M. & GIUSTA, M. D. 2007. Entrepreneurship and Social Capital: Analysing the Impact of Social Networks on Entrepreneurial Activity from a Rational Action Perspective. *International Small Business Journal,* 25**,** 220-244.

CASTELLS, M. 2000. Materials for an exploratory theory of the network society1. *The British journal of sociology,* 51**,** 5-24.

COWLING, M. & TAYLOR, M. 2001. Entrepreneurial women and men: two different species? *Small Business Economics,* 16**,** 167-175.

CHANDLER, G. N. & HANKS, S. H. 1998. An examination of the substitutability of founders human and financial capital in emerging business ventures. *Journal of Business Venturing,* 13**,** 353-369.

DAVIDSSON, P. & HONIG, B. 2003. The role of social and human capital among nascent entrepreneurs. *Journal of Business Venturing,* 18**,** 301-331.

DE WIT, G. & VAN WINDEN, F. A. 1989. An empirical analysis of self-employment in the Netherlands. *Small Business Economics,* 1**,** 263-272.

DELHEY, J. 2005. Predicting Cross-National Levels of Social Trust: Global Pattern or Nordic Exceptionalism? *European Sociological Review,* 21**,** 311-327.

DELHEY, J. & NEWTON, K. 2003. Who trusts?: The origins of social trust in seven societies. *European Societies,* 5**,** 93-137.

DIMAGGIO, P. 1994. Culture and economy. *The handbook of economic sociology,* 27.

DUNN, T. & HOLTZ-EAKIN, D. 2000. Financial capital, human capital, and the transition to self-employment: Evidence from intergenerational links. National bureau of economic research.

EARLE, J. S. & SAKOVA, Z. 2000. Business start-ups or disguised unemployment? Evidence on the character of self-employment from transition economies. *Labour economics,* 7**,** 575-601.

ESTRIN, S., KOROSTELEVA, J. & MICKIEWICZ, T. 2013. Which institutions encourage entrepreneurial growth aspirations? *Journal of Business Venturing,* 28**,** 564-580.

EUROPEAN COMMISSION. Entrepreneurship Education in Europe: Fostering Entrepreneurial Mindsets through Education and Learning. Conference on Entrepreneurship Education, 26-27 October 2006 2006 Oslo. European Commission.

EUROPEAN COMMISSION 2009. An EU Strategy for Youth – Investing and Empowering: A renewed open method of coordination to address youth challenges and opportunities. *In:* COMMUNITIES, C. O. T. E. (ed.) *546.* Brussels.

EUROPEAN COMMISSION 2013. Entrepreneurship 2020 Action Plan. Reigniting the entrepreneurial spirit in Europe.: European Commission.

EVANS, D. S. & LEIGHTON, L. S. 1989. Some Empirical Aspects of Entrepreneurship. *The American Economic Review,* 79**,** 519-535.

FINNIE, R. & MENG, R. 2005. Literacy and labour market outcomes: self-assessment versus test score measures. *Applied Economics,* 37**,** 1935-1951.

FOGEL, K., HAWK, A., MORCK, R. & YEUNG, B. 2008. Institutional Obstacles to Entrepreneurship. *In:* BASU, A., CASSON, M., WADESON, N. & YEUNG, B. (eds.) *The Oxford Handbook of Entrepreneurship.* Oxford: Oxford University Press.

FREYTAG, A. & THURIK, R. 2006. Entrepreneurship and its determinants in a cross-country setting. *Journal of Evolutionary Economics,* 17**,** 117-131.

GAGLIO, C. M. 2004. The Role of Mental Simulations and Counterfactual Thinking in the Opportunity Identification Process*. *Entrepreneurship Theory and Practice,* 28**,** 533-552.

GIBBONS, R. 2010. Transaction-Cost Economics: Past, Present, and Future? *Scandinavian Journal of Economics,* 112**,** 263-288.

GRANOVETTER, M. 1985. Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology,* 91**,** 481-510.

GROSSMANN, V. 2009. Entrepreneurial innovation and economic growth. *Journal of Macroeconomics,* 31**,** 602-613.

GUISO, L., PISTAFERRI, L. & SCHIVARDI, F. 2015. Learning entrepreneurship from other entrepreneurs? : National Bureau of Economic Research.

HAASE, H. & LAUTENSCHLÄGER, A. 2011. The 'Teachability Dilemma' of entrepreneurship. *International Entrepreneurship and Management Journal,* 7**,** 145-162.

HABER, S. & REICHEL, A. 2007. The cumulative nature of the entrepreneurial process: The contribution of human capital, planning and environment resources to small venture performance. *Journal of Business Venturing,* 22**,** 119-145.

HAMILTON, B. H. 2000. Does Entrepreneurship Pay? An Empirical Analysis of the Returns to Self-Employment. *Journal of Political Economy,* 108**,** 604-631.

HANUSHEK, E. A. & WOESSMANN, L. 2008. The Role of Cognitive Skills in Economic Development. *Journal of Economic Literature,* 46**,** 607-668.

HARTOG, J., VAN PRAAG, M. & VAN DER SLUIS, J. 2010. If you are so smart, why aren't you an entrepreneur? Returns to cognitive and social ability: entrepreneurs versus employees. *Journal of Economics & Management Strategy,* 19**,** 947-989.

HECKMAN, J. J. & KAUTZ, T. 2012. Hard evidence on soft skills. *Labour Economics,* 19**,** 451-464.

HOLTZ-EAKIN, D., JOULFAIAN, D. & ROSEN, H. S. 1994. Entrepreneurial Decisions and Liquidity Constraints. *The RAND Journal of Economics,* 25**,** 334-347.

HURST, E. & LUSARDI, A. 2004. Liquidity Constraints, Household Wealth, and Entrepreneurship. *Journal of Political Economy,* 112**,** 319-347.

HYYTINEN, A. & ILMAKUNNAS, P. 2007. Entrepreneurial Aspirations: Another Form of Job Search? *Small Business Economics,* 29**,** 63-80.

IOANNIDES, Y. M. & LOURY, L. D. 2004. Job information networks, neighborhood effects, and inequality. *Journal of Economic Literature,* 42**,** 1056-1093.

IRELAND, R. D., COVIN, J. G. & KURATKO, D. F. 2009. Conceptualizing Corporate Entrepreneurship Strategy. *Entrepreneurship Theory and Practice,* 33**,** 19-46.

KAISH, S. & GILAD, B. 1991. Characteristics of opportunities search of entrepreneurs versus executives: Sources, interests, general alertness. *Journal of Business Venturing,* 6**,** 45-61.

KIRZNER, I. 1973. *Competition and entrepreneurship,* Chicago, Chicago University Press.

KIRZNER, I. 1999a. Creativity and/or Alertness: A Reconsideration of the Schumpeterian Entrepreneur. *The Review of Austrian Economics,* 11**,** 5-17.

KIRZNER, I. 2009. The alert and creative entrepreneur: a clarification. *Small Business Economics,* 32**,** 145-152.

KIRZNER, I. M. 1999b. Creativity and/or alertness: A reconsideration of the Schumpeterian entrepreneur. *The Review of Austrian Economics,* 11**,** 5-17.

KNACK, S. & KEEFER, P. 1997. Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *The Quarterly Journal of Economics,* 112**,** 1251-1288.

KUCEL, A., RÓBERT, P., BUIL, M. & MASFERRER, N. 2016. Entrepreneurial Skills and Education-Job Matching of Higher Education Graduates. *European Journal of Education,* 51**,** 73-89.

KUCEL, A. & VILALTA-BUFI, M. 2016. Entrepreneurial skills and wage employment. *International Journal of Manpower,* 37**,** 556-588.

KURATKO, D. & AUDRETSCH, D. 2013. Clarifying the domains of corporate entrepreneurship. *International Entrepreneurship and Management Journal,* 9**,** 323-335.

KURATKO, D. F. 2005. The Emergence of Entrepreneurship Education: Development, Trends, and Challenges. *Entrepreneurship Theory and Practice,* 29**,** 577-598.

LAZEAR, E. P. 2004. Balanced Skills and Entrepreneurship. *The American Economic Review,* 94**,** 208-211.

LAZEAR, EDWARD P. 2005. Entrepreneurship. *Journal of Labor Economics,* 23**,** 649-680.

LECHMANN, D. S. J. & SCHNABEL, C. 2014. Are the self-employed really jacks-of-all-trades? Testing the assumptions and implications of Lazear's theory of entrepreneurship with German data. *Small Business Economics,* 42**,** 59-76.

LEONI, T. & FALK, M. 2008. Gender and field of study as determinants of self-employment. *Small Business Economics,* 34**,** 167-185.

LEVESQUE, M. & MINNITI, M. 2006. The effect of aging on entrepreneurial behavior. *Journal of Business Venturing,* 21**,** 177-194.

LEVI, M. & STOKER, L. 2000. Political trust and trustworthiness. *Annual Review of Political Science,* 3**,** 475-507.

LUCAS, R. E. 1988. On the mechanics of economic development. *Journal of Monetary Economics,* 22**,** 3-42.

MARTIARENA, A. 2013. What's so entrepreneurial about intrapreneurs? *Small Business Economics,* 40**,** 27-39.

MARTIN, B. C., MCNALLY, J. J. & KAY, M. J. 2013. Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes. *Journal of Business Venturing,* 28**,** 211-224.

MATLAY, H. 2008. The impact of entrepreneurship education on entrepreneurial outcomes. *Journal of Small Business and Enterprise Development,* 15**,** 382-396.

MCMULLEN, J. S. & SHEPHERD, D. A. 2006. Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management review,* 31**,** 132-152.

MICHELACCI, C. 2003. Low Returns in R&D Due to the Lack of Entrepreneurial Skills*. *The Economic Journal,* 113**,** 207-225.

MICHELACCI, C. & SILVA, O. 2007. Why So Many Local Entrepreneurs? *Review of Economics and Statistics,* 89**,** 615-633.

MITCHELL, J. R. & SHEPHERD, D. A. 2010. To thine own self be true: Images of self, images of opportunity, and entrepreneurial action. *Journal of Business Venturing,* 25**,** 138-154.

MORGAN, S. L. & WINSHIP, C. 2007. *Counterfactuals and Causal Inference: Methods and Principles for Social Research (Analytical Methods for Social Research)*, Cambridge University Press.

MORTENSEN, D. T. 1986. Chapter 15 Job search and labor market analysis. *In:* ORLEY, C. A. & RICHARD, L. (eds.) *Handbook of Labor Economics.* Elsevier.

NAUDE, W. 2010. *Entrepreneurship and economic development*, Springer.

NAUDÉ, W. 2009. Entrepreneurship, developing countries, and development economics: new approaches and insights. *Small Business Economics,* 34**,** 1-12.

NEWTON, K. 2001. Trust, Social Capital, Civil Society, and Democracy. *International Political Science Review,* 22**,** 201-214.

NICOLAOU, N. & SHANE, S. 2009. Can genetic factors influence the likelihood of engaging in entrepreneurial activity? *Journal of Business Venturing,* 24**,** 1-22.

NORTH, D. C. 1990. *Institutions, Institutional Change and Economic Performance*, Cambridge University Press.

OBERSCHACHTSIEK, D. 2012. The experience of the founder and self-employment duration: a comparative advantage approach. *Small Business Economics,* 39**,** 1-17.

OOSTERBEEK, H., VAN PRAAG, M. & IJSSELSTEIN, A. 2010. The impact of entrepreneurship education on entrepreneurship skills and motivation. *European Economic Review,* 54**,** 442-454.

ÖZCAN, B. 2011. Only the lonely? The influence of the spouse on the transition to self-employment. *Small Business Economics,* 37**,** 465.

PARKER, S. C. 2008. Entrepreneurship among married couples in the United States: A simultaneous probit approach. *Labour Economics,* 15**,** 459-481.

PARKER, S. C. 2009. *The Economics of Entrepreneurship,* Cambridge Cambridge University Press.

PARKER, S. C. 2011. Intrapreneurship or entrepreneurship? *Journal of Business Venturing,* 26**,** 19-34.

PIERSON, P. 2004. *Politics in time: History, institutions, and social analysis*, Princeton University Press.

PITTAWAY, L. 2005. Philosophies in entrepreneurship: a focus on economic theories. *International Journal of Entrepreneurial Behavior & Research,* 11**,** 201-221.

PORTER, M. 1990. *On Competition,* Boston, Harvard Business School Press.

PORTER, M., SACHS, J. & MCARTHUR, J. 2001. Executive summary: Competitiveness and stages of economic development. *The global competitiveness report,* 2002**,** 16-25.

POSCHKE, M. 2013. Who becomes an entrepreneur? Labor market prospects and occupational choice. *Journal of Economic Dynamics and Control,* 37**,** 693-710.

PUTNAM, R. 1993. *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton University Press.

QUINTANA, C. D. D., MORA, J.-G., PÉREZ, P. J. & VILA, L. E. 2016. Enhancing The Development Of Competencies: the role of UBC. *European Journal of Education,* 51**,** 10-24.

QUINTINI, G. 2011. Right for the Job: Over-Qualified or Under-Skilled? *OECD Social, Employment and Migration Working Papers,* 120.

QUINTINI, G. & MARTIN, S. 2006. Starting well or losing their way?: the position of youth in the labour market in OECD Countries. OECD Publishing.

REES, H. & SHAH, A. 1986. An empirical analysis of self-employment in the UK. *Journal of applied econometrics,* 1**,** 95-108.

REYNOLDS, P. D., HAY, M. & CAMP, S. M. 1999. Global entrepreneurship monitor. Kansas City, Mo.: Kauffman Center for Entrepreneurial Leadership.

ROBINSON, P. B. & SEXTON, E. A. 1994. The effect of education and experience on self-employment success. *Journal of business Venturing,* 9**,** 141-156.

SCHUMPETER, J. 1950. *Capitalism, Socialism, and Democracy,* New York, Harper and Row.

SCHUMPETER, J. A. 1934. *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*, Transaction publishers.

SILVA, O. 2007. The Jack-of-All-Trades entrepreneur: Innate talent or acquired skill? *Economics Letters,* 97**,** 118-123.

SIMOES, N., CRESPO, N. & MOREIRA, S. B. 2015. INDIVIDUAL DETERMINANTS OF SELF-EMPLOYMENT ENTRY: WHAT DO WE REALLY KNOW? *Journal of Economic Surveys*.

SIOW, A. 1984. Occupational Choice under Uncertainty. *Econometrica,* 52**,** 631-645.

SKRONDAL, A. & RABE-HESKETH, S. 2008. *Multilevel and Longitudinal Modeling Using Stata,* College Station, Stata Press.

STAM, E. 2013. Knowledge and entrepreneurial employees: a country-level analysis. *Small Business Economics,* 41**,** 887-898.

STENHOLM, P., ACS, Z. J. & WUEBKER, R. 2013. Exploring country-level institutional arrangements on the rate and type of entrepreneurial activity. *Journal of Business Venturing,* 28**,** 176-193.

STUETZER, M., GOETHNER, M. & CANTNER, U. 2012. Do balanced skills help nascent entrepreneurs to make progress in the venture creation process? *Economics Letters,* 117**,** 186-188.

STUETZER, M., OBSCHONKA, M., DAVIDSSON, P. & SCHMITT-RODERMUND, E. 2013a. Where do entrepreneurial skills come from? *Applied Economics Letters,* 20**,** 1183-1186.

STUETZER, M., OBSCHONKA, M. & SCHMITT-RODERMUND, E. 2013b. Balanced skills among nascent entrepreneurs. *Small Business Economics,* 41**,** 93-114.

TANG, J., KACMAR, K. M. & BUSENITZ, L. 2012. Entrepreneurial alertness in the pursuit of new opportunities. *Journal of Business Venturing,* 27**,** 77-94.

TAYLOR, M. P. 1996. Earnings, independence or unemployment: why become self-employed? *Oxford Bulletin of Economics and Statistics,* 58**,** 253-266.

TEGTMEIER, S., KURCZEWSKA, A. & HALBERSTADT, J. 2016. Are women graduates jacquelines-of-all-trades? Challenging Lazear's view on entrepreneurship. *Small Business Economics,* 47**,** 77-94.

TORCAL, M. & MONTERO, J. R. 2006. *Political disaffection in contemporary democracies: social capital, institutions and politics*, Routledge.

UCBASARAN, D., WESTHEAD, P. & WRIGHT, M. 2008. Opportunity Identification and Pursuit: Does an Entrepreneur's Human Capital Matter? *Small Business Economics,* 30**,** 153-173.

UNGER, J. M., RAUCH, A., FRESE, M. & ROSENBUSCH, N. 2011. Human capital and entrepreneurial success: A meta-analytical review. *Journal of Business Venturing,* 26**,** 341-358.

VALLIERE, D. 2013. Towards a schematic theory of entrepreneurial alertness. *Journal of Business Venturing,* 28**,** 430-442.

VAN DER SLUIS, J. & VAN PRAAG, M. 2004. Economic returns to education for entrepreneurs: The development of a neglected child in the family of economics of education? *Sweedish Economic Policy Review,* 11**,** 183-226.

VAN DER SLUIS, J., VAN PRAAG, M. & VAN WITTELOOSTUIJN, A. 2007. Why Are the Returns to Education Higher for Entrepreneurs than for Employees? *IZA Discussion Papers,* 3058.

VAN DER SLUIS, J., VAN PRAAG, M. & VIJVERBERG, W. 2005. Entrepreneurship selection and performance: A meta-analysis of the impact of education in developing economies. *The World Bank Economic Review,* 19**,** 225-261.

VAN DER SLUIS, J., VAN PRAAG, M. & VIJVERBERG, W. 2008. EDUCATION AND ENTREPRENEURSHIP SELECTION AND PERFORMANCE: A REVIEW OF THE EMPIRICAL LITERATURE. *Journal of Economic Surveys,* 22**,** 795-841.

VAN STEL, A. 2005. COMPENDIA: Harmonizing Business Ownership Data Across Countries and Over Time. *The International Entrepreneurship and Management Journal,* 1**,** 105-123.

VERHEUL, I., WENNEKERS, S., AUDRETSCH, D. & THURIK, R. 2002. An eclectic theory of entrepreneurship: policies, institutions and culture. *Entrepreneurship: Determinants and policy in a European-US comparison.* Springer.

VOLKER, G. 2009. Entrepreneurial innovation and economic growth. *Journal of Macroeconomics,* 31**,** 602-613.

VON GRAEVENITZ, G., HARHOFF, D. & WEBER, R. 2010. The effects of entrepreneurship education. *Journal of Economic Behavior & Organization,* 76**,** 90-112.

VON GRAEVENITZ, G. & WEBER, R. 2011. How to Educate Entrepreneurs? *Munich School of Management Discussion Papers,* 2011-2.

WAGNER, J. 2003. Testing Lazear's jack-of-all-trades view of entrepreneurship with German micro data. *Applied Economics Letters,* 10**,** 687-689.

WAGNER, J. 2006. Are nascent entrepreneurs 'Jacks-of-all-trades'? A test of Lazear's theory of entrepreneurship with German data. *Applied Economics,* 38**,** 2415-2419.

WELTER, F. 2012. All you need is trust? A critical review of the trust and entrepreneurship literature. *International Small Business Journal,* 30**,** 193-212.

WENNEKERS, S., UHLANER, L. & THURIK, R. 2002. Entrepreneurship and its Conditions: a Macro Perspective. *International Journal of Entrepreneurship Education (IJEE),* 1**,** 25-64.

WENNEKERS, S., VAN WENNEKERS, A., THURIK, R. & REYNOLDS, P. 2005. Nascent entrepreneurship and the level of economic development. *Small business economics,* 24**,** 293-309.

WILLIAMSON, O. E. 2000. The New Institutional Economics: Taking Stock, Looking Ahead. *Journal of Economic Literature,* 38**,** 595-613.