



**ASSOCIAÇÃO DE POLITÉCNICOS DO NORTE (APNOR)**

**INSTITUTO POLITÉCNICO DE BRAGANÇA**

**Factors that Influence Entrepreneurship Activity by Gender in the  
European Union**

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Final Dissertation presented to *Instituto Politécnico de Bragança*

To obtain the Master Degree in Management, Specialisation in Business  
Management

**Supervisors:**

**Alcina Maria de Almeida Rodrigues Nunes**

**Karine Khachatryan**

**Bragança, July, 2016.**



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## **Abstract**

This research work aims to discuss the gender issue concerning entrepreneurship in European Union countries in a period of nine years, from 2007 to 2015, identifying the factors which drive individuals to be entrepreneurs. The study mainly concentrates on identifying and quantifying the personal, social, political and economic features which are motivating individuals, especially women, to be entrepreneurs, as well as the main difficulties they feel during the process of business creation. In order to explore the entrepreneurial activity across a set of developed countries the econometric methodology of panel data (in particular the fixed effects and random effects models) is applied to a data set of entrepreneurial statistical indicators calculated and made available by the Global Entrepreneurship Monitor. The results show that the knowledge of other start-up entrepreneurs, a desired career choice, the governmental support and the existence of public policies that promote entrepreneurship (specially within the framework of small and medium sized firms) and the transfer of R&D are factors influencing negatively on the rate of female entrepreneurship. None of the observed variables are barriers for male entrepreneurs. The perceived capabilities and opportunities, the entrepreneurial intention, the policies to lower taxes and bureaucracy and the social and cultural norms are identified drives for women for engaging in a process of running their own ventures. These findings offer a set of valid knowledge to understand which measures could be implemented or should be changed and improved at a political and managerial level for stimulating entrepreneurship, especially for women.

**Keywords:** Entrepreneurship, gender, European Union, Global Entrepreneurship Monitor (GEM), panel data methods.

## Resumo

Este trabalho de investigação tem como principal objetivo discutir a questão de género em termos da atividade empresarial (empreendedorismo) nos países da União Europeia, num período de nove anos que decorre de 2007 a 2015, identificando os fatores que levam os indivíduos a tornar-se empreendedores. O estudo concentra-se, principalmente, na identificação e quantificação das características pessoais, sociais, políticas e económicas que motivam os indivíduos, especialmente as mulheres, a tornar-se empresários, bem como as principais dificuldades que sentem durante o processo de criação de empresas. Para explorar a atividade empreendedora num conjunto de países desenvolvidos, como são os países que compõem a União Europeia, a metodologia econométrica de dados em painel (em particular, os modelos de efeitos fixos e modelos de efeitos aleatórios) é aplicada a um conjunto de indicadores estatísticos calculadas e disponibilizadas pelo *Global Entrepreneurship Monitor*. Os resultados mostram que o conhecimento da existência de outros empresários em fase de arranque, uma escolha desejada de carreira, o apoio governamental e a existência de políticas públicas que promovam o espírito empresarial (especialmente no âmbito das pequenas e médias empresas) e a transferência de I&D são fatores que influenciam negativamente a taxa de empreendedorismo feminino. Nenhuma das variáveis mencionadas são barreiras para empreendedores do sexo masculino. As capacidades e oportunidades percebidas, a intenção empreendedora, as políticas que reduzem os impostos e a burocracia e as normas sociais e culturais são identificadas pelas mulheres como incentivos a que se envolvam num processo de criação de seus próprios negócios. Estes resultados oferecem um conjunto de conhecimentos válido para entender quais as medidas que podem e devem ser implementadas ou devem ser alteradas e melhoradas a um nível político e de gestão para estimular o empreendedorismo, especialmente entre as mulheres.

**Palavras-chave:** Empreendedorismo, género, União Europeia, *Global Entrepreneurship Monitor* (GEM), método econométrico de dados em painel.

## Առաջարան

Չետագոտական աշխատանքի նպատակն է քննարկել ձեռնարկատիրությունում առաջացող գենդերային խնդիրները (դիտարկելով Եվրոպական Միության երկրները 2007-2015 թթ. -ի ընթացքում), բացահայտել գործոնները, որոնք ազդում են անհատների վարքագծի վրա և խթանում նրանց մուտքը դեպի ձեռնարկատիրական գործունեություն: Աշխատանքը հիմնականում կենտրոնանում է անձնական, սոցիալական, քաղաքական և տնտեսական հատկանիշների բացահայտման և գնահատման վրա, որոնք մոտիվացնում կամ խոչընդոտում են անհատներին, հատկապես կանանց, սկսել ձեռնարկատիրական գործունեություն: Նպատակ ունենալով ուսումնասիրել ձեռնարկատիրական գործունեությունը մի շարք զարգացած երկրներում, տարբեր վիճակագրական ցուցանիշներ համար կիրառվել է պանելային տվյալների Էկոնոմետրիկ մեթոդաբանությունը (մասնավորապես ֆիքված և պատահական ազդեցությունների մոդելները): Աշխատանքում դիտարկված ցուցանիշները հասանելի են Ձեռներեցության համաշխարհային մոնիտորի (ՁՅՄ) ինտերնետային կայքում: Ինչպես ցույց են տալիս հետազոտության արդյունքները, այլ սկսնակ ձեռներեցների մասին տեղեկատվությունը, ցանկալի կարիերայի ընտրությունը, կառավարության աջակցությունը ու ձեռներեցությունը խթանող հանրային քաղաքականությունների առկայությունը (հատկապես փոքր և միջին ձեռնարկություններում) և R&D ոլորտի փոփոխությունը բնութագրող գործոնները բացասական են ազդում կին ձեռներեցների վրա, մինչդեռ դիտարկված գործոններից ոչ մեկը չի խոչընդոտում տղամարդկանց ձեռներեցության զարգացմանը: Ընկալման կարողությունները և հնարավորությունները, ձեռնարկատիրական մտադրությունը, հարկերի ու բյուրոկրատիայի մեղմ քաղաքականությունը և սոցիալ-մշակութային նորմերը բացահայտվել են որպես կանանց ձեռներեցությունը խթանող գործոններ: Այսպիսով, ստացված արդյունքները օգնում են հասկանալ, հետագա միջոցառումների իրականացման, փոփոխման կամ բարելավման անհրաժեշտությունը՝ նպատակ ունենալով խթանել ընդհանուր և հատկապես կանանց ձեռներեցությունը:

**Զիմնաբառեր.** Ձեռնարկատիրության, գենդեր, Եվրոպական Միություն, Ձեռներեցության համաշխարհային մոնիտոր (ՁՅՄ), պանելային տվյալների մեթոդներ:

## Resumen

Este trabajo de investigación tiene como objetivo discutir la cuestión de género en torno al emprendimiento en países de la Unión Europea en un período de nueve años, de 2007 a 2015, con la identificación de los factores que impulsan a las personas a ser empresarios. El estudio se centra principalmente en la identificación y cuantificación de las características personales, sociales, políticas y económicas, que son las características que motivan, especialmente a las mujeres, a ser empresarias, así como las principales dificultades con las que se sienten durante el proceso de creación de empresas. Con el fin de explorar la actividad empresarial a través de un conjunto de países desarrollados, la metodología econométrica de datos de panel (en particular, los efectos fijos y los modelos de efectos aleatorios) se aplica a un conjunto de datos de indicadores estadísticos calculados empresariales y puestos a disposición por el *Global Entrepreneurship Monitor*. Los resultados muestran que el conocimiento de otros empresarios de puesta en marcha, una selección portadora deseada, el apoyo gubernamental y la existencia de políticas públicas que promuevan el espíritu empresarial (especialmente en el marco de las empresas pequeñas y medianas) y la transferencia de *I&D* están influyendo factores negativamente en la tasa de actividad empresarial femenina. Ninguna de las variables observadas son obstáculos para los empresarios de sexo masculino. Las oportunidades y capacidades percibidas, el emprendimiento empresarial, la burocracia, las normas sociales y culturales son factores indicadores para que las mujeres participen en un proceso de ejecución de sus propias empresas. Estos resultados ofrecen un conjunto de conocimientos válidos para comprender qué medidas podrían aplicarse o deben modificarse y mejorar a nivel político y de gestión para estimular el espíritu empresarial, especialmente para las mujeres.

**Palabras clave:** Emprendimiento, género, Unión Europea, *Global Entrepreneurship Monitor* (GEM), métodos de datos de panel.

I dedicate this work to my family for their love,  
belief and support.

## **Acknowledgements**

I would like to thank all those who, somehow, were beside me helping me to overcome all obstacles.

At first, I would like to thank Erasmus+ International Credit Mobility Programme (ICM) for giving me the chance to be in the Polytechnic Institute of Bragança (IPB), studying management in a Master Programme, graduate and be awarded with a double master diploma.

I would like to thank also to my two universities - the National Polytechnic University of Armenia (NPUA) and the Polytechnic Institute of Bragança – and all my lecturers for support and knowledge transmission. In special, I would like to thanks my supervisors: Alcina Nunes (IPB's supervisor), for the excellent guidance and supervision, the patience, availability, reviews and relevant suggestions, and the necessary accuracy over the completion of the work, and Karine Khachatryan (NPUA's supervisor) for her effort, advices and encouragement even from far away.

Thank you to my family for their presence, motivation, understanding and support throughout this work period.

Finally, I would like to thanks to my friends and colleagues, who were part of my academic life.

To all my thanks.



## **Acronyms**

APS - The Adult Population Survey

BFIIN - The British Female Inventors and Innovators Network

CBO - Characteristics of Business Owners

EFC - The Entrepreneurial Framework Conditions

ESF - European Social Fund

ETF - European Training Foundation

EU - European Union

FE – Fixed Effects

FGIF - The Fonds de Garantie à l'Initiative des Femmes

GEM - Global Entrepreneurship Monitor

NES - The National Expert Survey

OECD - Organisation for Economic Co-operation and Development

R&D – Research & Development

RE – Random Effects

SME - Small and Medium-sized Enterprises

TEA - Total early-stage Entrepreneurial Activity

UK – United Kingdom

USA - United States of America

WES - The European network to promote women's entrepreneurship

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## Introduction

In the last decades, the importance of the entrepreneurial activity has been highlighted in many researcher works. The entrepreneurship has been found as a vehicle for economic growth and innovation, job creation and career opportunity (Wennekers & Thurik, 1999; Wong, Ho, & Autio, 2005; Agarwal, Audretsch, & Sarkar, 2007; Szirmai, Naudé, & Goedhuys, 2011; Drucker, 2014), regardless of gender. Several of those studies discuss the gender issue on entrepreneurship and indicated a higher prevalence of entrepreneurship rates for man than for women, even with similar backgrounds. A study from Kepler and Shane (2007), for example, concluded that differences between male and female entrepreneurs came from type of business, its size and outcomes, venture risk, expectations and efforts. However, in spite female entrepreneurship legged behind from male entrepreneurial activity, during the last years is registered the growth of women entrepreneurs and female entrepreneurship had been identified as a stimulus for innovation and job creation (Orhan & Scott, 2001), economic development and poverty reduction (Kreide, 2003).

As men, women created ventures for personal freedom, independence, job satisfaction and/or security (Klapper & Parker, 2011), however the literature mentioned that they do not start the same types of businesses. In the discussion of factors that may influence entrepreneurial activity, scholars have defined the importance and influence of socio-cultural factors such as the fear of failure, the perceived capabilities and opportunities and the role models (Arenius & Minniti, 2005; Koellinger, Minniti, & Schade, 2007; Noguera, Alvarez, & Urbano, 2013). Due to the importance of social and cultural factors, and its influence on individual's opinion and career choice of creating a new business, international organizations such as the Organisation for Economic Co-operation and Development (OECD) and European Union elected these as core factors in their promotion policies for entrepreneurship (European Commission, 2004, 2006; OECD, 1998, 2000).

The most important factors that can enhance female entrepreneurial activity are defined as "Push" and "Pull" factors (Apergis & Pekka-Economou, 2010; Vossenbergh, 2013). Push factors are associated with

low family income, difficult work conditions, divorces, job dissatisfaction and losses, high unemployment conditions, economic recession and financial reasons. Pull factors are related to the need of independence and self-achievement, financial gains, increased profit and wealth, personal development, social status and power (Apergis & Pekka-Economou, 2010; Kobeissi, 2010). In the process of creating their own ventures, women combine work and private life, while men's attract the desire to make money, achieve wealth and perform a challenging job (Kepler & Shane, 2007; Klapper & Parker, 2011; Maes, Leroy, & Sels, 2014; Hazudin, Kader, Tarmuji, Ishak, & Ali, 2015). Finally, when the topic is entrepreneurship, it is also important not to avoid the educational background and experience. It is believed that men entrepreneurs have more previous work, business experience, technical and managerial skills and high level of education (Klapper & Parker, 2011; Huarng, Mas-Tur, & Yu, 2012).

Compare to men-led businesses, women-led ventures present lower sales, lower income, lower venture survival and employment growth (Kepler & Shane, 2007; Fairlie & Robb, 2009; Ferik et al., 2013). Social skills and networks are considered important factors for business achievements. Ozgen and Baron (2007) noted that entrepreneurs use their social networks as a source of information that promote acknowledge opportunities. Minniti, Langowitz, and Arenius (2005) alerted the fact that women have limited network and geographic mobility, which reduce their abilities to follow role models, obtain resources and confidence for using and improving their entrepreneurial skills. Credit and start-up costs are also identified as financial barriers for both women and men (Verheul, Stel, & Thurik, 2006; Klapper & Parker, 2011; Hazudin et al., 2015), moreover, this obstacle seems bigger for women than for men (Verheul et al., 2006).

In 2008, the European Commission started to adopt regulations, services and networks which allowed to extend the number of new enterprises created by women. For example, in 2009, the Commission launched the European Network of Female Entrepreneurship Ambassadors as a promoter for potential women entrepreneurs and, in 2011, the European Network of Mentors for Women Entrepreneurs and the European Network to Promote Women's Entrepreneurship (WES) (Adema et al., 2014). Furthermore, some European Union countries implemented their own policies for enhancing female entrepreneurship.

Having in attention the previous explained framework, especially the issues faced by women entrepreneurs and the European Union countries policies (both as an economic block and as individual economies) to enhance not only entrepreneurship, in general, but female entrepreneurship, in particular, the objective of this research is to analyse the gender issue and entrepreneurship in EU countries - in the period from 2007 to 2015 - identifying the factors which drive individuals, in particular women, to be entrepreneurs. The study mainly concentrates on identifying and quantifying the personal, social, legal and economic features which are motivating women to be entrepreneurs, in comparison with their male counterparts, as well as the main difficulties they face during the process of business creation.

To reach the objective proposed, the study focuses on three variables which were created, calculated and publicised by the Global Entrepreneurship Monitor (GEM), in order to measure the entrepreneurial

activity in a given economy: the total early-stage entrepreneurial activity, the female early-stage entrepreneurial activity and the male early-stage entrepreneurial activity. These three variables – the first applied to analysed the entrepreneurial activity in general and the two last to address the gender issue - are the ones that the study will try to explain using as explanatory variables another set of indicators divide in three main types: the ones related to individual aspirations, the ones related to the individuals' attitudes and perceptions towards entrepreneurship and the last ones related to the economic, legal, political and social business environment of an economy. The set of explanatory variables are also created, calculated and publicised by the Global Entrepreneurship Monitor.

The study results will be obtained using as the data treatment methodology, the panel data econometric methodology. As mentioned, for the models estimation is used the GEM's data available for twenty five EU countries in the time period from 2007 to 2015. Panel data (or longitudinal data) are characterized by a set of observations in two dimensions - time and individuals. In this particular work, time refers to the period of 9 years between 2007 and 2015 and individuals refer to the 25 EU countries in analysis. Due to this two dimensions, the panel data methods allow to control variables that cannot be observed or measured, like cultural factors or differences in business practices across countries or variables that change over time but not across individuals (i.e. national policies and regulations or international agreements). It also allows to combine the diversity of individual behaviour (in this case, countries entrepreneurial behaviour) with temporal adjustment dynamics even if they differ among countries.

This research work consists of three chapters. The first one includes the literature review related to the gender issue on entrepreneurship. Some researchers' work are compared in order to define differences and similarities between male- and female-owned ventures, identify factors motivating people to run their own businesses and barriers that they faced during their activity. The second chapter presents the objective of the study, the database and variables under the study and concludes with the methodology of panel data which is applied for achieving the goals proposed in this research work. In the last chapter are presented the results of descriptive statistics and summarised the results of the panel data methodology. The comparative analysis of the results allows to define factors which have influence on total, female and male entrepreneurial activities. This research work ends with the presentation of the main findings, limitations and possible future research.

# **1. Entrepreneurship gender issues: literature review**

## **1.1. Differences and similarities between female and male entrepreneurship**

Entrepreneurship literature had proved the phenomenon became, during the last decades, an important factor for economic growth and development, innovation, employment creation and career opportunity for both man and woman (Wennekers & Thurik, 1999; Wong et al., 2005; Agarwal et al., 2007; Szirmai et al., 2011; Drucker, 2014), independently of gender issues. However, this may be particularly true if the issue is female entrepreneurship. In 2001, Orhan and Scott (2001) concluded that female entrepreneurship had been identified as a stimulus for innovation and job creation. In 2003, Kreide (2003) referred the importance of female entrepreneurship on economic development and poverty mitigation. One year later, Thurik and Wennekers (2004, p. 144) defended that in the world context “small businesses, and particularly new ones, are seen more than ever as a vehicle for entrepreneurship, contributing not just to employment and social and political stability, but also to innovative and competitive power.” A decade later, these evidences continue to be true particularly in developing countries (Naude (2013) and De Vita, Mari, and Poggesi (2014), for example).

Despite the importance given to female entrepreneurship, regarding to the previous macroeconomic topics, two opposite perspectives argue about the relationship between gender and entrepreneurial performance in a more microeconomics perspective. The ‘constraint driven gap’ perspective considers that restrictions of the performance of female entrepreneurs are a reality. These restrictions or barriers relate to obstacles that women might face in obtaining credit, cultivating business networks or dealing with government policies. By contrast, the ‘preference-driven gap’ perspective rejects the existence of differences in business performance between male- and female-owned businesses (Bardasi, Sabarwal, & Terrell, 2011). Klapper and Parker (2011) also supported the view of gender based gaps in entrepreneurial performance between female and male entrepreneurs.

Indeed, the gender issue, and related to subsequent differences, has been a topic of many research studies on the entrepreneurship topic over the last decades. Various studies have shown a higher prevalence of entrepreneurship rates for men than for women with similar backgrounds. The gender differences tend also to be obvious across countries and cultures. Simultaneously, there is a register of differences (defined in different studies and summarized by Kepler and Shane (2007)), between male and female entrepreneurs in terms of: (i) business outcomes; (ii) motivations for starting a business; (iii) preferences for venture risk; (iv) type of business; (v) processes of identifying business opportunities and problems and performance expectations; (vi) size of start-ups; (vii) effort and confidence spent in developing a business.

In the beginning of the twenty-first century, Cowling (2000) estimated that female self-employment rates considerably differ in the European Union (EU), from just over 20% in the United Kingdom (UK), Ireland, and Sweden to 40% in Belgium and Portugal. Four years later Acs, Arenius, Hay, and Minniti (2004), using the data of the Global Entrepreneurship Monitor (GEM), estimated that around the world men are involved in entrepreneurial activity twice often than women, only one year later, the number increased for a rate, where women represent more than one third of all people involved in entrepreneurial activity (Minniti et al., 2005). More recently, Minniti and Naudé (2010) noticed that women entrepreneurs' embeddedness in entrepreneurial activity tended to become higher compared with men. One of the causes was that in recent years, many researchers focused on women entrepreneurship as an important 'untapped source' of economic growth and development. According to Xavier, Kelley, Kew, Herrington, and Vorderwulbecke (2012) men made up 52% of all entrepreneurial activity compared to 48% of women entrepreneurs. In fact, women had outpaced men in the rate of new business they formed (Minniti & Naudé, 2010).

As their male counterpart, women created ventures for personal freedom, independence, job satisfaction, and/or security (Klapper & Parker, 2011), however they did not start the same types of businesses. According to Nosek, Banaji, and Greenwald (2002 cited by Gupta, Turban, Wasti, & Sikdar, 2009) men often were involved in activities related to math and science, while women mainly inclined to arts and languages activities. Moreover, concentrated in the service sector and part-time work, women tended to establish small businesses, which increased the probability of difficulties in securing a bank loan compared to men (Thurik & Verheul, 2001), despite women needed more financial and accounting support than men (Ferk et al., 2013). Further, women got less support from resource providers (e.g., lenders, suppliers, customers) and men in their lives (their partner, husband, father and/or sons) (Gupta et al., 2009).

The issue of the size of businesses created is an important one when the topic is gender and entrepreneurship. Apergis and Pekka-Economou (2010, p.374) retrieved a Btygrave's (1994) statement that entrepreneurial activity was not related to any special personality features, but an entrepreneur "is someone who perceives an opportunity and creates an organization to pursue it". In other words,

entrepreneur is someone who shows readiness to take risks and to start up a new business. Nonetheless, Apergis and Pekka-Economou (2010) referred several other studies that showed the existence of differences between entrepreneurial activity and small business owners and, following Carland, Hoy, Boulton, and Carland (1984), and Stevenson and Gumpert (1985) works, they stated that entrepreneurial activity was related to a profit maximization perspective, a growth and innovative behaviour and it concentrated on market opportunities and on the efficient using of the available resources, while small business owners used their available resources in order to satisfy their desires and requirements.

Regardless of motivations that drive male or female entrepreneurs, or the size of the created businesses, the literature is also rich to results related to business performance gender-based differences. Compare to men-led businesses, women-led ventures present lower sales, lower income, lower venture survival and employment growth (Kepler & Shane, 2007; Fairlie & Robb, 2009; Ferk et al., 2013). For instance, Bardasi et al. (2011) quoting a work from Robb and Wolken (2002) showed that, on average, women-owned businesses generated only 78% of the profits of comparable male-owned. The author also used previous research works to state that, comparing with men, women produce less sales turnover, even if they operate in the same industrial sector, and their ventures have a lower survival rate. Citing Lohmann and Luber (2004), Bardasi and his co-authors referred that, a decade ago, in Germany after 5 years survival only 42% of self-employed women continued their business, while for male entrepreneurs the percentage was 63. This last conclusion was also presented by Bosma, Praag, Thurik, and Wit (2004). The authors referred that the survival rate of male entrepreneurs' businesses was greater than that of their female counterparts in Dutch businesses.

## **1.2. Factors that influence the entrepreneurial activity**

### **1.2.1. Socio-cultural factors**

Scholars have defined the importance and influence of socio-cultural factors on new businesses creating process and noted that entrepreneurship included a social context (Noguera et al., 2013). Kobeissi (2010), presenting the results of some previous literature, discussed that cultural factors supported and motivated people to create new firms, however, when it referred to women, the influence of social and cultural factors on female entrepreneurship might not be positive - usually these factors forced women to keep away from entrepreneurship. Researchers clarify that the most important socio-cultural factors are the fear of failure, the perceived capabilities and opportunities and the role models (Arenius & Minniti, 2005; Koellinger et al., 2007; Noguera et al., 2013). Due to the importance of social and cultural factors, and its influence on individual's opinion and career choice of creating a new business, international organizations such as the Organisation for Economic Co-operation and Development (OECD) and EU

elected these as core factors in their promotion policies for entrepreneurship (European Commission, 2004, 2006; OECD, 1998, 2000).

Fear of failure has been defined as an important deterrent for new business creation mainly in case of women (Wagner, 2006; Langowitz & Minniti, 2007; Minniti & Nardone, 2007; Díaz-García & Jiménez-Moreno, 2009; BarNir, Watson, & Hutchins, 2011; Noguera et al., 2013; Koellinger, Minniti, & Schade, 2013). Simultaneously, perceived capabilities are considered as a crucial step for achieving business success. Various studies have shown that usually women undervalue their entrepreneurial skills (Noguera et al., 2013) and this thought prevents women from starting their own business. The authors showed that the fear of failure acted on entrepreneurship negatively, while perceived capabilities presented a positive influence. Altogether the previous factors can explain why male entrepreneurs follow more risky business opportunities than the opportunities pursued by female entrepreneurs (Kepler & Shane, 2007). And it is important not to forget that good business opportunities play a crucial role in entrepreneurship (Tominc & Rebernik, 2007) and researchers determine entrepreneurial activity as a source of opportunities (Noguera et al., 2013).

Social skills and networks are defined as another important factor of business achievement. According to Baron (2007), entrepreneurs with well-developed social skills are able to present wider and higher quality social networks than people with less developed skills. Ozgen and Baron (2007) pointed out that entrepreneurs use their social networks as a source of information that promotes and acknowledges opportunities. Moreover, women have different types of social networks than men (Kepler & Shane, 2007; Fairlie & Robb, 2009). For instance, male entrepreneurs more likely than females have business relations with financial investors and bankers. At the same time, social networks allow members to socialise with role models, obtain experience from observing others and enhance their entrepreneurial skills and knowledge. Minniti et al. (2005) alerted the fact that women have limited networks and geographic mobility, which reduces their abilities to follow role models, obtain resources and confidence for using and improving their entrepreneurial skills. Moreover, Díaz-García and Jiménez-Moreno (2009) stressed that women have fewer female role models which might attract them less to entrepreneurship.

### **1.2.2. Push and Pull factors**

Another partition of the most important factors that can induce and enhance female entrepreneurial activity are defined as “Push” and “Pull” factors (Apergis & Pekka-Economou, 2010; Vossenbergh, 2013). Push factors are associated with low family income, difficult work conditions, divorces, job dissatisfaction and losses, high unemployment conditions, economic recession and financial reasons. Pull factors are related to the need of independence and self-achievement, financial gains, increased profit and wealth, personal development, social status and power (Apergis & Pekka-Economou, 2010; Kobeissi, 2010). In recent years female entrepreneurial activities are not only developed by just push or pull factors, but also by some combination of the two factors (Apergis & Pekka-Economou, 2010).

In many cases unemployment “pushes” both men and women into entrepreneurship by necessity. However, according to European Commission (2005) Eurostat survey of entrepreneurs across fifteen EU countries, the start-up motivations present gender differences. For 58% of women, comparing with only 42% of men, avoidance of unemployment situation is considered a strong motive for starting an own business (Klapper & Parker, 2011). The authors gave the example of Italy where men tended to enter self-employment for career progression, while women prone to self-employment to avoid inactivity.

If females seem to be mainly pushed by necessity, other studies mention that women are more motivated (pulled) than men by personal fulfilment, flexibility and autonomy than income growth or profits (Klapper & Parker, 2011). Greece is an example of a European economy, where women usually start their new business in order to get self-fulfilment, achieve creativity, autonomy and independence (Sarri & Trihopoulou, 2005). Usually, in the process of creating their own ventures, women trust the ability to combine work and private life, while for men more vital is the desire to make money, achieve wealth and perform a challenging job (Kepler & Shane, 2007; Klapper & Parker, 2011; Maes et al., 2014; Hazudin et al., 2015). Supporting the existing literature, Apergis and Pekka-Economou (2010), argued that the flexible working schedule offers a significant motivation for female entrepreneurs. For women, to become self-employed is a way to balance work and family demands (Kepler & Shane, 2007; Kobeissi, 2010; Minniti & Naudé, 2010; Ferk et al., 2013; Hazudin et al., 2015). Bardasi et al. (2011) suggested that family positively linked to entrepreneurship for both men and women, while satisfaction with life had a positive effect on entrepreneurship predominantly for women.

Actually, family demands appear as an important explanatory variable in the study of female entrepreneurship. Verheul et al. (2006) proved that parenthood negatively influence on female employment, while it worked in the opposite direction for male employment. Klapper and Parker (2011), citing a study from Edwards and Field-Hendrey (2002), claimed that small children (with age lower than six years old) have great impact on the probability of self-employed women reducing additionally their potential earnings (Hundley, 2001). Vossenberg (2013) confirmed this evidence, citing a study of Williams (2004), where the author argued that in Europe the existence of children negatively influenced on the business success of female entrepreneurs. Family support was therefore a factor considered as an important determinant of entrepreneurship activity, especially for women. Experience in family business allowed to get new business skills and opportunities, confidence for achieving ambitions and business (Fairlie & Robb, 2009; Vossenberg, 2013). Likewise, engaging other male family members into business promote women networks with other entrepreneurs.

Returning to push factors, the salary gap accounts as an important one when studying female entrepreneurship. Kobeissi (2010) supported that gender inequality in earning has a positive influence on women's decision to create their own business. Research, made across developed and developing countries, highlighted that in developed countries women earn around 77% of men earnings and only 73% in developing countries. The same research found that in low-income countries with high fertility

rates the likelihood of female entrepreneurship is higher (Arenius & Minniti, 2003). Among developed countries have been found mix effects. By one side, a positive relationship between per capita income and entrepreneurship (Carree, Stel, Thurik, & Wennekers, 2002; Verheul et al., 2006). By the other side, a U-shaped relationship between entrepreneurial activity and *per capita* income for both female and male (Carree et al., 2002; Wennekers, Wennekers, Thurik, & Reynolds, 2005; Verheul et al., 2006).

In 1992 the Characteristics of Business Owners (CBO), a survey, conducted by the Census United States Bureau provides economic, demographic, and sociological data on business owners, self-employed people, and their business<sup>1</sup>, indicated that female business owners differ from their male counterpart by many characteristics, such as prior work experience and industry (Fairlie & Robb, 2009). The authors also show that educational background is an important determinant of business outcomes for both female and male entrepreneurs. Many women start their business with lack of previous experience what is considering a barrier to run successful businesses (Verheul et al., 2006). This evidence was found in many studies which explain the low number of female entrepreneurs (comparing with the number of male entrepreneurs) with the lack of managerial skills, work experience, financial difficulties and gender discrimination, both in education and in the labour market (Carter, Brush, Greene, Gatewood, & Hart, 2003; Langowitz & Minniti, 2007; Kobeissi, 2010; Klapper & Parker, 2011). According to Huarng et al. (2012), women with widely managerial skills overcome obstacles and problems easily at the beginning of their entrepreneurial activity.

Klapper and Parker (2011), based in several empirical studies, argued that men and women start their entrepreneurial activity in different industries due to capital restrictions, skills ability, preferences, discrimination and/or educational level. Women entrepreneurs are over-represented in industry sectors such as sales, retail, and services, while men conduct their business in high-technology sectors (Díaz-García & Jiménez-Moreno, 2009). Using data from GEM, Vossenber (2013) mentioned that female deal with the consumer sector and are mainly involved in retail business. Several years before Boden (1996) noted, that women especially focus on administrative and secretary job because it is not require advanced qualifications and work experience. By contrast, men have more previous work, business experience, technical and managerial skills and high level of education (Klapper & Parker, 2011; Huarng et al., 2012). Men have more education and experience than women, especially in technical business and managerial elements (Klapper & Parker, 2011), which might influence on business performance (Bardasi et al., 2011). Even not business-related to education seems to help entrepreneurs' to overcome difficulties with banks loans, financial obstacles and analytical and managerial abilities (as several authors, cited by Kobeissi, 2010), concluded).

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<sup>1</sup> The data were collected through a statistically chosen mail sample survey and were combined with administrative records data, which were originally obtained for use in the 1992 Economic Census.

Finally, credit and start-up costs are still counted as significant financial barrier for both women and men (Verheul et al., 2006; Klapper & Parker, 2011; Hazudin et al., 2015). Financial costs, and often the discrimination faced by female, are problems to start a business, but they assume a bigger importance for women. These faced financial obstacles are bigger for women than for men (Verheul et al., 2006) and programmes, like the ones that allow and smooth access to micro-credit, affect women decision-making process (Minniti & Naudé, 2010). In conjunction, the regulatory environment of a country can promote entrepreneurship by declining start-up costs (Naudé, Gries, Wood, & Meintjies, 2008; Gries & Naudé, 2009; Minniti & Naudé, 2010). Female have limited access to business opportunities and financial resources and additional limitations such as social, cultural and human capital restrict the ability of women to get loans and attract investors and venture capitalists (Gupta et al., 2009).

### **1.3 Female Entrepreneurship in European Union**

In the discussion of female entrepreneurship it is assumed that entrepreneurship is one of the forms of professional activity. People who work can be either hired employees who receive remuneration for their work, or entrepreneurs who obtain income from running their own businesses. As have already mentioned in the literature review, women are one of the most relevant untapped resources for entrepreneurship. Very little is known about the economic relevance of women's entrepreneurship, the policy instruments that are effective in raising entrepreneurship rates among women and the economy-wide effects of higher participation of women in entrepreneurial activity.

To overcome the abovementioned shortcomings, in 2008 the European Commission started adopt regulations, services and networks which allowed to extend the number of new enterprises created by women. For example, in 2009, the Commission launched the European Network of Female Entrepreneurship Ambassadors as a promoter for potential women entrepreneurs and, in 2011, the European Network of Mentors for Women Entrepreneurs and the European Network to Promote Women's Entrepreneurship (WES). In September 2011, the European Parliament applied a resolution on women's entrepreneurship in small and medium-sized enterprises (SME) which acknowledges that "promoting women's entrepreneurship is a long-term process that requires time to change structures and attitudes in society" and recommendations in the areas of financial and educational support, network opportunities, and information and communication technologies (Adema et al., 2014).

According to the European Commission, " women constitute 52% of the total European population but only 34.4% of the EU self-employed and 30% of start-up entrepreneurs". In 2008, women entrepreneurs made up 29% of all entrepreneurs in Europe (11.6 million) which increased by 3% in 2012 (European Commission, 2016). Out of all European women entrepreneurs, 78% were solo entrepreneurs preferring to set up businesses in the area of health, social-work activities, services or education and only 22% employers. At a national level numbers are uneven. In 2012, around 30% of all entrepreneurs in Greece

or Estonia were women, in Spain the number increases to 33%. Since 2008, the number of women entrepreneurs in Greece has decreased by 5%, in Estonia by 3% and in Spain by 7%. However in the UK had been observed a positive evolution: from 12 % in 2000 to 14% in 2008 and 20% in 2012 (European Commission, 2014; Panteia, 2014a, 2014b, 2014c, 2014d).

The different female entrepreneurship rates at the EU national level demanded the intervention of important national institutions which promote equal legal rights, access to education, networks, technology, capital, social norms, values and expectations. The overall national business environment in terms of laws, regulations and business stability affect businesses' ability to prosper and grow.

For example, in order to overcome difficulties related to the lack of knowledge and access to networks, the Swedish government tries to promote women entrepreneurship through the Agency for Economic and Regional Growth which supports the establishment of new businesses by providing information and sharing experience with female business owners. It is believed that public policies can improve the financing perspective of female owned companies by improving small and medium sized firms' conditions to access bank credit, smoothing women's access to equity and venture financing and excluding discrimination in markets. In France, for instance, the *Fonds de Garantie à l'Initiative des Femmes (FGIF)* guarantees 70% of bank loans taken by women for establishing or developing their own ventures (Adema et al., 2014). The German National Agency for Women Start-ups offers financial support for female entrepreneurs. Partly financing by European Social Fund (ESF), the Irish Going for Growth Programme helps women entrepreneurs to overcome difficulties in their existing companies, while the Spanish government offers a micro-loan programme for female entrepreneurs. Overall, the public policies are even effective when financing instruments are supplemented with other services, such as training and consultancy. In order to increase the number of female entrepreneurs the British Female Inventors and Innovators Network (BFIIN), through seminars and awards, helps women to commercialise their inventions (European Training Foundation [ETF], 2013). Other examples of national level public policies are in the social policies presented in Nordic countries. There exists an effective support to citizens related to day-care and pre-school services as well as out-of-school hours care services for children in primary school (OECD, 2011, 2012). These illustrations of family-related policies have great impact on the levels of female entrepreneurship, as many scientific papers defined "work-family balance" as a significant factor for women to start business (Kepler & Shane, 2007; Minniti & Naudé, 2010; Kobeissi, 2010; Hazudin et al., 2015).

## **2. Study methodology: objectives, data and method of analysis**

### **2.1. Objective of the study**

The main goal of this research work addresses the issue of gender and entrepreneurship in EU countries over the last years (more precisely from 2007 to 2015), identifying and quantifying the factors that are driving the entrepreneurial activity in this economic block and, mainly, the differences related to gender in relation to the entrepreneurial activity. In the spotlight is the goal to identify and quantify the personal, social and economic features that are motivating women to be entrepreneurs, in different developed countries, as well as the main difficulties they feel during the process of business creation. The identification of such features allows the policy makers to develop more effective public policies towards the entrepreneurial activity, managing the economic scarce resource more efficiently in order to enhance the entrepreneurship impact on economic growth and development, innovation and employment creation. In a microeconomic point of view, it allows possible prospective entrepreneurs, particularly women, to understand the economic impact of their social, political and economic environment in their potential entrepreneurial activity.

The analysis will focus on the gender issues in early-stage rate of entrepreneurial activity in EU countries over time, trying to perceive what factors influence on both the general rate of entrepreneurial activity and the different gender rates of entrepreneurial activity. To achieve this goal will be analysed – in a descriptive and inferential way - a database of secondary information on entrepreneurial activity which is publicly available and is properly treated for use in scientific research, such as this dissertation. The database – the Global Entrepreneurship Monitor (GEM) – publishes information on the rate of entrepreneurial activity for a vast range of world economies including the ones in European Union.

## **2.2. Global Entrepreneurship Monitor (GEM): database and variables in study**

The Global Entrepreneurship Monitor (GEM) is a fundamental project addressing entrepreneurship all over the world. The GEM had been launched in 1997 by the London Business School (UK) and the Babson College in Wellesley (USA) as a research program which included annual assessments regarding to entrepreneurial activity in various countries (Reynolds et al., 2005; Sternberg & Wennekers, 2005). Starting from 1999 with ten developed countries, GEM had grown and in 2010 it had already included a set of fifty nine countries (Kelley, Bosma, & Amorós, 2011).

Nowadays, with 17 years of life, according to their own numbers (GEM, 2016), GEM reaches more than 100 countries, where more than 500 specialists in entrepreneurial research, 300 academic and research institutions and 200 funding institutions conduct, every year, plus than 200,000 interviews looking at two elements: (i) the entrepreneurial behaviour and attitudes of individuals and (ii) the national context and its' impacts on entrepreneurship. Still, according to GEM (2016), "GEM is the richest resource of information on the subject, publishing a range of global, national and 'special topic' reports on an annual basis". According to Amorós and Bosma (2014) the GEM's adult population survey database included about two million observations in 104 economies that had participated in GEM between 1999 and 2013. In 2014, more than 206,000 individuals were surveyed across 73 economies and 3,936 national experts on entrepreneurship from 73 economies participated in the survey (Singer, Amorós, & Moska, 2015).

Since its creation, the GEM has four main objectives: (i) measure differences in the level of entrepreneurial activity between countries, (ii) discover the factors that determine entrepreneurial activity levels, (iii) identify policies that promote entrepreneurial activity and (iv) clear up the relationship between entrepreneurship and economic growth (Sternberg & Wennekers, 2005).

It is currently, undeniably, the main project of international research that aims to describe, analyse and compare the entrepreneurial process in a wide range of countries. The GEM's data is not only used to write and publish reports on the theme, but also academics and policy makers look it in order to analyse the phenomenon. Various scientific papers use GEM's data to produce knowledge related to the entrepreneurship theme, in general, and the themes related to particular. The gender issue, for example, is one of those particular related to themes. Indeed, several research papers identify, analyse and discuss the features related to differences between female and male entrepreneurs and the factors influencing on their behaviours around the world ((Apergis & Pekka-Economou, 2010; Klapper & Parker, 2011 and Vossenbergh, 2013)) are examples of such published scientific research). According to Álvarez, Urbano and Amorós (2013) many GEM researchers seek to describe the relationship between entrepreneurial activity and economic growth, and define public policies which will promote entrepreneurship. But the above entrepreneurship related to theme is not the only one that can be study using GEM's data.

Recognizing entrepreneurship as a process, GEM concentrates on the individual entrepreneurs. According to Reynolds et al. (2005), the primary objective of GEM's is to evaluate the prevalence of

individuals involved in entrepreneurial activity at a single point in time and highlight factors that have the crucial role in the process of firm creation. But GEM's data is also being collected from owner-managers of established firms, regardless of firm age.

Regarding to the data collection, the GEM research consists of two complimentary tools: (1) the Adult Population Survey (APS) and (2) the National Expert Survey (NES). The APS focuses on the entrepreneurial attitudes, activity and aspirations of individuals, for instance the rates of new product early-stage entrepreneurial activity, the rate of the population with fear of failure and the rate of growth expectation early-stage entrepreneurial activity. The NES distinguishes nine factors that have considerable influence on entrepreneurship which known as the Entrepreneurial Framework Conditions (EFCs): access to finance, government policies, government entrepreneurship programs, entrepreneurship education, research and development (R&D) transfer, commercial and legal infrastructure, market openness and physical infrastructure and cultural and social norms. In GEM, each country is represented by a 'National Team', led by an academic or research institution, responsible for collecting the data and reporting on their findings. GEM data experts work closely with GEM National Teams to guarantee the quality of the data. Each GEM national team controls an annual survey of at least 2,000 adults. In addition, they consult with national experts on factors that can explain the nature and level of entrepreneurship in their economies. Measuring the attitudes of a population, the activities and characteristics of individuals participating in various phases of entrepreneurship, GEM also indicates aspirations of entrepreneurs which remain them in business.

In current work is used GEM's data regarding to information about entrepreneurship from 2007 to 2015 in twenty five European Union's countries. From the GEM's database was not possible to collect information for Bulgaria, Cyprus and Malta – so the twenty five countries under analysis are: Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom. For several countries was not possible to present the data for the 9 years in study which will produce an unbalanced panel. The countries in analysis and the years available for each country are presented in Table 1.

Table 1. List of European Union countries with available statistical information, per year.

	YEAR								
	2007	2008	2009	2010	2011	2012	2013	2014	2015
COUNTRY	Austria	-	-	-	-	Austria	-	Austria	-
	Belgium	Belgium	Belgium	Belgium	Belgium	Belgium	Belgium	Belgium	Belgium
	Croatia	Croatia	Croatia	Croatia	Croatia	Croatia	Croatia	Croatia	Croatia
	-	-	-	-	Czech Republic	-	Czech Republic	-	-
	Denmark	Denmark	Denmark	Denmark	Denmark	Denmark	-	Denmark	-
	-	-	-	-	-	Estonia	Estonia	Estonia	Estonia
	Finland	Finland	Finland	Finland	Finland	Finland	Finland	Finland	Finland
	France	France	France	France	France	France	France	France	-
	-	Germany	Germany	Germany	Germany	Germany	Germany	Germany	Germany
	Greece	Greece	Greece	Greece	Greece	Greece	Greece	Greece	Greece
	Hungary	Hungary	Hungary	Hungary	Hungary	Hungary	Hungary	Hungary	Hungary
	Ireland	Ireland	-	Ireland	Ireland	Ireland	Ireland	Ireland	Ireland
	Italy	Italy	Italy	Italy	-	Italy	Italy	Italy	Italy
	Latvia	Latvia	Latvia	Latvia	Latvia	Latvia	Latvia	-	Latvia
	-	-	-	-	Lithuania	Lithuania	Lithuania	Lithuania	-
	-	-	-	-	-	-	Luxembourg	Luxembourg	Luxembourg
	Netherlands	Netherlands	Netherlands	Netherlands	Netherlands	Netherlands	Netherlands	Netherlands	Netherlands
	-	-	-	-	Poland	Poland	Poland	Poland	Poland
	Portugal	-	-	Portugal	Portugal	Portugal	Portugal	Portugal	Portugal
	Romania	Romania	Romania	Romania	Romania	Romania	Romania	Romania	Romania
	-	-	-	-	Slovakia	Slovakia	Slovakia	Slovakia	Slovakia
	Slovenia	Slovenia	Slovenia	Slovenia	Slovenia	Slovenia	Slovenia	Slovenia	Slovenia
	Spain	Spain	Spain	Spain	Spain	Spain	Spain	Spain	Spain
	Sweden	-	-	Sweden	Sweden	Sweden	Sweden	Sweden	Sweden
	UK	UK	UK	UK	UK	UK	UK	UK	UK

Source: Own construction based on GEM (2007-2015).

As referred in the previous subsection, the main goal of this research study is to identify and quantify the factors that drive entrepreneurship in the EU countries, over the last years, put a special emphasis in the gender analysis. Three variables will be used as the dependent ones, this is, the ones that the work tries to explain. The variables are: (1) the total early-stage entrepreneurial activity (TEA), which measures the percentage of 18-64 years old population who are either nascent entrepreneurs or owner-managers of a new business; (2) the female early-stage entrepreneurial activity, which measures the percentage of female 18-64 years old population who are either nascent entrepreneurs or owner-managers of a new business; and, (3) the male early-stage entrepreneurial activity, which measures the percentage of male 18-64 years old population who are either nascent entrepreneurs or owner-managers of a new business (Table 2). The factors that may drive each one of the previous three variables, are presented in the Tables below (Table 2 and Table 3). These variables are divided in three types: the ones related to individual aspirations, the ones divided by the individuals' attitudes and perceptions towards entrepreneurship and the ones related to the economic, legal, political and social country's business environment.

Table 2. Variables presentation and definition: dependent variables and independent variables related to aspirations, attitudes and perceptions.

Variables	Abbreviation	Unit of measure	Definition
<b>Dependent variables</b>			
Total early-stage Entrepreneurial Activity (TEA)	Teayy		Percentage of 18-64 population who are either nascent entrepreneur or owner-manager of a new business
Female early-stage Entrepreneurial Activity	Teayyfem	%	Percentage of female 18-64 population who are either nascent entrepreneur or owner-manager of a new business
Male early-stage Entrepreneurial Activity	Teayymal		Percentage of male 18-64 population who are either nascent entrepreneur or owner-manager of a new business
<b>Independent variables: aspirations</b>			
Growth Expectation early-stage Entrepreneurial Activity	TEAyyjg5		Percentage of TEA who expect to employ at least five employees five years from now
International Orientation early-stage Entrepreneurial Activity	TEAyyint	%	Percentage of TEA who indicate that at least 25% of the customers come from other countries
New Product early-stage Entrepreneurial Activity	TEAyynwp		Percentage of TEA who indicate that their product or service is new to at least some customers
<b>Independent variables: attitudes and perceptions</b>			
Entrepreneurial Intention	Futsupno		Percentage of 18-64 population (individuals involved in any stage of entrepreneurial activity excluded) who are latent entrepreneurs and who intend to start a business within three years
Entrepreneurship as Desirable Career Choice	Nbgoodyy		Percentage of 18-64 population who agree with the statement that in their country, most people consider starting a business as a desirable career choice
Fear of Failure Rate	Frfailop		Percentage of 18-64 population (individuals involved in any stage of entrepreneurial activity excluded) who indicate that fear of failure would prevent them from setting up a business
High Status Successful Entrepreneurship	Nbstatyy	%	Percentage of 18-64 population who agree with the statement that in their country, successful entrepreneurs receive high status
Know Startup Entrepreneur Rate	Knoentyy		Percentage of 18-64 population who personally know someone who started a business in the past two years
Media Attention for Entrepreneurship	Nbmediyy		Percentage of 18-64 population who agree with the statement that in their country, you will often see stories in the public media about successful new businesses
Perceived Capabilities	Suskilyy		Percentage of 18-64 population (individuals involved in any stage of entrepreneurial activity excluded) who believe they have the required skills and knowledge to start a business
Perceived Opportunities	Opportyy		Percentage of 18-64 population (individuals involved in any stage of entrepreneurial activity excluded) who see good opportunities to start a firm in the area where they live

Source: Own construction based on GEM (2016).

Table 3. Variables presentation and definition: independent variables related to the business environment.

Variables	Abbreviation	Unit of measure	Definition
<b>Independent variables: business environment</b>			
Financing for entrepreneurs	Finance	Likert 5-point scale, where 1 = least positive and 5 = most positive	The availability of financial resources - equity and medium enterprises (SMEs) (including grants and subsidies )
Governmental support and policies	Support		The extent to which public policies support entrepreneurship - entrepreneurship as a relevant economic issue
Taxes and bureaucracy	Taxes		The extent to which public policies support entrepreneurship - taxes or regulations are either size-neutral or encourage new and SMEs
Governmental programs	Programs		The presence and quality of programs directly assisting SMEs at all levels of government (national, regional, municipal)
Basic-school entrepreneurial education and training	B_education		The extent to which training in creating or managing SMEs is incorporated within the education and training system at primary and secondary levels
Post-school entrepreneurial education and training	P_education		The extent to which training in creating or managing SMEs is incorporated within the education and training system in higher education such as vocational, college, business schools, etc.
R&D transfer	R&D		The extent to which national research and development will lead to new commercial opportunities and is available to SMEs
Commercial and legal infrastructure	C_Infrastructure		The presence of property rights, commercial, accounting and other legal and assessment services and institutions that support or promote SMEs
Internal market dynamics	M_dynamics		The level of change in markets from year to year
Internal market openness	M_openness		The extent to which new firms are free to enter existing market
Physical and services infrastructure	P_Infrastructure		Ease of access to physical resources-communication, utilities, transportation, land or space- at a price that does not discriminate against SMEs
Cultural and social norms	Norms	The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income	

Source: Own construction based on GEM (2016).

### **2.3. Panel data method: fixed and random effects models<sup>2</sup>**

In order to achieve the objective of the study, identifying and quantifying the factors which have significant influence on entrepreneurial activity by gender in the EU, the econometric methodology of panel data is applied. For model estimation is used the GEM's data available for (25) EU countries in the time period from 2007 to 2015. Due to the crescent availability of data and econometric software packages, this method is often used to studies with the same type of objectives as this study. For example, using a panel data Thurik and Verheul (2001) found that female entrepreneurs have a smaller amount of start-up capital than their male counterparts. Is the same way Apergis and Pekka-Economou (2010) justified that combination of pull and push motives and effective mentoring framework encourage Greek women to start their own new ventures. Verheul et al. (2006) used panel data methods for explaining female and male entrepreneurship at a country level.

Panel data (or longitudinal data) are characterized by a set of observations in two dimensions - time and individual. In this particular work, time refers to a period of 9 years between 2007 and 2015 and individuals refer to the 25 EU countries identified in the previous section. Due to this two dimensions, the panel data methods allow to control variables that cannot be observed or measured, like cultural factors or difference in business practices across countries, or variables that change over time but not across entities (i.e. national policies and regulations or international agreements). It also allows to combine the diversity of individual behaviour (in this case countries entrepreneurial behaviour) with temporal adjustment dynamics, even if they differ between countries. According to Hsiao (2003), the panel data econometric method offers many advantages, among which: (i) controls for the possible heterogeneity among the economies in the study; (ii) allows to use a larger number of observations, increasing the number of degrees of freedom and decreasing multicollinearity between the independent variables (since the data between individuals has different structures) making inferences more robust and more reliable; and, (iii) permits to identify and measure effects that are not possible to detect using only cross-sectional or time series analysis of data.

Within the available panel data models the most commonly are the fixed effects (FE) model and the random effects (RE) model. The FE model seeks to control the effect of omitted variables (not present in the model) that vary between individuals and remain constant over time. The RE model is based on the same assumptions considered in the FE model, however the RE model is estimated parameters which are constant for all subjects and all time periods - the differences are unobservable random parameters.

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<sup>2</sup> The work uses the econometric software STATA (version 12.0) to obtain the empirical results.

In the FE model, as mentioned above, the estimation is performed assuming that the heterogeneity among individuals is captured by the constant part, which is different from individual to individual. Thus, the FE model is represented by the following general stochastic equation that considers the existence of  $n$  independent variables:

$$Y_{it} = \alpha_i + \beta_1 X_{1it} + \dots + \beta_n X_{nit} + \varepsilon_{it} \quad (1)$$

Where  $Y_{it}$  is the dependent variable observed for country  $i$  at time  $t$ ,  $\alpha_i$  is the independent component of the model that is constant over time, but differs across countries capturing invariant differences in time,  $\beta$  is the model parameter associated with each independent variable,  $X_{it}$  is the value of each independent variable for country  $i$  at the time  $t$  and  $\varepsilon_{it}$  is the error term associated with each country  $i$  at the time  $t$ .

In the RE model, the estimation is performed assuming that the heterogeneity among countries is captured introducing this heterogeneity in the error term. The RE model admits the constant part is not a fixed parameter, but a random variable. Thus, considering the FE model, the independent component is replaced considering  $\alpha_i = \alpha + v_i$ . Therefore, the RE model is represented by the following equation:

$$Y_{it} = (\alpha + v_i) + \beta_1 X_{1it} + \dots + \beta_n X_{nit} + \varepsilon_{it} \quad (2)$$

Which is equivalent to:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \dots + \beta_n X_{nit} + (v_i + \varepsilon_{it}) \quad (3)$$

In this model  $v_i$  represents the unobservable variable of the RE,  $Y_{it}$  is the dependent variable observed for country  $i$  at time  $t$ ,  $\alpha$  the independent component of model that is a constant,  $\beta$  is the model parameter associated with each independent variable,  $X_{it}$  the value of each independent variable for country  $i$  at time  $t$  and  $\varepsilon_{it}$  the error term associated with each country  $i$  at time  $t$ .

According to Wooldridge (2002), if the number of individuals (groups) is small, it is preferable to use the estimation method with FE. If the number of subjects is large, and are chosen in a random manner, the estimation method with RE is the most suitable. For choosing between one and another estimation method a formal test should be used, although. For example, the Hausman test.

The Hausman test, which is based on differences between the estimates obtained from the FE model and those obtained from the RE model, is the one applied in this empirical study. The test indicates whether the two sets of estimated coefficients are significantly different and test the null hypothesis for

clarifying whether the RE model is preferable or the FE model. Accept the null hypothesis means accepting that the results of the RE model are better than those obtained through the estimation of the FE model. Do not accept the hypothesis means accepting that the results obtained by the estimation of the FE model are better than the results of the RE model. The Hausman test involves testing the following assumptions (Wooldridge, 2002; Baltagi, 2013; Longhi & Nandi, 2015):

$$\begin{cases} H_0: Cov(\alpha_i, X_{it}) = 0 & \rightarrow \text{The Random effect} \\ H_1: Cov(\alpha_i, X_{it}) \neq 0 & \rightarrow \text{The Fixed effect} \end{cases} \quad (4)$$

### **3. Study results: analysis and discussion**

#### **3.1. Variables in study: descriptive statistics**

In order to understand the statistical data made available by GEM, for the variables selected in this study over time and for the 25 countries for which exists information, is presented a Figure (Figure 1) with the evolution of the dependent variables: total early-stage entrepreneurial activity (that presents the percentage of 18-64 age population that own new businesses), female and male early-stage entrepreneurial activity (that show the percentage of 18-64 age female and male, respectively, that own a new business).

Observing Figure 1, the first observation refers to the facts that the information does not exist for all the countries in all the years in study (2007 to 2015), as mentioned in the previous section. The second observation relates to the fact that the levels of entrepreneurial activity, which vary between 1.41% and 20.27%, present an equal feature for all the countries. The percentage of male entrepreneurs always overpass their female counterparts. In some countries that difference is not much (e.g. in Austria, Germany or Spain), while in Hungary, Poland, Ireland, Lithuania, Latvia, Croatia, Czech Republic or Slovakia the differences are visible. The last main observation concerns the evolution of entrepreneurial activities over time. Different countries present also a different evolution of entrepreneurial activities. For example, during the last 9 years in Austria was observed a continuous growth, while in Greece or in Hungary the evolution was not so constant over time and changes are more visible. Countries like Italy, Denmark or Germany do not present such big oscillations and the evolution was more constant and stable over time. From Figure 1 is, therefore, possible to understand that, even for a group of countries with similar levels of development, income levels and similar business environments, differences exist among countries and these difference evolve in different patterns over time.

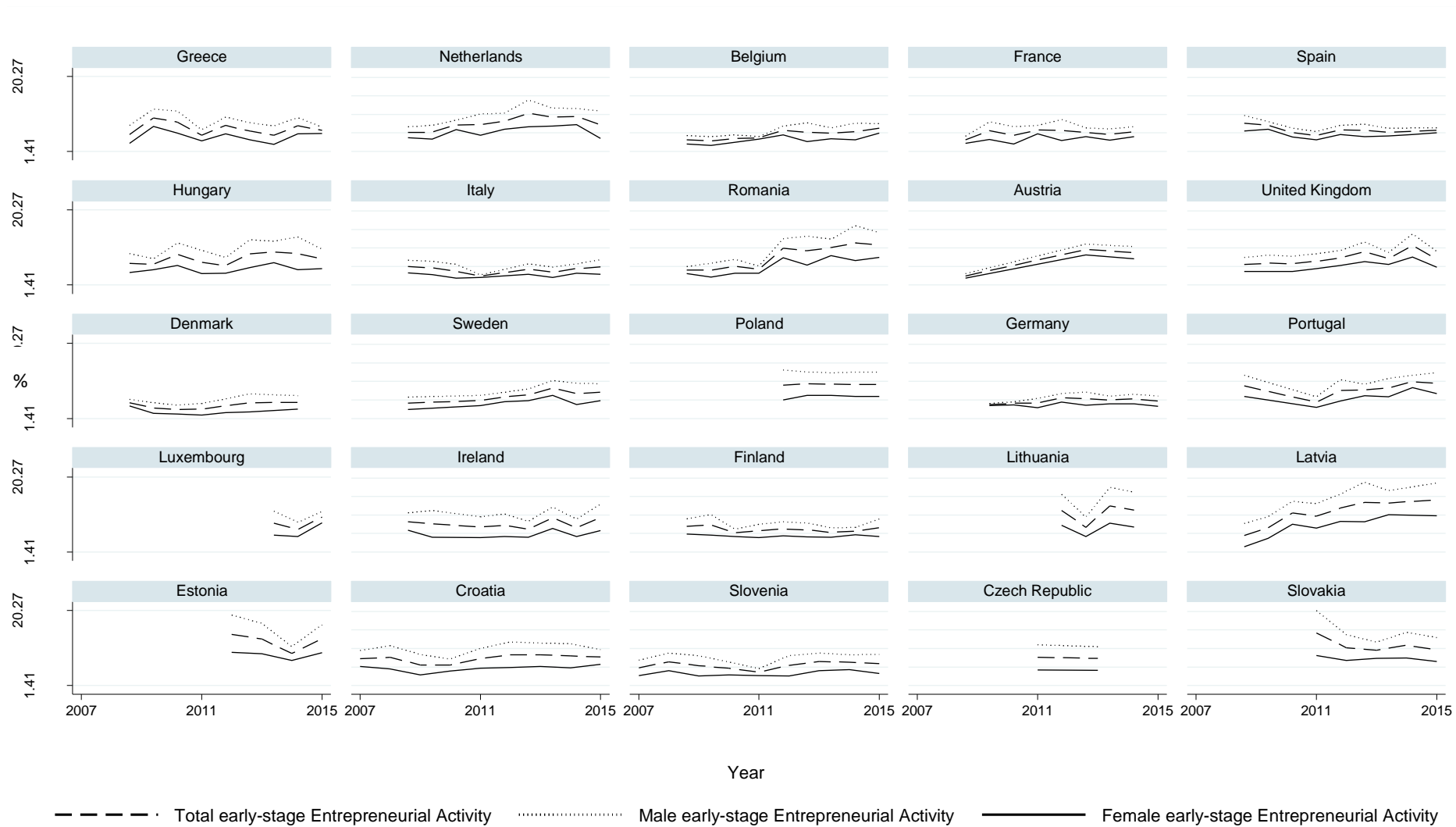


Figure 1. Evolution of the total, female and male early-stage entrepreneurial activity, by country in the period between 2007 and 2015.

Source: Own construction based on GEM (2016).

To analyse the three above variables and the other variables – the ones that may explain the changes in the entrepreneurial activity (total and by gender) - several measures of descriptive statistics are used. These measures are presented in Table 4 and Table 5. The between observations refer to countries which are examined in this study and the within observations refer to the evolution across countries during the period of time in analysis.

Table 4. Descriptive statistics for dependent variables and independent variables related to aspirations, attitudes and perceptions.

Variables	Statistics	Mean	Std. Dev.	Min	Max	Observations
<b>Dependent variables</b>						
Total early-stage Entrepreneurial Activity (TEA)	overall	7.02	2.52	2.35	14.26	N = 177
	between		2.16	4.09	12.48	n = 25
	within		1.56	1.00	10.73	$\bar{T}=7.8$
Male early-stage Entrepreneurial Activity	overall	9.27	3.41	2.71	20.27	N = 177
	between		2.97	5.56	16.01	n = 25
	within		2.07	2.74	15.16	$\bar{T}=7.8$
Female early-stage Entrepreneurial Activity	overall	4.78	1.85	1.41	10.08	N = 177
	between		1.52	2.62	9.13	n = 25
	within		1.25	-0.73	7.95	$\bar{T}=7.8$
<b>Independent variables: aspirations</b>						
Growth Expectation early-stage Entrepreneurial Activity	overall	26.31	9.62	4.88	52.81	N = 177
	between		7.95	11.57	41.05	n = 25
	within		5.59	3.00	40.23	$\bar{T}=7.8$
New Product early-stage Entrepreneurial Activity	overall	44.53	10.99	13.21	79.28	N = 177
	between		9.51	28.14	67.06	n = 25
	within		6.76	25.02	68.41	$\bar{T}=7.8$
International Orientation early-stage Entrepreneurial Activity	overall	22.05	9.22	5.79	59.74	N = 177
	between		7.06	12.35	38.61	n = 25
	within		6.05	-0.09	57.08	$\bar{T}=7.8$
<b>Independent variables: attitudes and perceptions</b>						
Perceived Capabilities	overall	43.10	7.51	23.77	60.67	N = 177
	between		6.25	33.15	53.57	n = 25
	within		4.32	26.63	56.72	$\bar{T}=7.8$
Perceived Opportunities	overall	32.12	13.66	2.85	71.49	N = 177
	between		12.05	18.95	65.59	n = 25
	within		7.37	14.01	52.98	$\bar{T}=7.8$
Fear of Failure Rate	overall	37.97	7.15	17.38	61.58	N = 177
	between		5.20	28.75	50.18	n = 25
	within		4.70	19.19	49.45	$\bar{T}=7.8$
Entrepreneurial Intention	overall	11.05	5.59	2.60	31.70	N = 177
	between		4.46	5.77	19.41	n = 25
	within		3.58	-1.71	23.74	$\bar{T}=7.8$
Know Startup Entrepreneur Rate	overall	34.64	7.94	16.83	56.13	N = 177
	between		6.15	23.46	46.76	n = 25
	within		5.16	23.77	56.41	$\bar{T}=7.8$
Entrepreneurship as Desirable Career Choice	overall	58.49	10.46	33.17	85.37	N = 163
	between		9.89	40.61	82.11	n = 24
	within		4.35	48.08	73.14	$\bar{T}=7.8$
High Status Successful Entrepreneurship	overall	67.73	10.30	41.73	89.55	N = 166
	between		9.70	47.09	85.60	n = 25
	within		3.59	56.88	80.31	$\bar{T}=7.8$
Media Attention for Entrepreneurship	overall	50.94	11.27	19.37	75.68	N = 163
	between		9.92	30.95	68.67	n = 24
	within		5.65	38.96	67.34	$\bar{T}=6.79$

Source: Own calculations

Table 5. Descriptive statistics for independent variables related to the business environment.

Variables	Statistics	Mean	Std. Dev.	Min	Max	Observations
<b>Independent variables: business environment</b>						
Financing for entrepreneurs	overall	2.80	0.69	1.65	5.74	N = 177
	between		0.29	2.23	3.37	n = 25
	within		0.63	2.03	5.50	$\bar{T}=7.8$
Governmental support and policies	overall	2.78	0.73	1.59	6.48	N = 177
	between		0.49	1.94	4.03	n = 25
	within		0.59	2.04	5.99	$\bar{T}=7.8$
Taxes and bureaucracy	overall	2.59	0.76	1.50	5.80	N = 176
	between		0.59	1.76	4.07	n = 25
	within		0.54	1.74	5.93	$\bar{T}=7.8$
Governmental programs	overall	2.96	0.75	1.72	5.96	N = 177
	between		0.53	2.15	4.35	n = 25
	within		0.59	2.09	5.48	$\bar{T}=7.8$
Basic-school entrepreneurial education and training	overall	2.25	0.63	1.37	5.60	N = 173
	between		0.38	1.64	2.92	n = 25
	within		0.52	1.47	5.40	$\bar{T}=7.8$
Post-school entrepreneurial education and training	overall	2.99	0.64	2.21	5.61	N = 177
	between		0.29	2.50	3.74	n = 25
	within		0.59	2.14	5.18	$\bar{T}=7.8$
R&D transfer	overall	2.67	0.61	1.87	5.38	N = 177
	between		0.35	2.21	3.71	n = 25
	within		0.53	1.73	4.96	$\bar{T}=7.8$
Commercial and legal infrastructure	overall	3.40	0.74	2.52	6.23	N = 177
	between		0.31	2.97	4.26	n = 25
	within		0.68	2.41	6.03	$\bar{T}=7.8$
Internal market dynamics	overall	3.17	0.78	1.84	6.36	N = 176
	between		0.44	2.43	4.46	n = 25
	within		0.67	1.98	5.68	$\bar{T}=7.8$
Internal market openness	overall	2.88	0.71	1.92	6.00	N = 177
	between		0.39	2.25	3.83	n = 25
	within		0.61	1.98	5.38	$\bar{T}=7.8$
Physical and services infrastructure	overall	4.12	0.93	2.82	7.61	N = 177
	between		0.43	3.28	5.13	n = 25
	within		0.84	3.12	7.11	$\bar{T}=7.8$
Cultural and social norms	overall	2.78	0.71	1.88	5.73	N = 177
	between		0.44	2.11	3.99	n = 25
	within		0.60	1.93	5.28	$\bar{T}=7.8$

Source: Own calculations.

The available number of observations, the mean, the standard deviation, the minimum and maximum values are presented for the overall observations (number of countries multiplied by the years with existing information for the country), the within observations (refers to the evolution of values for a given country) and the between observations (refers to the evolution of values across countries within a time period).

The standard deviation for total early-stage entrepreneurial activity (TEA) (the population of either nascent entrepreneur or owner-manager of a new business) is larger across country than that of the within country across years. This explain the fact that the number of nascent entrepreneurs, in general, differs across EU countries - in some countries they exist in a bigger proportion than the others, as was seen by the analysis of Figure 1. For female early-stage entrepreneurs is observed the same situation –

the countries with more proportion of entrepreneurs have also a bigger proportion of female entrepreneurs and that proportion is different from country by country. Regarding to male early-stage entrepreneurial activity that measures the population of male owner-manager of a new business, the standard deviation across countries is also larger than that within groups (in a country over time). This expresses the fact that across the countries start-up male entrepreneurs differ more than in a country across years.

The standard deviation for growth expectations (the expectation of employee at least five employees five years after the business creation) is larger across country than that of the within country across years. This indicates that EU countries have different expectations regarding to the possibilities of business growth – the entrepreneurs in some countries are expecting to grow more than entrepreneurs in other EU countries. The same happens when the analysis is made for the businesses which indicate that for some customers their product or service is new one and for the variable that measures the international orientation of the new entrepreneurial activity (note that exists an international orientation of the business activity if at least 25% of the activity is considered international) - the standard deviation across EU countries is larger than that within countries over time.

Regarding to the perceived capabilities and opportunities that measure the population that believe they have the required skills and knowledge to start a business and that the area where they live has good opportunities for starting a business, respectively, the standard deviation across countries is also larger than the values found within groups (in a country over time). Again these results show that countries are different in terms of the opportunities offered to individuals and their capabilities to start a business. Over time, it seems that the changes are not so drastic and the standard deviation does not differ much from the average value found in a country over the 9 (or less) years of study.

These previous results may drive the changes also verified in the entrepreneurial intention of EU citizens and in the statement that entrepreneurship is as desirable a career choice for them. The percentage of those who intend to start a business in three years is more diverse among the 25 economies in analysis than in a given one over time. In consequence the amount of individuals that know others that already started a business. Regarding to the choice of entrepreneurship as a desirable career choice, it can be verified that in some countries the deviation from the EU average reaches twice the value of that average. This last result could be a combined effect of the perception that in some countries a bigger percentage of the population refer that a successful entrepreneurial activity gives a higher social status and that a higher media attention is given to successful stories of new businesses. In those countries the intention to start a business is also higher than in the others. Over 9 years the changes verified in a single country are not so noticeable.

Even, if differences seem to exist among countries, the EU countries business environment is almost similar and therefore there is no significant differences both between and within EU countries' entrepreneurs in terms of their fear of failure, which may prevent a given percentage of the population to set up a business.

When the analysis is made in terms of the business environment, the results stress the differences that EU countries observed over time between 2007 and 2015. The existence of similar regulations and entrepreneurial policies and, particularly, the enforcement of such regulations and public policies in the last years, made the business environment to become more favourable in some countries, with the existent differences among EU economies being not so obvious.

For the variables that measure a more favourable financing environment (measuring the availability of financial resources), the standard deviation is larger within countries across years. The same for the variable that measures the governmental support and policies and the one that measures the presence and quality of programmes, which directly support SMEs at all levels of government (national, regional and municipal). Related to these public policies are the commercial and legal infrastructure indicators (that describe the existence of property rights, commercial, accounting and other legal and assessment services and institutions promoting SMEs) and the physical and service infrastructure indicators (which define the access level to physical resources, like communication, utilities, transportation, land or space, at a reasonable price for SMEs). For both these indicators, and following the results of the public policies, the deviation of the values from each one of the economies to the EU average is smaller between countries that within each economy over time. Such results show that changes occurred over time in all EU countries.

European Union countries also perform as a block when the internal market dynamics and openness is analysed – here the changes are also much more observable over time than among countries. The same is verified for the cultural and social norms that measure the level of encouragement they offer to new entrepreneurs. Even, if 25 different European countries are being analysed, the set of cultural and social normal that prevail is common between countries.

The main differences between countries, seem to appear when indicators that measure how much taxes or regulations are either size-neutral or encourage new SMEs. In the future this indicator, due to need to simplify notation, will just be called taxes and bureaucracy, however, it must be noted that a bigger value for this indicator means that taxes and bureaucracy are lower. Tax regulation seem to be much more distinct between countries than within each economy over time. Another indicator that differs among EU countries is the one that focuses on the post- school entrepreneurial education and training even if the indicators that measures the basic- school entrepreneurial education and the R&D transfer is very similar between economies.

## 3.2. Panel data (fixed and random effects) results and discussion

### 3.2.1. Estimated models equations

Over this section are presented the results of four FE and four RE models. The models are estimated to explain for the total early-stage entrepreneurial activity rate and the respective gender (female and male) entrepreneurial activity.

The first models (fixed and random) try to identify which “aspiration” factors drive the entrepreneurial activity, in total and by gender. This explanatory variable includes factors like growth expectations, international orientation of the entrepreneurial activity and the possibility to create a new product and the equations for the fixed and random panel data models are the following ones (only the equations for the total early-stage entrepreneurial activity are offered - by gender the equations are the same only changing the dependent variable, *Teayyfem* for females and *Teayymal* for males):

Aspirations FE model:

$$Teayy_{it} = \alpha_i + \beta_1 TEAyyjg5_{it} + \beta_2 TEAyyint_{it} + \beta_3 TEAyyynwp_{it} + \varepsilon_{it} \quad (5)$$

Aspirations RE model:

$$Teayy_{it} = \alpha + \beta_1 TEAyyjg5_{it} + \beta_2 TEAyyint_{it} + \beta_3 TEAyyynwp_{it} + (\varepsilon_i + \varepsilon_{it}) \quad (6)$$

The second models (fixed and random) try to identify which “attitudes and perceptions” factors drive the entrepreneurial activity, in total and by gender. This is the explanatory variable, which includes factors like perceived capabilities, perceived opportunities, fear of failure rate, entrepreneurial intention, the rate of knowledge of start-up entrepreneur, the desire to choose a career of entrepreneur, the high status given by successful entrepreneurship and the media attention for entrepreneurship. So, the equations for the fixed and random panel data models are the following ones (only the equations for the total early-stage entrepreneurial activity are offered – by gender the equations are the same only changing the dependent variable, *Teayyfem* for females and *Teayymal* for males):

Attitudes and perceptions FE model:

$$Teayy_{it} = \alpha_i + \beta_1 Suskilyy_{it} + \beta_2 Opportyy_{it} + \beta_3 Frfailop_{it} + \beta_4 Futsupno_{it} + \beta_5 Knoentyy_{it} + \beta_6 Nbgoodyy_{it} + \beta_7 Nbstatyy_{it} + \beta_8 Nbmediyy_{it} + \varepsilon_{it} \quad (7)$$

Attitudes and perceptions RE model:

$$Teayy_{it} = \alpha + \beta_1 Suskilyy_{it} + \beta_2 Opportyy_{it} + \beta_3 Frfailop_{it} + \beta_4 Frfailop_{it} + \beta_5 Frfailop_{it} + \beta_6 Frfailop_{it} + \beta_7 Frfailop_{it} + \beta_8 Frfailop_{it} + (\varepsilon_i + \varepsilon_{it}) \quad (8)$$

The third models (fixed and random) try to identify which economic, legal and political environmental characteristics impact on the entrepreneurial activity, in total and by gender. This explanatory variable includes factors like the environment regarding to entrepreneurs financing, governmental support and policies, taxes and bureaucracy, governmental programs, basic- school entrepreneurial education and training, post- school entrepreneurial education and training, R&D transfer, commercial and legal infrastructure, internal market dynamics, internal market openness, physical and services infrastructure, cultural and social norms. So, the equations for the fixed and random panel data models are the following ones (only the equations for the total early-stage entrepreneurial activity are offered – by gender the equations are the same only changing the dependent variable):

Environment FE model:

$$Teayy_{it} = \alpha_i + \beta_1 Finance_{it} + \beta_2 Support_{it} + \beta_3 Taxes_{it} + \beta_4 Programs_{it} + \beta_5 B\_education_{it} + \beta_6 P\_education_{it} + \beta_7 R\_D_{it} + \beta_8 C\_Infrastructure_{it} + \beta_9 M\_dynamics_{it} + \beta_{10} M\_openness_{it} + \beta_{11} P\_Infrastructure_{it} + \beta_{12} Norms_{it} + \varepsilon_{it} \quad (9)$$

Environment RE model:

$$Teayy_{it} = \alpha + \beta_1 Finance_{it} + \beta_2 Support_{it} + \beta_3 Taxes_{it} + \beta_4 Programs_{it} + \beta_5 B\_education_{it} + \beta_6 P\_education_{it} + \beta_7 R\_D_{it} + \beta_8 C\_Infrastructure_{it} + \beta_9 M\_dynamics_{it} + \beta_{10} M\_openness_{it} + \beta_{11} P\_Infrastructure_{it} + \beta_{12} Norms_{it} + (\varepsilon_i + \varepsilon_{it}) \quad (10)$$

Finally, the last models put together all the previous models offering an overall model (only the equations for the total early-stage entrepreneurial activity are offered – by gender the equations are the same only changing the dependent variable, Teayy<sub>fem</sub> for females and Teayy<sub>mal</sub> for males):

Overall FE model:

$$Teayy_{it} = \alpha_i + \beta_1 TEAyyjg5_{it} + \beta_2 TEAyyint_{it} + \beta_3 TEAyyinwp_{it} + \beta_4 Suskilyy_{it} + \beta_5 Opportyy_{it} + \beta_6 Frfailop_{it} + \beta_7 Futsupno_{it} + \beta_8 Knoentyy_{it} + \beta_9 Nbgoodyy_{it} + \beta_{10} Nbstatyy_{it} + \beta_{11} Nbmediyy_{it} + \beta_{12} Finance_{it} + \beta_{13} Support_{it} + \beta_{14} Taxes_{it} + \beta_{15} Programs_{it} + \beta_{16} B\_education_{it} + \beta_{17} P\_education_{it} + \beta_{18} R\_D_{it} + \beta_{19} C\_Infrastructure_{it} + \beta_{20} M\_dynamics_{it} + \beta_{21} M\_openness_{it} + \beta_{22} P\_Infrastructure_{it} + \beta_{23} Norms_{it} + \varepsilon_{it} \quad (11)$$

Overall RE model:

$$\begin{aligned}
 Teayy_{it} = & \alpha + \beta_1 TEAyyjg5_{it} + \beta_2 TEAyyint_{it} + \beta_3 TEAyynwp_{it} \\
 & + \beta_4 Suskilyy_{it} + \beta_5 Opportyy_{it} + \beta_6 Frfailop_{it} + \beta_7 Futsupno_{it} + \beta_8 Knoentyy_{it} \\
 & + \beta_9 Nbgoodyy_{it} + \beta_{10} Nbstatyy_{it} + \beta_{11} Nbmediyy_{it} + \beta_{12} Finance_{it} \\
 & + \beta_{13} Support_{it} + \beta_{14} Taxes_{it} + \beta_{15} Programs_{it} + \beta_{16} B\_education_{it} \\
 & + \beta_{17} P\_education_{it} + \beta_{18} R\_D_{it} + \beta_{19} C\_Infrastructure_{it} + \beta_{20} M\_dynamics_{it} \\
 & + \beta_{21} M\_openness_{it} + \beta_{22} P\_Infrastructure_{it} + \beta_{23} Norms_{it} + (\varepsilon_i + \varepsilon_{it})
 \end{aligned} \tag{12}$$

In the FE model, it is admitted that the estimated effect for each selected independent variable is constant over the EU countries and over time. If it is believed the individual effects (this is the location effects) result from a higher number of no random factors, this specification is the most logical. This model could be the suitable when the aim is to estimate the country's effect on the entrepreneurial activity (Baltagi, 2013; Longhi & Nandi, 2015). The RE models assumes the countries' specific entrepreneurial behaviour over time is unknown. Therefore, if exists a country's non observable specific behaviour, and that behaviour persists over time, such individual or time specific effects may be represented by a random variable. This way, the heterogeneity is captured through the error term and not by the constant as in the FE model (Wooldridge, 2002; Baltagi, 2013; Longhi & Nandi, 2015). The choice between the two models' results is made using the Hausman test.

The results of the panel data estimation (FE and RE models) are presented in the following tables. Table 6 analyses the total early-stage entrepreneurial activity, Table 7 analyses female early-stage entrepreneurial activity and Table 8 analyses male early-stage entrepreneurial activity. In each table is presented the estimated coefficient for each independent variable and the indication of the respective significance level. For each model is also presented the result of the Hausman test that allows to choose between FE and RE estimations. Additionally, even if is not common to present post estimation measures in panel data applications since the results are slightly different for the traditional Ordinary Least Squares estimation (Verbeek, 2008), here are presented the following. The  $R^2$  (within, between and overall), that although not coincident with the Ordinary Least Squares coefficient of determination (and therefore not having the exact same meaning) are possible approaches to model goodness-of-fit measures (Verbeek, 2008), the joint significance test F (for the FE models) and the joint significance Wald test (for the RE models), that if statistical significant indicate the independent variables' estimated coefficients, together, are nor equal to zero and therefore the model is a good one (Baltagi, 2013; Longhi & Nandi, 2015).

A note for the different number of observations include in each model – 177 observations for the aspirations models, 162 for the attitudes and perceptions models, 171 for the environmental models and 157 for the overall models. The difference is due to the fact that for some variables in some moments in time there is no information.

### 3.2.2. Total early-stage entrepreneurial activity

The previous explanations allow to understand the tables that follow starting with the next table that presents the results for the total early-stage entrepreneurial activity (Table 6).

Table 6. Panel data estimation results: total early-stage entrepreneurial activity.

Independent Variables	Aspirations model		Attitudes and perceptions model		Environment model		Overall model	
	Fixed effects	Random effects	Fixed effects	Random effects	Fixed effects	Random effects	Fixed effects	Random effects
Constant	4.150 ***	4.155 ***	-0.784	-0.654	7.672 ***	7.805 ***	0.967	2.394
TEAyyjg5	0.029	0.049 **	-	-	-	-	-0.017	0.002
TEAyyntp	0.055 **	0.045 ***	-	-	-	-	0.023	0.007
TEAyyint	-0.015	-0.010	-	-	-	-	-0.026	-0.007
Suskilyy	-	-	0.063 **	0.060 **	-	-	0.061 *	0.089 ***
Opportyy	-	-	0.021	0.021	-	-	0.024	0.026 *
Frailop	-	-	0.055 **	0.048 **	-	-	0.048 *	0.010
Futsupno	-	-	0.259 ***	0.267 ***	-	-	0.249 ***	0.256 ***
Knoentyy	-	-	0.006	0.007	-	-	0.000	-0.040 *
Nbgoodyy	-	-	0.000	-0.003	-	-	0.002	-0.028 *
Nbstatyy	-	-	-0.019	-0.016	-	-	-0.029	-0.021
Nbmediyy	-	-	0.011	0.013	-	-	0.012	0.022
Finance	-	-	-	-	1.299 **	1.074 *	0.403	-0.083
Support	-	-	-	-	0.064	-0.491	-0.572	-1.332 ***
Taxes	-	-	-	-	0.918	1.418 **	0.035	1.550 ***
Programs	-	-	-	-	0.175	-0.785	1.021	-0.875
B_education	-	-	-	-	-0.438	-0.432	-0.233	-0.595
P_education	-	-	-	-	0.568	1.051	-0.264	0.469
R_D	-	-	-	-	-0.358	-1.581 *	-0.073	-1.836 **
C_Infrastructure	-	-	-	-	-0.960	-0.940	0.361	0.390
M_dynamics	-	-	-	-	0.169	0.100	0.231	-0.703 **
M_openness	-	-	-	-	-2.395 **	-1.429 *	-1.201	0.407
P_Infrastructure	-	-	-	-	0.433	0.680	-0.100	0.722 *
Norms	-	-	-	-	0.272	0.981	0.033	1.437 ***
<b>Statistics</b>								
Nº of observation	177		162		171		157	
Hausman test	5.96		1.61		25.76**		42.85**	
R2 Within	0.073	0.0668	0.5097	0.5093	0.1326	0.098	0.5436	0.4009
R2 Between	0.053	0.1467	0.4797	0.4901	0.0027	0.3227	0.3537	0.738
R2 Overall	0.039	0.0907	0.4531	0.4628	0.0108	0.203	0.3487	0.6634
F test	3.91 **	n.a.	16.9 ***	n.a.	1.71 *	n.a.	5.7 ***	n.a.
Wald test	n.a.	14.24 ***	n.a.	156.69 ***	n.a.	24.9 **	n.a.	262.16 ***

Notes: \* indicates that the coefficient is statistical significant at the 10% significance level, \*\* indicates that the coefficient is statistical significant at the 5% significance level, \*\*\* indicates that the coefficient is statistically significant at a significance level of 1%. n.a. means not applicable.

For the all population, according to the Hausman test, for the aspiration models and the attitudes and perceptions models should be chosen the results of the FE models, while for environmental models the better estimation is the result of a RE model. If all the variables are put together in the same model the RE model is the one that fits better.

The last abovementioned model presents the highest overall  $R^2$ . For the REs' overall model, the variation of the explanatory variables explain approximately 66% of the changes verified in the total early-stage entrepreneurial activity. This value decreases till 4% for the aspiration model, indicating a low explanatory power of this variables in the determination of factors enhancing entrepreneurial activity and to 45% for the attitudes and perceptions model, indicating that the use of the variables measuring only the attitudes and perceptions have a higher explanatory power for explaining the phenomenon of entrepreneurship (regardless of gender) in EU countries. According to the value of the overall  $R^2$  for the business environment model, it is possible to state that the use of only this variables explain almost 20% of the variations that occur in the total entrepreneurial activity. However, because for the attitudes and perceptions model is selected the FE's estimation results, the within  $R^2$  is the best indicator for the model's explanatory power. The observable differences between attitudes and perceptions towards entrepreneurship, in each one of the EU countries analysed, that persist over time, explain approximately 51% of the variations in the rate of entrepreneurship in those countries. The selection of a RE econometric model to estimate the overall model, suggesting the existence of a non-observable behaviour between countries that remains over time, comes with a highest between  $R^2$  which indicates that the changes in the variables that compose the overall model may explain in almost 74% the variations in the total entrepreneurial activity in EU countries over the time analysed.

So, regarding to the aspirations model only the variable related to the creation of a new product is important (statistically) for explaining of the rate of entrepreneurship in EU countries over the last years. A new product or service creation has positive impact on the rate of entrepreneurial activity (regardless of gender). Regarding to the attitudes and perceptions model, the variables that measure the perceived capabilities, the fear of failure and the entrepreneurial intention have significant statistical influence on the level of entrepreneurship (regardless of gender). The perceived capabilities and the entrepreneurial intention variables remain statistical significant in the overall model, what shows their importance in the explanation of rate of entrepreneurial activity. The results of the third model indicate that variables measuring financial support of entrepreneurs, the level of taxes and bureaucracy, the level of R&D and the level of openness of the internal market are statistically significant drivers of entrepreneurial activity in EU countries.

As show the results of the overall model, variables that measure the perceived capabilities, the entrepreneurial intention, the level of governmental support and policies, the level of taxes and bureaucracy, the level of R&D, the level dynamism of the internal market, the level of post-school entrepreneurial education and training, and the level of cultural and social norms, are found to be statistically significant drivers of entrepreneurship in European Union countries.

For example, with a 99% confidence level, and remaining all the other factors constant, it is possible to state that if the rate of perceived capabilities increase in 1%, in an EU country, the rate of entrepreneurial activity increases 0.089%. While, if the rate of entrepreneurial intention increases also 1%, remaining all

the other variables constant, the rate of entrepreneurship increases 0.256%. An increase of perceived opportunities in 1%, the rate of entrepreneurial activity will increase in 0.026%.

Taxes and bureaucracy has a positive effect on the rate of entrepreneurial activity in general. It is important to remember that this indicator is bigger if taxes and bureaucracy are friendlier to the entrepreneurial activity. Due to the way this indicator is measure, if public policies that reduce taxes and bureaucracy as a way to support SMEs increase 1 point, with a 99% confidence level and remaining all the other factors constant, the percentage of new businesses increases in 1.55%. This result confirms the literature that indicate the fiscal system and the administrative burden as an obstacle to entrepreneurship. A positive impact on the rate of entrepreneurship is also found for physical and services infrastructures and social-cultural norms. If the availability of physical resources, such as communication, utilities, transportation and land, present one point more in the specialist opinion, the rate of entrepreneurial activity increases 0.722%. Also one single point more regarding to the stimulus given by social and cultural norms increases the rate of total entrepreneurial activity in 1.44%. All these variables have a positive impact on the rate of entrepreneurship expected after what have been mentioned in the literature review.

A negative impact on the rate of total entrepreneurial activity has been found for the following variables: rate of knowledge of other start-up entrepreneurs, the desire to choose an entrepreneur career, the governmental support and policies, R&D transfer and the internal market dynamics. For example, with a 90% confidence level, if the rate of knowledge of other start-up entrepreneurs and the percentage of individuals that state being an entrepreneur is a desirable choice career increases one point, the rate of entrepreneurship decreases 0.04% and 0.03%, respectively. According to the results, over the last nine years, the governmental support and policies do not promote entrepreneurship in the 25 EU countries in analysis. If the public policies support increases 1 point, the rate of entrepreneurs will decrease 1.33%. These result do not confirmed the literature which indicated a positive influence of governmental policies and support on the rate of entrepreneurship. Several reasons may be pointed to explain these result. Such policies and the governmental support might not be effectively implemented in EU countries or even if they are implemented in an effective way other measures (tax system measures or reduction of the red tape) could be more effective than the ones directly addressed to promote entrepreneurship. Another not expected results is the result obtained for the R&D transfer. According to the results, if the experts indicate that R&D leads to new commercial opportunities, the rate of entrepreneurship in EU countries decreases 1.836%. Finally, if the internal market dynamics increases that also has a negative influence on the rate of new business creation what could indicated that more EU citizens would like to run their business in a stable market with a lower risk of failure.

### 3.2.3. Female early-stage entrepreneurial activity

The estimated results for female early-stage entrepreneurial activity are presented in Table 7. For the estimation using only the entrepreneurial activity measured within the female population the analysis will be made as it was made for the total population. The objective is to verify if there are difference for this particular subgroup of the population and, if they exist, which differences should be stressed.

Table 7. Panel data estimation results: female early-stage entrepreneurial activity.

Independent Variables	Aspiration model		Attitudes and perception model		Environment model		Overall model	
	Fixed effect	Random effect	Fixed effect	Random effect	Fixed effect	Random effect	Fixed effect	Random effect
Constant	3.087 ***	3.192 ***	-0.623	-0.385	4.928 ***	4.899 ***	0.460	2.490
TEAyyjg5	0.002	0.014	-	-	-	-	-0.034 *	-0.019
TEAyynewp	0.042 **	0.034 **	-	-	-	-	0.035 **	0.005
TEAyyint	-0.010	-0.005	-	-	-	-	-0.022	-0.012
Suskilyy	-	-	0.076 *	0.067 ***	-	-	0.084 *	0.075 ***
Opportyy	-	-	0.011	0.018	-	-	0.018	0.027 **
Frfailop	-	-	0.046 *	0.038 *	-	-	0.035	0.009
Futsupno	-	-	0.160 ***	0.166 ***	-	-	0.153 ***	0.186 ***
Knoentyy	-	-	-0.006	-0.007	-	-	-0.015	-0.044 **
Nbgoodyy	-	-	0.005	-0.007	-	-	0.002	-0.024 *
Nbstatyy	-	-	-0.034	-0.018	-	-	-0.042	-0.021
Nbmediyy	-	-	0.009	0.005	-	-	0.012	0.009
Finance	-	-	-	-	0.692	0.472	0.012	-0.148
Support	-	-	-	-	0.184	-0.309	-0.534	-1.036 **
Taxes	-	-	-	-	0.882	1.319 **	0.179	1.324 ***
Programs	-	-	-	-	0.034	-0.538	0.604	-0.421
B_education	-	-	-	-	-0.009	-0.334	-0.140	-0.321
P_education	-	-	-	-	0.409	0.820	-0.099	0.196
R_D	-	-	-	-	-0.432	-1.114	-0.401	-1.256 *
C_infrastructure	-	-	-	-	-0.425	-0.421	0.462	0.575
M_dynamics	-	-	-	-	0.102	0.017	0.069	-0.589 **
M_openness	-	-	-	-	-1.983 **	-1.229 *	-0.693	0.096
P_infrastructure	-	-	-	-	0.366	0.454	0.012	0.473
Norms	-	-	-	-	0.114	0.749	0.247	0.905 **
<b>Statistics</b>								
Nº of observation	177		162		171		157	
Hausman test	3.32		2.36		10.25		46.68 ***	
R2 Within	0.051	0.0465	0.4103	0.4071	0.1006	0.0708	0.4834	0.3637
R2 Between	0.000	0.0139	0.3233	0.3725	0.0223	0.3247	0.277	0.6758
R2 Overall	0.002	0.0129	0.32	0.3688	0.0197	0.172	0.3145	0.6038
F test	2.65 *	n.a.	11.31 ***	n.a.	1.25	n.a.	4.47 ***	n.a.
Wald test	n.a.	7.26 *	n.a.	103.66 ***	n.a.	20.36 *	n.a.	202.72 ***

Notes: \* indicates that the coefficient is statistical significant at the 10% significance level, \*\* indicates that the coefficient is statistical significant at the 5% significance level, \*\*\* indicates that the coefficient is statistically significant at a significance level of 1%. n.a. means not applicable.

According to the Hausman test for the aspiration models, attitudes and perceptions models and environmental models, applied to women that started a business, should be chosen the results of the FE models. If all the variables are put together in the same model the RE model is the one that fits better.

The overall model is the one that presents the highest overall  $R^2$ . For the random effects' overall model, the changes in the female entrepreneurial activity are explained in approximately 60% by the variations occurred in the explanatory variables of that model. This value drops till 0.2% for the aspiration model, indicating a low explanatory power of only this variables in the determination of factors that drive female entrepreneurship, and to almost 2% for the environmental model, also indicating that the use of only environmental variable has a low explanatory power to explain the phenomenon of female entrepreneurship in EU countries. The value of the overall  $R^2$  is 32% for the attitudes and perception model, which means the changes in only this factors to explain female entrepreneurship, explain its variation in almost 32%. However, because for the attitudes and perceptions model is selected the FE's estimation results, that admit the existence of constant observable female entrepreneurship drivers within the EU countries and over time, the within  $R^2$  is the best indicator for the model explanatory power. The observable differences between attitudes and perceptions towards female entrepreneurship, in each one of the EU countries analysed, that persist over time, explain approximately 41% of the variations in the rate of female entrepreneurship in those countries. The explanatory power of these variables, are enhanced by the environmental variables and, even if less, by the aspiration variables. The selection of a RE model, suggesting that a non-observable behaviour between countries that remains over time, influences the results, maximises the between  $R^2$  showing that all the variables is study may explain in almost 68% the variations on the female entrepreneurial activity in EU countries in the last 9 years.

So, regarding to the aspirations model only the variable related to the creation of a new product is important (statistically) for explaining of the rate of female entrepreneurship in EU countries over the last years. If the firm creates a new product or service, the probability of being a women-owner of the firm is positive. Regarding to the attitudes and perceptions model, the variables that measure the perceived capabilities, the fear of failure and the entrepreneurial intention have significant statistical influence on the level of female entrepreneurship. The variables measuring the perceived capabilities and the entrepreneurial intention remain statistical significant in the overall model, what shows their importance in the explanation of female rate of entrepreneurial activity. The results of the third model, alone, do not present statistical significance in the explanation of this female activity but together with aspirations and perceptions are important drivers as shown by the results of the overall model.

Variables that measure the perceived capabilities, the perceived opportunities, the entrepreneurial intention, the rate of knowledge regarding to the entrepreneurial activity of others, the entrepreneurship activity as a desirable career choice, the level of governmental support and policies, the level of taxes and bureaucracy, the level of R&D, the level dynamism of the internal market and the level of cultural and social norms, are found to be statistically significant drivers of female entrepreneurship in EU countries.

For example, with a 99% confidence level, and remaining all the other factors constant, it is possible to state that if the rate of perceived capabilities increase in 1%, in an EU country, the rate of female

entrepreneurial activity increases 0.075%. While, if the rate of perceived opportunities increases also 1%, remaining all the other variables constant, the rate of female entrepreneurial activity increases 0.027%. Both these variables present a positive impact on the rate of female entrepreneurship as mentioned in the literature. Entrepreneurial intention also has positive impact on the rate of female entrepreneurship. If the rate of entrepreneurial intention increases in 1%, remaining all the other variables constant, the rate of female entrepreneurship increases 0.186%. With a 90% confidence level, if the rate of knowledge of other start-up entrepreneur increases 1% in the EU countries, the rate of female entrepreneurs' decreases 0.044%. The literature indicates a positive influence of role models on the female entrepreneurial activity but that seems to be not so important in the European Union developed countries. At the same time, 1% of increment of the desire to choose a career as an entrepreneur, decreases the rate of female entrepreneurship in 0.024%. These results support the literature: females start their own venture forced by mainly by necessity and not by opportunity or desire.

The governmental support and policies also negatively influence the rate of female entrepreneurial activity decreasing its' rate by more than 1%. The literature mentions the existence of several institutions that support female entrepreneurship in EU countries, however, these results show that such policies and the governmental support may be not effectively implemented in EU countries. The biggest negative impact on the rate of female entrepreneurs is found for R&D transfer. As females are more involved in commercial sectors such as sales, retail and services, new opportunities in R&D area (more related to industrial and manufacturing sectors of activity) decrease the number of female entrepreneurs in 1.256%. Note that this results was expected since had been already identified in the literature. Changes in the dynamics of the internal market also negatively influence on the rate of female entrepreneurship. Most of female business owners balance family and business and because of that they are not so much willing to take risks or acquired new knowledge and/or experience for engaging in a business activity, as mentioned in the literature.

As noted by the literature review the impact of social and cultural norms might not be positive in case of female entrepreneurs. The result here obtained for the variable that is called social-cultural norms confirms the literature. GEM experts give a higher value to an environment where social and cultural norms encourage entrepreneurship, so in the 25 analysed EU countries, if social-cultural norms that encourage women increase by 1 point the rate of female entrepreneurial activity increases by 0.905%. Indeed, social and cultural aspects are important explanatory factors for female entrepreneurship, even in countries more developed and more aware of the importance of women in society.

Also for women, policies that make taxes less important and facilitate bureaucracy and consequently encourage new and SMEs have a positive impact on female entrepreneurship. Less taxes and bureaucracy (1 point more in the value of the variable) make the number of female entrepreneurs bigger, increasing it 1.324%.

According to the results of the estimated models for the subgroup of female population, in EU countries, the perceived capabilities and opportunities, the entrepreneurial intention, lower tax burden and bureaucracy and supporting social-cultural norms seem to be the most important drivers of female entrepreneurship in the last 9 years.

### 3.2.4. Male early-stage entrepreneurial activity

As made for the subgroup of women, the same models were estimated for the male subpopulation. The estimated results for male early-stage entrepreneurial activity are presented in Table 8.

Table 8. Panel data estimation results: male early-stage entrepreneurial activity.

Independent Variables	Aspiration model		Attitudes and perception model		Environment model		Overall model	
	Fixed effect	Random effect	Fixed effect	Random effect	Fixed effect	Random effect	Fixed effect	Random effect
Constant	5.162 ***	5.044 ***	-0.836	-0.755	10.470 ***	10.746 ***	1.598	2.559
TEAyyjg5	0.056 *	0.088 ***	-	-	-	-	0.001	0.025
TEAyynwp	0.069 ***	0.056 **	-	-	-	-	0.011	0.008
TEAyyint	-0.020	-0.014	-	-	-	-	-0.030	-0.001
Suskilyy	-	-	0.047	0.050	-	-	0.036	0.100 ***
Opportyy	-	-	0.031	0.025	-	-	0.031	0.025
Frfailop	-	-	0.061 *	0.055 *	-	-	0.060	0.012
Futsupno	-	-	0.361 ***	0.374 ***	-	-	0.347 ***	0.329 ***
Knoentyy	-	-	0.019	0.021	-	-	0.016	-0.037
Nbgoodyy	-	-	-0.005	0.000	-	-	0.002	-0.032
Nbstatyy	-	-	-0.004	-0.013	-	-	-0.016	-0.024
Nbmediyy	-	-	0.013	0.021	-	-	0.013	0.035 *
Finance	-	-	-	-	1.900 **	1.673 **	0.785	-0.016
Support	-	-	-	-	-0.061	-0.717	-0.614	-1.638 **
Taxes	-	-	-	-	0.945	1.525 *	-0.121	1.772 **
Programs	-	-	-	-	0.336	-1.025	1.472	-1.359 *
B_education	-	-	-	-	-0.900	-0.611	-0.363	-0.949
P_education	-	-	-	-	0.739	1.319	-0.446	0.779
R_D	-	-	-	-	-0.256	-2.013 *	0.300	-2.450 **
C_infrastructure	-	-	-	-	-1.554	-1.510	0.219	0.187
M_dynamics	-	-	-	-	0.248	0.186	0.409	-0.857 **
M_openness	-	-	-	-	-2.800 **	-1.614	-1.716	0.706
P_infrastructure	-	-	-	-	0.509	0.905	-0.211	1.020 *
Norms	-	-	-	-	0.439	1.272	-0.167	2.053 ***
<b>Statistics</b>								
Nº of observation	177		162		171		157	
Hausman test	8.42 **		2.32		36.24 ***		27.39	
R2 Within	0.083	0.0758	0.4894	0.4885	0.1419	0.107	0.5178	0.3667
R2 Between	0.137	0.2739	0.527	0.5399	0.0001	0.323	0.3616	0.7715
R2 Overall	0.088	0.1594	0.4703	0.4752	0.0075	0.209	0.3257	0.659
F test	4.48 ***	n.a.	15.58 ***	n.a.	1.85 **	n.a.	5.14 ***	n.a.
Wald test	n.a.	18.89 ***	n.a.	148.11 ***	n.a.	26.06 **	n.a.	257.08 ***

Notes: \* indicates that the coefficient is statistical significant at the 10% significance level, \*\* indicates that the coefficient is statistical significant at the 5% significance level, \*\*\* indicates that the coefficient is statistically significant at a significance level of 1%. n.a. means not applicable.

For the aspiration and environmental models, applied to the male population, the best estimation is performed using the RE's models, regarding to the Hausman test. The results of FE's models are better for the attitudes and perceptions models and the overall model. The highest overall  $R^2$  appears in the model for attitudes and perceptions – the changes in the variables of this model cause a change of approximately 47% of the variation in the male entrepreneurial activity. This value drops to 33% for the overall model. The value of the overall  $R^2$  decreases for variables measuring the aspirations and the business environment.

According to the aspiration model, variables related to grow expectations and a new product creation are statistically important for explaining male entrepreneurial activity in EU countries since 2007 until 2015. From the attitudes and perceptions model, is possible to infer that variables measuring the fear of failure and the entrepreneurial intention have significant statistical influence on the rate of male business owners. The results of the third model indicate that variables measuring financial support of entrepreneurs, the level of taxes and bureaucracy and the level of R&D are statistically significant drivers of male entrepreneurial activity in EU countries but in other models the statistical significance disappears. Different results for different models may indicate the environment variables are important explanatory factors alone, but when other factors are add they lose their explanatory power. As show the results of the overall model, the variable measuring the entrepreneurial intention is important (statistically) for explaining the rate of male entrepreneurship in the 25 developed countries analysed.

Finally, the variables that measures the fear of failure and the entrepreneurial intention present a positive impact on the rate of male entrepreneurship. If fear of failure increase 1%, the rate of male entrepreneurs increases 0.061%. Regarding to the literature male business owners take more risk when they follow business opportunities, while for women this factor appears as an obstacle. Remaining all the other factors constant, with a 99% confidence level, 1% increase of the male entrepreneurial intention, in an EU country, will increase the rate of male entrepreneurial activity in 0.361%. It seems, by these results, that man (as their women counterparts) really put in practice their entrepreneurial intentions and create new businesses.

### **3.3. Comparative analysis of results**

Comparison of the results for the all population and the subgroups of population characterised by gender, is presented in a table (Table 9) that includes the statistical significant variables that are found in the previous estimated models.

Table 9. Comparison of statistical estimated results for the total, female and male entrepreneurial activity.

Independent Variables	Female early-stage entrepreneurial activity	Male early-stage entrepreneurial activity	Total early-stage entrepreneurial activity
Perceived Capabilities	0.075 ***	-	0.089 ***
Perceived Opportunities	0.027 **	-	0.026 *
Fear of Failure Rate	-	0.061 *	-
Entrepreneurial Intention	0.186 ***	0.361 ***	0.256 ***
Know Startup Entrepreneur Rate	-0.044 **	-	-0.040 *
Entrepreneurship as Desirable Career Choice	-0.024 *	-	-0.028 *
Governmental support and policies	-1.036 **	-	-1.332 ***
Taxes and bureaucracy	1.324 ***	-	1.550 ***
R&D transfer	-1.256 *	-	-1.836 **
Internal market dynamics	-0.589 **	-	-0.703 **
Physical and services infrastructure	-	-	0.722 *
Cultural and social norms	0.905 **	-	1.437 ***

Notes: \* indicates that the coefficient is statistical significant at the 10% significance level, \*\* indicates that the coefficient is statistical significant at the 5% significance level, \*\*\* indicates that the coefficient is statistically significant at a significance level of 1%.

Comparing analysis of the results for the total population and the female and male subpopulations, only the variable describing the entrepreneurial intention has a statistical significant influence for all. The entrepreneurial intention is a driver for males towards entrepreneurial activities and this variable has the highest influence on the rate of male entrepreneurs. If the number of individuals intending to start a business within three years increases 1% the rate of entrepreneurial activities increases 0.256%, for the all population, 0.361% for men and just 0.186% for women.

The belief women have the required skills and knowledge to start a business positively influences them but no statistical significance was found for men. The result is statistical significant for the all populations but that is driven by the subpopulation of women. These results go in the same way indicated in the literature review – skills, competences and knowledge are important factors to explain entrepreneurship gender issues.

Females conviction that the area, where they are going to establish a firm, has good opportunities for them, positively influence on the rate of female entrepreneurs, while it do not have any impact on male entrepreneurship. For all population this result is also significant, but as perceived capabilities it is stimulus only women. Fear of failure was found statistical significant only for men, whilst it has no impact on female entrepreneurship and on the rate of entrepreneurship in general. In the analysed countries

the social-cultural norms have positive influence on all population and on female subpopulation, moreover such norms are not found statistical significant for male entrepreneurs.

Encouragement of the public policies, in terms of lowering taxes and reducing bureaucracy, towards entrepreneurship is found statistically significant for both total and female entrepreneurship, while for male entrepreneurs it is not statistical significant in the best model. Although, if only environmental variables are analysed this variable become statistical significant.

The availability of physical resources (such as communication, utilities, transportation, land or space) do not have statistical significant influence on male and female entrepreneurship in separate, but this variable has positive influence on the rate of entrepreneurs in general.

The knowledge of other start-up entrepreneurs have a negative impact on female entrepreneurial activity and total entrepreneurial activity, moreover the impact is higher for female entrepreneurial activity because this variable has no impact on male entrepreneurs. Comparing to men, women entrepreneurs have a smallest social network and less role models (as mentioned the literature) and this facts usually keeps women away from running their own businesses. Female entrepreneurs follow fewer female role models and it is considered as an obstacle for obtaining resources and confidence in order to improve their entrepreneurial skills.

According to the literature, women are not choosing a career as an entrepreneur because it is their desire. The necessity drives them to start and own a new business. Therefore the variable has a negative impact on female entrepreneurship as on total entrepreneurial activity. Women may desire to be entrepreneurs because there is media attention to it and it is given a high status to successful entrepreneurs, but when the rate of effective entrepreneurial activity is registered, the desire is not transformed to something real and in an actual new business.

In the 25 EU countries analysed, the implementation of supportive public policies towards entrepreneurship has negative impact on female entrepreneurship. This negative impact is higher in case of entrepreneurship in general, while this factor was not statistical significant for male entrepreneurs. Changes in the dynamics of the internal market also negatively influence on the rate of female entrepreneurship and on the rate of entrepreneurship in general. In case of men this factor is not found as a barrier for starting a new businesses. This result supports the literature - most of female business owners balance family and business. Also, new opportunities in R&D have higher negative influence on the rate of entrepreneurship, in general, than in case of female entrepreneurs. While this factor was considered as a barrier for women, it has no significant effect on male entrepreneurship.

## **Conclusions, limitations and future research lines**

This work intended to analyse the phenomenon of entrepreneurship by gender in European Union over the last years. For reaching the objective, a literature review was presented, in order to offer a framework for the issue in question and an empirical analysis was conducted based on a set of data collected for EU countries (from 2007 to 2015) by the Global Entrepreneurship Monitor (GEM). From the literature review was selected a set of variables considered important to describe the phenomenon in EU countries over time.

According to the literature, women are less entrepreneurial than men and exist many inequalities in the gender access to an entrepreneurial activity. Push and pull factors may explain the female entrepreneurial rates and several obstacles may influence on it negatively. Some of these pull and push factors and the limitations were empirical analysed for a set of 25 EU countries and important findings were found.

After analysing the empirically results presented in the third chapter of this dissertation, it is possible to state that the knowledge of other start-up entrepreneurs negatively influence on the female entrepreneurs. This results was not expectable but may occur because women entrepreneurs have fewer female role models which might not attract them so much to entrepreneurship. Another variable that presents a non-expectable result refers to the governmental support and policies. In the literature has been referred that EU, in general, and many other specific institutions and organizations are implementing different programs and policies in order to enhance female entrepreneurship, however, that seems not positively influence on the rates of female entrepreneurial activity. Or these measures are not being effective and need to be changed and/or improved or other factors are even more important to define the level of female entrepreneurship in European Union countries.

The variable measuring women's desire to choose the career of entrepreneurs influence negatively on their entrepreneurial activity rate. As mentioned in the literature, in the process of establishment a new

firms, women are forced by necessity, whilst men choose the career of entrepreneurs because it is a challenging activity that offers to them an increase in the personal wealth and income (Kepler & Shane, 2007; Klapper & Parker, 2011; Maes et al., 2014; Hazudin et al., 2015).

The rate of female entrepreneurial activity decreases cause of the new opportunities of the R&D area. Explanation of this unexpected result is that women are involved in commercial sectors such as sales, retail and services (according to literature), while new opportunities of R&D area are more related to industrial and manufacturing sectors where men are more involved.

Changes in the dynamics of internal markets is defined, in this study, as an obstacle for female in the process of business creation. According to many other studies, women become self-employed for balancing work and family demands (Kepler & Shane, 2007; Kobeissi, 2010; Minniti & Naudé, 2010; Ferik et al., 2013; Hazudin et al., 2015). So, if they observe many changes can occur in the market that may force them to keep away from entrepreneurship in order to avoid problems caused by possible failures. Indeed, many scholars highlight the negative influence of the fear of failure. In the EU economies, a set of developed high income economies, this factor do not shows any direct influence which may be explained by the level of confidence that women have in European Union institutions and the overall economies. If female fail on their entrepreneurial activity they are able to find other solutions to increase their income.

Even, if in European Union countries various barriers may force women not to create their own businesses, many other factors drive and encourage them in the process of business creation. Skills and knowledge, offered to them in the education system and through training, help women to run successful business and increases the rate of female entrepreneurial activity. According to Huarng et al. (2012) women with widely managerial skills overcome obstacles and problems easily at the beginning of their entrepreneurial activity and that seems to be happening in EU. So, the perceived opportunities together with an effective entrepreneurial intention, that was found a significant statistical indicator, are drivers of female entrepreneurship.

Policies that reduce taxes and bureaucracy are found as another stimulus for women to start their ventures, while this factor do not have significant effect in the case of men entrepreneurs. Social-cultural norms that encourage the entrepreneurial activity are defined also as significant drivers of female entrepreneurship in European Union countries.

As any other research, the work suffers from some limitations. First, was not possible to collect information for Bulgaria, Cyprus and Malta and because of that only twenty five (from the 28) European countries were analysed. Secondly, for several other European countries was not possible to present the data for the entire 9 years. The panel data methodology applied solves the problem of unbalanced panel data, like the one in this work, but better and more robust results would be possible to obtain if more data were available. Finally, in the descriptive analysis is observed the differences exist between countries and that differences may remain over time, so an individual analysis to each one of the

European countries would be important – several limitations that were found for European countries, in general, may have a different impact on different countries. It could be the case of the governmental support and public policies. However, 9 observations (in the maximum) by country do not allow to obtain statistical significant results at a country's level and, therefore, only a panel data method could be apply while longer statistical series are not available by country.

If these limitations may undermine the results and restrict the discussion it is believed that in future works these can be overcome. For example the availability of longer time series may allow to obtain more robust results not only in terms of panel data models but also to estimate results for individual economies to compare which factors drive entrepreneurship, in general, and by gender, in particular, country by country.

Regardless of the above mentioned limitations, this work is valuable, because it is the first one related to the topic of gender issue on entrepreneurship which observes many variables at the same time for 25 countries, in order to clarify the state of entrepreneurial activities in European Union, in special the case of female entrepreneurs. Besides of variables related to aspirations, attitudes and perceptions also adds variables related to the experts opinion regarding to business environment. So, the value added by the thesis, in terms of the conclusions withdraw, is fundamental not only for policy makers that have the power to change the environment but also for managers, in particular women, that observing existent of the business environment may analyse it and adapt their aspirations, perceptions and attitudes to it. This work is also a good start-up for more advanced studies on the theme.

## References

Acs, Z. J., Arenius, P., Hay, M., & Minniti, M. (2004). *Global entrepreneurship monitor 2004 executive report*. Retrieved from [http://www.emekin.net/documentos/eu/GEM\\_2004\\_Exec\\_Report.pdf](http://www.emekin.net/documentos/eu/GEM_2004_Exec_Report.pdf)

Adema, W., Ali, N., Frey, V., Kim, H., Lunati, M., Piacentini, M., & Queisser, M. (2014). Enhancing women's economic empowerment through entrepreneurship and business leadership in OECD countries. Retrieved April 9, 2016, from <http://docplayer.net/5676496-Enhancing-women-s-economic-empowerment-through-entrepreneurship-and-business-leadership-in-oecd-countries.html>

Agarwal, R., Audretsch, D., & Sarkar, M. B. (2007). The process of creative construction: knowledge spillovers, entrepreneurship, and economic growth. *Strategic Entrepreneurship Journal*, 1(3–4), 263–286. <http://doi.org/10.1002/sej.36>

Álvarez, C., Urbano, D., & Amorós, J. E. (2013). GEM research: achievements and challenges. *Small Business Economics*, 42(3), 445–465. <http://doi.org/10.1007/s11187-013-9517-5>

Amorós, J. E., & Bosma, N. (2014). *Global Entrepreneurship Monitor 2013 global report*. Retrieved from <http://www.babson.edu/academics/centers/blank-center/global-research/gem/documents/gem%202013%20global%20report.pdf>

Apergis, N., & Pekka-Economou, V. (2010). Incentives and female entrepreneurial activity: evidence from panel firm level data. *International Advances in Economic Research*, 16(4), 371–387. <http://doi.org/10.1007/s11294-010-9277-9>

Arenius, P., & Minniti, M. (2003). *Women in entrepreneurship. The entrepreneurial advantage of nations: first annual global entrepreneurship symposium*. United Nations Headquarters. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.471.7819&rep=rep1&type=pdf>

Arenius, P., & Minniti, M. (2005). Perceptual variables and nascent entrepreneurship. *Small Business Economics*, 24(3), 233–247. <http://doi.org/10.1007/s11187-005-1984-x>

Baltagi, B. H. (2013). *Econometric analysis of panel data* (5th ed.). West Sussex: Wiley.

Bardasi, E., Sabarwal, S., & Terrell, K. (2011). How do female entrepreneurs perform? Evidence from three developing regions. *Small Business Economics*, 37(4), 417–441. <http://doi.org/10.1007/s11187-011-9374-z>

BarNir, A., Watson, W. E., & Hutchins, H. M. (2011). Mediation and moderated mediation in the relationship among role models, self-efficacy, entrepreneurial career intention, and gender. *Journal of Applied Social Psychology*, 41(2), 270–297. <http://doi.org/10.1111/j.1559-1816.2010.00713.x>

- Baron, R. A. (2007). Behavioral and cognitive factors in entrepreneurship: Entrepreneurs as the active element in new venture creation. *Strategic Entrepreneurship Journal*, 1(1–2), 167–182. <http://doi.org/10.1002/sej.12>
- Boden, R. (1996). Gender and self-employment selection: An empirical assessment. *The Journal of Socio-Economics*, 25(6), 671–682. [http://doi.org/10.1016/S1053-5357\(96\)90046-3](http://doi.org/10.1016/S1053-5357(96)90046-3)
- Bosma, N., Praag, M. van, Thurik, R., & Wit, G. de. (2004). The value of human and social capital investments for the business performance of startups. *Small Business Economics*, 23(3), 227–236. <http://doi.org/10.1023/B:SBEJ.0000032032.21192.72>
- Btygrave, W. D. (1994). *The portable MBA in entrepreneurship*. New York: John Wiley & Sons.
- Carland, J. W., Hoy, F., Boulton, W. R., & Carland, J. A. C. (1984). Differentiating entrepreneurs from small business owners: A conceptualization. *Academy of Management Review*, 9(2), 354–359. <http://doi.org/10.5465/AMR.1984.4277721>
- Carree, M., Stel, A. van, Thurik, R., & Wennekers, S. (2002). Economic development and business ownership: an analysis using data of 23 OECD countries in the period 1976–1996. *Small Business Economics*, 19(3), 271–290. <http://doi.org/10.1023/A:1019604426387>
- Carter, N., Brush, C., Greene, P., Gatewood, E., & Hart, M. (2003). Women entrepreneurs who break through to equity financing: the influence of human, social and financial capital. *Venture Capital: An International Journal of Entrepreneurial Finance*, 5(1), 1–28. <http://doi.org/10.1080/1369106032000082586>
- Cowling, M. (2000). Are entrepreneurs different across countries? *Applied Economics Letters*, 7(12), 785–789. <http://doi.org/10.1080/135048500444804>
- De Vita, L., Mari, M., & Poggesi, S. (2014). Women entrepreneurs in and from developing countries: Evidences from the literature. *European Management Journal*, 32(3), 451–460. <http://doi.org/10.1016/j.emj.2013.07.009>
- Díaz-García, M. C., & Jiménez-Moreno, J. (2009). Entrepreneurial intention: the role of gender. *International Entrepreneurship and Management Journal*, 6(3), 261–283. <http://doi.org/10.1007/s11365-008-0103-2>
- Drucker, P. (2014). *Innovation and entrepreneurship*. Routledge.
- Edwards, L. N., & Field-Hendrey, E. (2002). Home-based work and women's labor force decisions. *Journal of Labor Economics*, 20(1), 170–200. <http://doi.org/10.1086/323936>
- European Commission (2004). *Action plan: the European agenda for entrepreneurship*. Brussels: Commission of the European Communities. Retrieved from [http://cordis.europa.eu/pub/incubators/docs/action\\_plan\\_on\\_entrepreneurship.pdf](http://cordis.europa.eu/pub/incubators/docs/action_plan_on_entrepreneurship.pdf)

European Commission (2005). *Europe in figures: Eurostat yearbook 2005*. Retrieved from <http://ec.europa.eu/eurostat/documents/3217494/5662531/KS-CD-05-001-EN.PDF/751b319f-9bec-4eab-8b55-4dec31789b23>

European Commission (2006). *Entrepreneurship education in Europe: Fostering entrepreneurial mindsets through education and learning*. Oslo: Commission of the European Communities. Retrieved from [http://www.gvpartners.com/web/pdf/Workshop\\_3\\_Higher\\_Education\\_Summary\\_FINAL.pdf](http://www.gvpartners.com/web/pdf/Workshop_3_Higher_Education_Summary_FINAL.pdf)

European Commission (2014). *Encouraging female entrepreneurship: United Kingdom. Exchange of good practices on gender equality: summary report*. Retrieved from [http://ec.europa.eu/justice/gender-equality/files/exchange\\_of\\_good\\_practice\\_uk/summary\\_report\\_uk\\_2014\\_en.pdf](http://ec.europa.eu/justice/gender-equality/files/exchange_of_good_practice_uk/summary_report_uk_2014_en.pdf)

European Commission (2016). *Growth, internal market, industry, entrepreneurship and SMEs, promoting entrepreneurship, who we work for, female entrepreneurs*. Retrieved April 20, 2016, from [http://ec.europa.eu/growth/smes/promoting-entrepreneurship/we-work-for/women/index\\_en.htm](http://ec.europa.eu/growth/smes/promoting-entrepreneurship/we-work-for/women/index_en.htm)

European Training Foundation [ETF] (2013). *Training for women entrepreneurs: an imperative for growth and jobs*. *INFORM*, 14, 1-4. Retrieved from [http://www.etf.europa.eu/webatt.nsf/0/541576CCB06E2F1EC1257B28004846C2/\\$file/INFORM\\_14\\_Women%20entrepreneurs.pdf](http://www.etf.europa.eu/webatt.nsf/0/541576CCB06E2F1EC1257B28004846C2/$file/INFORM_14_Women%20entrepreneurs.pdf)

Fairlie, R. W., & Robb, A. M. (2009). Gender differences in business performance: evidence from the Characteristics of Business Owners survey. *Small Business Economics*, 33(4), 375–395. <http://doi.org/10.1007/s11187-009-9207-5>

Ferk, M., Quien, M., & Posavec, Z. (2013). Female vs. male entrepreneurship - is there a difference? *Studies of Organisational Management & Sustainability*, 1(1), 67–77. Retrieved from <http://soms.ismai.pt/index.php/SOMS/article/view/4/6>

Global Entrepreneurship Monitor [GEM] (2016). *What is GEM?* Retrieved February 17, 2016, from <http://www.gemconsortium.org/about/gem/5>

Gries, T., & Naudé, W. (2009). Entrepreneurship and regional economic growth: towards a general theory of start-ups. *Innovation-The European Journal of Social Science Research*, 22(3), 309–328. <http://doi.org/10.1080/13511610903354877>

Gupta, V. K., Turban, D. B., Wasti, S. A., & Sikdar, A. (2009). The role of gender stereotypes in perceptions of entrepreneurs and intentions to become an entrepreneur. *Entrepreneurship Theory and Practice*, 33(2), 397–417. <http://doi.org/10.1111/j.1540-6520.2009.00296.x>

Hazudin, S. F., Kader, M. A. R. A., Tarmuji, N. H., Ishak, M., & Ali, R. (2015). Discovering small business start-up motives, success factors and barriers: a gender analysis. *Procedia Economics and Finance*, 31, 436–443. [http://doi.org/10.1016/S2212-5671\(15\)01218-6](http://doi.org/10.1016/S2212-5671(15)01218-6)

Hsiao, C. (2003). *Analysis of panel data* (2nd ed.). Cambridge: Cambridge University Press.

- Huang, K.-H., Mas-Tur, A., & Yu, T. H.-K. (2012). Factors affecting the success of women entrepreneurs. *International Entrepreneurship and Management Journal*, 8(4), 487–497. <http://doi.org/10.1007/s11365-012-0233-4>
- Hundley, G. (2001). Why women earn less than men in self-employment. *Journal of Labor Research*, 22(4), 817–829. <http://doi.org/10.1007/s12122-001-1054-3>
- Kelley, D., Bosma, N., & Amorós, J. E. (2011). *Global Entrepreneurship Monitor 2010 global report*. Retrieved from <http://entreprenorskapsforum.se/wp-content/uploads/2011/02/GEM-2010-Global-Report.pdf>
- Kepler, E., & Shane, S. (2007). *Are male and female entrepreneurs really that different?* The Office of Advocacy, US Small Business Administration. Retrieved from <http://econpapers.repec.org/paper/sbawpaper/07ekss.htm>
- Klapper, L. F., & Parker, S. C. (2011). Gender and the business environment for new firm creation. *The World Bank Research Observer*, 26(2), 237–257. <http://doi.org/10.1093/wbro/lkp032>
- Kobeissi, N. (2010). Gender factors and female entrepreneurship: International evidence and policy implications. *Journal of International Entrepreneurship*, 8(1), 1–35. <http://doi.org/10.1007/s10843-010-0045-y>
- Koellinger, P., Minniti, M., & Schade, C. (2007). “I think i can, i think i can”: Overconfidence and entrepreneurial behavior. *Journal of Economic Psychology*, 28(4), 502–527. <http://doi.org/http://dx.doi.org/10.1108/02683949910287912>
- Koellinger, P., Minniti, M., & Schade, C. (2013). Gender differences in entrepreneurial propensity. *Oxford Bulletin of Economics and Statistics*, 75(2), 213–234. <http://doi.org/10.1111/j.1468-0084.2011.00689.x>
- Kreide, R. (2003). Self-employment of women and welfare-state policies. *International Review of Sociology*, 13(1), 205–218. <http://doi.org/10.1080/0390670032000087069>
- Langowitz, N. S., & Minniti, M. (2007). The entrepreneurial propensity of women. *Entrepreneurship Theory and Practice*, 31(3), 341–364. <http://doi.org/10.1111/j.1540-6520.2007.00177.x>
- Lohmann, H., & Luber, S. (2004). Trends in self-employment in Germany: different types, different developments? In Arum, R., & Muller, W. (Eds.), *The reemergence of self-employment. A comparative study of self-employment dynamics and social inequality* (pp. 36–74). Princeton University Press.
- Longhi, S., & Nandi, A. (2015). *A practical guide to using panel data*. London: SAGE Publications.
- Maes, J., Leroy, H., & Sels, L. (2014). Gender differences in entrepreneurial intentions: a TPB multi-group analysis at factor and indicator level. *European Management Journal*, 32(5), 784–794. <http://doi.org/10.1016/j.emj.2014.01.001>

- Minniti, M., Langowitz, N. S., & Arenius, P. (2005). *Global Entrepreneurship Monitor: 2004 report on women and entrepreneurship*. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship. Retrieved from <http://papers.ssrn.com/abstract=1509263>
- Minniti, M., & Nardone, C. (2007). Being in someone else's shoes: The role of gender in nascent entrepreneurship. *Small Business Economics*, 28(2–3), 223–238. <http://doi.org/10.1007/s11187-006-9017-y>
- Minniti, M., & Naudé, W. (2010). What do we know about the patterns and determinants of female entrepreneurship across countries? *European Journal of Development Research*, 22(3), 277–293. <http://doi.org/10.1057/ejdr.2010.17>
- Naude, W. (2013). Entrepreneurship and economic development: theory, evidence and policy (IZA Discussion Paper No. 7507). Retrieved from <http://papers.ssrn.com/abstract=2314802>
- Naudé, W., Gries, T., Wood, E., & Meintjies, A. (2008). Regional determinants of entrepreneurial start-ups in a developing country. *Entrepreneurship & Regional Development*, 20(2), 111–124. <http://doi.org/10.1080/08985620701631498>
- Noguera, M., Alvarez, C., & Urbano, D. (2013). Socio-cultural factors and female entrepreneurship. *International Entrepreneurship and Management Journal*, 9(2), 183–197. <http://doi.org/10.1007/s11365-013-0251-x>
- OECD (1998). *Fostering entrepreneurship*. Paris: Organization for Economic Co-operation and Development. <http://doi.org/10.1787/9789264163713-en>
- OECD (2000). *OECD Employment Outlook 2000*. Paris: Organization for Economic Co-operation and Development. [http://doi.org/10.1787/empl\\_outlook-2000-en](http://doi.org/10.1787/empl_outlook-2000-en)
- OECD (2011). *Doing Better for Families*. Paris: Organization for Economic Co-operation and Development. <http://doi.org/10.1787/9789264098732-en>
- OECD (2012). *Closing the Gender Gap*. Paris: Organization for Economic Co-operation and Development. <http://doi.org/10.1787/9789264179370-en>
- Orhan, M., & Scott, D. (2001). Why women enter into entrepreneurship: an explanatory model. *Women in Management Review*, 16(5), 232–247. <http://doi.org/10.1108/09649420110395719>
- Ozgen, E., & Baron, R. A. (2007). Social sources of information in opportunity recognition: effects of mentors, industry networks, and professional forums. *Journal of Business Venturing*, 22(2), 174–192. <http://doi.org/10.1016/j.jbusvent.2005.12.001>
- Panteia (2014a). *Statistical data on women entrepreneurs in Europe*. Retrieved from <http://ec.europa.eu/DocsRoom/documents/7481/attachments/1/translations/en/renditions/native>

Panteia (2014b). *Statistical data on women entrepreneurs in Europe: Estonia*. Retrieved from [http://www.praxis.ee/wp-content/uploads/2015/04/Statistical-Data-on-Women-Entrepreneurs-in-Europe\\_Estonia.pdf](http://www.praxis.ee/wp-content/uploads/2015/04/Statistical-Data-on-Women-Entrepreneurs-in-Europe_Estonia.pdf)

Panteia (2014c). *Statistical data on women entrepreneurs in Europe: Greece*. Retrieved from <http://www.isotita.gr/var/uploads/ANNOUNCEMENTS/2014/Greece%20Women%20entrepreneurs%20in%20Europe.pdf>

Panteia (2014d). *Statistical data on women entrepreneurs in Europe: Spain*. Retrieved from <http://viaemprende.es/sites/default/files/estadisticas/Spain%20Women%20entrepreneurs%20in%20Europe.pdf>

Reynolds, P., Bosma, N., Autio, E., Hunt, S., Bono, N. D., Servais, I., ... Chin, N. (2005). Global Entrepreneurship Monitor: data collection design and implementation 1998–2003. *Small Business Economics*, 24(3), 205–231. <http://doi.org/10.1007/s11187-005-1980-1>

Robb, A., & Wolken, J. D. (2002). Firm, owner, and financing characteristics: differences between female- and male-owned small businesses (FEDS Working Paper No. 2002–18). Retrieved from <http://papers.ssrn.com/abstract=306800>

Sarri, K., & Trihopoulou, A. (2005). Female entrepreneurs' personal characteristics and motivation: a review of the Greek situation. *Women in Management Review*, 20(1), 24–36. <http://doi.org/10.1108/09649420510579559>

Singer, S., Amorós, J. E., & Moska, D. (2015). *Global Entrepreneurship Monitor 2014 global report*. Retrieved from <http://www.babson.edu/Academics/centers/blank-center/global-research/gem/Documents/GEM%202014%20Global%20Report.pdf>

Sternberg, R., & Wennekers, S. (2005). Determinants and effects of new business creation using global entrepreneurship monitor data. *Small Business Economics*, 24(3), 193–203. <http://doi.org/10.1007/s11187-005-1974-z>

Stevenson, H. H., & Gumpert, D. E. (1985). The heart of entrepreneurship. *Harvard Business Review*, 63(2), 85–94. <http://doi.org/10.1225/85216>

Szirmai, A., Naudé, W., & Goedhuys, M. (2011). *Entrepreneurship, innovation, and economic development*. Oxford University Press.

Thurik, R., & Verheul, I. (2001). Start-up capital: Does gender matter? *Small Business Economics*, 16(4), 329–346. <http://doi.org/10.1023/A:1011178629240>

Thurik, R., & Wennekers, S. (2004). Entrepreneurship, small business and economic growth. *Journal of Small Business and Enterprise Development*, 11(1), 140–149. <http://doi.org/10.1108/14626000410519173>

- Tominc, P., & Rebernik, M. (2007). Gender differences in early-stage entrepreneurship in three European post- socialist countries. *Drustvena Istrazivanja: Journal for General Social Issues*, 16(3 (89)), 589–611. Retrieved from [http://hrcak.srce.hr/index.php?show=clanak&id\\_clanak\\_jezik=29809&lang=en](http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=29809&lang=en)
- Verbeek, M. (2008). *A guide to modern econometrics*. John Wiley & Sons.
- Verheul, I., Stel, A. V., & Thurik, R. (2006). Explaining female and male entrepreneurship at the country level. *Entrepreneurship & Regional Development*, 18(2), 151–183. <http://doi.org/10.1080/08985620500532053>
- Vossenbergh, S. (2013). Women entrepreneurship promotion in developing countries: What explains the gender gap in entrepreneurship and how to close it (Maastricht School of Management Working Paper No. 2013/08). Retrieved from <ftp://ftp.repec.org/opt/ReDIF/RePEc/msm/wpaper/MSM-WP2013-08.pdf>
- Wagner, J. (2006). What a difference a Y makes-female and male nascent entrepreneurs in Germany. *Small Business Economics*, 28(1), 1–21. <http://doi.org/10.1007/s11187-005-0259-x>
- Wennekers, S., & Thurik, R. (1999). Linking entrepreneurship and economic growth. *Small Business Economics*, 13(1), 27–56. <http://doi.org/10.1023/A:1008063200484>
- Wennekers, S., Wennekers, A. van, Thurik, R., & Reynolds, P. (2005). Nascent entrepreneurship and the level of economic development. *Small Business Economics*, 24(3), 293–309. <http://doi.org/10.1007/s11187-005-1994-8>
- Williams, D. R. (2004). Effects of childcare activities on the duration of self-employment in Europe. *Entrepreneurship Theory and Practice*, 28(5), 467–485. <http://doi.org/10.1111/j.1540-6520.2004.00058.x>
- Wong, P. K., Ho, Y. P., & Autio, E. (2005). Entrepreneurship, innovation and economic growth: evidence from GEM data. *Small Business Economics*, 24(3), 335–350. <http://doi.org/10.1007/s11187-005-2000-1>
- Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data* (2nd ed.). MIT Press.
- Xavier, S. R., Kelley, D., Kew, J., Herrington, M., & Vorderwulbecke, A. (2012). *Global Entrepreneurship Monitor 2012 global report*. Retrieved from [http://www.cise.es/wp-content/uploads/2013/03/10\\_GEM-Global\\_2012.pdf](http://www.cise.es/wp-content/uploads/2013/03/10_GEM-Global_2012.pdf)