

Entrepreneurship Education and Self-Employment: The Role of Perceived Barriers

**MSc Economics and Business,
Specialisation Entrepreneurship and Strategy Economics**

Abstract

This research explores the relation between entrepreneurship education and self-employment. The direct relation is investigated, but the potential mediating role of perceived barriers to entrepreneurship is also taken into account. For this, individual-level data of the 2009 Flash Eurobarometer No 283 is used; which contains data on 32 European countries, the United States, South Korea, Japan and China. Entrepreneurship education is measured by education that raises interest for becoming an entrepreneur, and by education that provides skills and know-how for running a business. Evidence to support the positive relation between entrepreneurship education and being self-employed is found. It is also found that some perceived barriers to entrepreneurship can serve as mediators in this relation. Implications of the findings and limitations of this research are discussed.

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Table of Contents

Preface	3
Executive summary	4
1. Introduction	6
2. Literature review	11
2.1 The human capital theory	11
2.2 Entrepreneurship education	12
2.2.1 Entrepreneurship education as a determinant of entrepreneurship	13
2.2.2 Entrepreneurship education, perceived barriers and entrepreneurship	28
3. Data and Method	39
3.1 Data	39
3.2 Descriptive statistics	49
3.3 Method	51
4. Analyses and Results	54
4.1 Multicollinearity	54
4.2 Direct relations	54
4.3 Mediation effects	58
4.4 Additional analyses: Instrumental variables approach	61
5. Conclusion and Discussion	63
6. References	70
Annex	76

Preface

This research serves as a Master's thesis, performed for the Master Economics and Business, specialisation Entrepreneurship and Strategy Economics, at the Erasmus School of Economics.

By reviewing literature and performing empirical research with data from the 2009 Flash Eurobarometer No 283, entrepreneurship education is investigated. As a result of the analyses, direct relations of entrepreneurship with self-employment but also indirect relations of entrepreneurship education with self-employment are found.

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I hope you will enjoy reading this research and that it will be informative.

Patroesjka Zuurhout

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Executive summary

This research focuses on the relation between entrepreneurship education and being self-employed. The direct relation is tested, but mediation effects are tested as well. Perceived barriers to entrepreneurship (availability of financial support, administrative complexity and risk tolerance) are considered as possible mediators in the relationship between entrepreneurship education and being self-employed. The barriers were selected based on prior research that demonstrated the relevance of these barriers in determining entrepreneurship (e.g., Fleming, 1996; Grilo and Thurik, 2005; Knight, 1996; Luthje and Franke, 2003). Therefore, having received entrepreneurship education (*a decision made by the individual*) in combination with perceived barriers to entrepreneurship (*the environment*) are considered as variables that might be related with whether individuals are self-employed.

This research is the first to take perceived barriers to entrepreneurship into account when examining the relation between entrepreneurship education and self-employment. A previous study of Hatala (2005) focused on the effect of a self-employment training program on perceived barriers to entrepreneurship, but the indirect effect of entrepreneurship education on self-employment is not investigated so far. Therefore, investigating the impact of entrepreneurship education on self-employment through the role of perceived barriers fills the research gap which is currently present.

Moreover, according to Gibcus et al. (2012), the impacts of entrepreneurship education are investigated in few studies. Of the studies that do focus on the influences of entrepreneurship education, a large part is from the United States. These studies are mostly project-based as well. This research takes a broader focus when investigating the effects of entrepreneurship education. In this study, entrepreneurship education in several countries is considered. In addition, it is investigated whether individuals ever received entrepreneurship education and whether this could have influenced the decision they once took to become self-employed. This makes this research more encompassing than many previous studies that only focused on one specific program, school or area.

Data from the 2009 Flash Eurobarometer No 283, which contains data of individuals from 36 countries, is used for the empirical analyses. Entrepreneurship education is measured by two variables. The first variable considers education that raises interest for becoming an entrepreneur and the second variable considers education that provides skills and know-how for running a business.

Using multinomial logit models, it was found that both entrepreneurship education variables are positively related with being self-employed. This is in line with previous research, which found entrepreneurship education and entrepreneurship are positively related (e.g., Kolvereid and Moen, 1997; McMullan and Murray, 1998; Menzies and Paradi, 2003). By applying (multinomial) logit models, the following relations were found to hold as well. Firstly, entrepreneurship education that provides the skills and know-how for running a business is negatively related with the perceived lack of financial support and this is in turn positively related with being self-employed. Secondly, entrepreneurship education that raises interest for becoming an entrepreneur is positively related with low risk tolerance and this in turn is negatively associated with being self-employed. This indicates that perceived financial support and risk tolerance can serve as mediators in the relation between entrepreneurship education and self-employment.

Thus, this research contributes to the existing literature on the relation between entrepreneurship education and entrepreneurship. The direct relation between entrepreneurship education and self-employment is tested, but also indirect effects of entrepreneurship education on self-employment are found. Since entrepreneurship education is positively related with entrepreneurship through a direct channel, stimulating entrepreneurship might be done through entrepreneurship education.

1. Introduction

The number of entrepreneurs is increasing globally. The Global Entrepreneurship Monitor (GEM) assessed 388 million early-stage entrepreneurs were active in 54 countries in 2011. These entrepreneurs include individuals who are setting up and managing new businesses (Kelley, Singer and Herrington, 2012). Entrepreneurship has several benefits for individuals, but also benefits of entrepreneurship at the country level can be found. At the individual level, entrepreneurs create jobs for themselves, but they can also create jobs for others. Van Praag and Versloot (2007) show that, by reviewing 57 studies on the contribution of entrepreneurs to society, entrepreneurs create comparatively much employment, which can be seen as an effect of entrepreneurship at the country level. Besides, when considering benefits at the individual level, entrepreneurs have higher utility levels than employees (Van Praag and Versloot, 2007). In addition, some effects of entrepreneurial activity at the country level are that it influences innovation and economic growth in a country. Entrepreneurs bring high-quality innovations to the market, and affect firms in their region in the long run by producing spillovers that influence the regional employment growth rates of these firms (Van Praag and Versloot, 2007). Moreover, entrepreneurship positively influences a country's economic growth in high-income countries (Hessels and Van Stel, 2011; Van Stel, Carree and Thurik, 2005). Also Van Praag and Versloot (2007) show that entrepreneurs contribute to productivity growth. On the other hand, not all effects of entrepreneurship might be considered as positive. Entrepreneurs, for example can have an adverse impact on the stability of the labour market because the job creation by entrepreneurs occurs dynamically (Van Praag and Versloot, 2007).

Individuals have to make an occupational choice when it comes to the decision to work: they can either enter into paid-employment or they can become entrepreneurs. Entrepreneurship can be seen as detecting opportunities (Kirzner, 1979). However, an accepted definition of entrepreneurship does not exist (Reynolds, Bosma, Autio, Hunt, De Bono, Servais, Lopez-Garcia and Chin, 2005; Van Praag, 1999). Studies have used several definitions for entrepreneurship. For example, entrepreneurship can be defined as the creation of new firms (Gartner, 1985). The Global Entrepreneurship Monitor (GEM) defines individuals who are active in entrepreneurship as “adults in the process of setting up a business they will (partly) own and or currently owning

and managing an operating young business” (Reynolds et al., 2005, p. 209). Entrepreneurship often concerns the creation of something new (Reynolds et al., 2005), such as the creation of a new business and/or the introduction of new goods or services by an existing business. Self-employment is used to measure entrepreneurship in previous research (e.g., Blanchflower, Oswald and Stutzer, 2001; Disney and Gathergood, 2009). In this research, entrepreneurs will be defined as self-employed individuals as well.

Previous research investigated the determinants of entrepreneurship (e.g., Blanchflower, 2000; Blanchflower and Oswald, 1998; Blanchflower et al., 2001; Earle and Sakova, 2000; Ekelund, Johansson, Jarvelin and Lichtermann, 2005; Evans and Jovanovic, 1989; Fonseca, Lopez-Garcia and Pissarides, 2001; Lazear, 2005; Torrinni, 2005; Verheul, Thurik and Grilo, 2006). Individuals’ possession of human capital might influence their decision for becoming self-employed. The relation between human capital and entrepreneurship is investigated in several studies (Kim, Aldrich and Keister, 2006; Sanders and Nee, 1996; Ucbasaran, Westhead and Wright, 2008). Human capital is defined as individuals’ skills, traits, knowledge and experience. In this research a specific form of human capital is considered: entrepreneurship education. Investing in human capital can be important in determining an individual’s future income (Becker, 1962), but it could also be important in determining career choices, such as being or becoming self-employed. Therefore, the type of investments made in human capital might also be related to the kind of jobs individuals will perform. Individuals’ educational attainment, which indicates their human capital, might be related to whether they are entrepreneurs. This research will investigate whether individuals ever received entrepreneurship education and whether this could have influenced the decision they once took to become self-employed.

Entrepreneurship education can be defined in several ways: it ranges from participation in a course on entrepreneurship to following a whole study on entrepreneurship. Additionally, entrepreneurship education can be offered at different kinds of education levels: from elementary schools up to higher education institutions. Entrepreneurship education can e.g. give individuals the skills and knowledge necessary for running a business. Previous research has, for example, focused on the impact of a specific course in a higher vocational college (Oosterbeek, van Praag and IJsselstein, 2010), but also following a specific study on entrepreneurship is considered in

previous research, such as entrepreneurship studies in higher education institutions in the research of Gibcus, De Kok, Snijders, Smit and Van der Linden (2012).

Previous research states that entrepreneurship education is directly related with different facets related to entrepreneurship, e.g. the decision to become an entrepreneur, but also with having entrepreneurial skills, knowledge and intentions (Menzies and Paradi, 2003; Peterman and Kennedy, 2003). This research builds on previous entrepreneurship education studies by investigating the direct relation between entrepreneurship education and self-employment. Next to this, previous research has shown several barriers exist that can hinder individuals in becoming entrepreneurs (e.g., Blanchflower and Oswald, 1998; Fleming, 1996; Grilo and Thurik, 2005). It is found that receiving entrepreneurship education can lead to that individuals start businesses (e.g., Kolvereid and Moen, 1997; McMullan and Murray, 1998; Menzies and Paradi, 2003). In this research, this will be taken one step further. There will be investigated whether receiving entrepreneurship education is related with the perception of barriers to entrepreneurship and whether this in turn is related with self-employment. The barriers that will be considered are the perceived availability of financial support, the perceived administrative complexity and risk tolerance. The research of Hatala (2005) focused on the effect of a self-employment training program on perceived barriers to entrepreneurship, but the indirect effect of entrepreneurship education on self-employment is not investigated so far. This will be done in this research. This research is the first to take perceived barriers to entrepreneurship into account when examining the relation between entrepreneurship education and self-employment. Therefore, investigating the impact of entrepreneurship education on self-employment through the role of perceived barriers will contribute to the existing literature on determinants of entrepreneurship: it will fill the research gap which is currently present. The research questions are formulated as follows:

- *Is entrepreneurship education directly related with self-employment?*
- *Do perceived barriers to entrepreneurship (availability of financial support, administrative complexity and risk tolerance) mediate the effect of entrepreneurship education on self-employment?*

The goal of this research is to investigate the direct relation between entrepreneurship education and self-employment, but the impact of entrepreneurship education on being self-employed through the role of perceived barriers to entrepreneurship will also be investigated. For examining this, data from the 2009 Flash Eurobarometer No 283 will be used. This research will use a sample of 36 countries. These 36 countries include 27 EU Member States, Croatia, Turkey, Iceland, Norway, Switzerland, the United States, South Korea, Japan and China. The dependent variable indicates whether individuals are without a professional activity, in paid employment or self-employed. This study will not focus one specific entrepreneurship education program, but rather on whether individuals agree with that their education raised interest to enter into entrepreneurship and whether their education has provided them the skills and know-how required to run a business. Entrepreneurship education is therefore measured by two variables in this research. The perceived barriers to entrepreneurship that are considered in this research are the availability of financial support, administrative complexity and the risk tolerance. These barriers were selected based on prior research that demonstrated the relevance of these barriers (e.g., Fleming, 1996; Grilo and Thurik, 2005; Knight, 1996; Luthje and Franke, 2003).

Investigating whether entrepreneurship education has an influence on being an entrepreneur through the role of perceived barriers, can lead to insights on determinants of entrepreneurship. Knowledge on the determinants of entrepreneurship can be improved when one knows more about whether entrepreneurship education influences being an entrepreneur through the perceived barriers to entrepreneurship. Moreover, the findings of this research can lead to policy implications. For example, if entrepreneurship education is positively related with entrepreneurship (through lowering the perceived barriers to entrepreneurship), stimulating entrepreneurship can be done through entrepreneurship education. Given the potential benefits of entrepreneurship that are discussed earlier, stimulating entrepreneurship can help to improve individual and economic welfare.

According to Gibcus et al. (2012), the impacts of entrepreneurship education are investigated in few studies. Of the studies that do focus on the influences of entrepreneurship education, a large part is from the United States. These studies are mostly project-based as well. This research will take a broader focus when investigating the effects of entrepreneurship education. In this study,

entrepreneurship education in several countries will be considered. Moreover, different kinds of entrepreneurship education will not be compared, but the overall effect of entrepreneurship education will be considered: there will be taken into account whether individuals considered they have had entrepreneurship education. The focus will be on the role of entrepreneurship education in the development of entrepreneurial skills, knowledge and intentions towards entrepreneurship. This makes this research more encompassing than many previous studies that only focused on one specific program, school or area.

This research will contribute to the existing literature by not only focusing on the direct impact of entrepreneurship education, but also on the impact of entrepreneurship education through other variables. This research will investigate the relation between entrepreneurship education and entrepreneurship, which is measured by self-employment, and will also take the role of perceived barriers into account.

The research questions will be answered by using (multinomial) logit models (Wooldridge, 2002). In this research, direct effects of entrepreneurship education on self-employment, and mediation effects of perceived barriers in the relationship between entrepreneurship education and self-employment will be tested. Average marginal effects will be used to estimate the coefficients.

In the following chapter, previous research will be discussed. After this, the data and method used will be explained. This is followed by the analyses and results of this research. Finally, a discussion and conclusion are presented.

2. Literature review

In previous research, occupational choice models are used to explain why individuals become self-employed. For example, De Wit (1993) explains several models that are present in the literature which show the determinants of the amount of entrepreneurs (individuals that are self-employed) in a competitive market. This research intends to further contribute to research on determinants of self-employment. The main factor that will be examined is an investment in human capital: entrepreneurship education. During the course of this chapter, it will become clear why entrepreneurship education can be seen as a determinant of entrepreneurship.

First, this chapter will give an explanation of the human capital theory. After this, previous research on entrepreneurship education and perceived barriers to entrepreneurship will be discussed.

2.1 The human capital theory

In this research, human capital is defined as individuals' possession of skills, traits, knowledge and experience. Both physical resources and human capital can determine an individual's income. The general theory of investments in human capital of Becker (1962) explains that earnings differ among individuals and areas. Differences in earnings are also present among individuals of different ages. An investment in human capital is defined as an activity that can affect an individual's future income (earnings and consumption) by influencing the resources that the individual possesses. Several activities can be seen as investments in human capital, e.g. participating in an education program and attaining firm-specific skills by 'on the job training', but also eating healthy. These activities increase what individuals are able to do mentally and physically. In this way, future income can be affected positively. However, the activities that can be seen as investments in human capital differ "in the relative effects on earnings and consumption, in the amount of resources typically invested, in the size of returns, and in the extent to which the connection between investment and return is perceived" (Becker, 1962, p. 9). Investing in human capital has a significant influence on observed earnings due to income is affected by the difference between investment costs and returns. However, not all investments in

human capital influence the earnings of individuals. For example, it could be that both the costs and returns are for companies that make use of this capital.

Extensions of the human capital theory show that human capital is related with occupational choices of individuals. For example, a study on the United States showed that individuals' human capital influences the decision to become an entrepreneur. This means that more opportunities to procure human capital might positively influence that an individual becomes an entrepreneur (in the short run). It is found that advanced education and managerial experience are positively related with becoming an entrepreneur (Kim, Aldrich and Keister, 2006).

Besides general human capital, entrepreneurship-specific human capital can have an influence on individuals' decisions to become an entrepreneur (Ucbasaran, Westhead and Wright, 2008), since aspects like experience with business ownership and entrepreneurial capabilities might give individuals more confidence on the success they will have as entrepreneurs. In this research, a specific investment in (entrepreneurship-specific) human capital will be considered as a possible influence on the choice of becoming an entrepreneur. More specifically, there will be investigated whether participation in entrepreneurship education is related with being an entrepreneur.

2.2 Entrepreneurship education

Entrepreneurship education can be defined in several ways: it ranges from participation in a course on entrepreneurship to following a whole study on entrepreneurship. Also entrepreneurship education can be offered at different kinds of education levels: from elementary schools until higher education institutions. Van Praag, Sloof, and Rosendahl Huber (2012) analysed literature on entrepreneurship education and revealed that the effects of entrepreneurship education are investigated in five studies that concern secondary education and in twenty studies that concern higher education. Van Praag et al. (2012) state they were the first to perform research on the impacts of entrepreneurship education at elementary schools. The research of Van Praag et al. (2012) focused on the effects of entrepreneurship education on knowledge and skills. Moreover, Van Praag et al. (2012) describe that, out of the five studies on secondary education, four focus on the effects on intentions/attitude and one focuses on

knowledge/skills. They also show that all twenty studies on higher education focus on intentions/attitude, but four of these studies also test for the effects on knowledge/skills.

Entrepreneurship education has several objectives. Objectives for the short-term can be increasing individuals' knowledge and skills, making individuals aware of entrepreneurship as an alternative for paid employment and to test what it would be like to be an entrepreneur. On the long-term, entrepreneurship education aims to increase the number of individuals that become entrepreneurs in a society (Van Praag et al., 2012).

Furthermore, Naia, Baptista, Junuário and Trigo (2012) analyzed academic literature on entrepreneurship education in higher education institutions, issued in 2000-2011, and revealed that recent previous research examined contents, methodologies and effects of entrepreneurship education. This research focuses on examining the results of entrepreneurship education in general. Entrepreneurship education might influence the perception of opportunities related to entrepreneurship (DeTienne and Chandler, 2004). The effect of having received entrepreneurship education (*a decision made by the individual*) in combination with perceived barriers to entrepreneurship (*the environment*) will be considered as variables that are related with whether individuals are entrepreneurs. Below, previous research on entrepreneurship education is discussed.

2.2.1 Entrepreneurship education as a determinant of entrepreneurship

Studies on the relation between entrepreneurship education and entrepreneurship are discussed below. After this, studies on the effects of entrepreneurship education on entrepreneurial intentions, knowledge and skills are presented.

Entrepreneurship education and entrepreneurship

In this study, I investigate whether past participation in entrepreneurship education is related to whether an individual is self-employed or not. In this respect, prior research has suggested that entrepreneurship courses could influence new venture creation (Clark, Davis and Harnish, 1984). This is confirmed by several studies. For instance, having participated in courses on entrepreneurship positively influences becoming an entrepreneur among graduates of an

engineering degree programme at a Canadian university. Namely, graduates of a Canadian university that participated in an optional course on entrepreneurship are more likely to own a business than graduates that did not participate in an entrepreneurship course; the percentages of graduates that own a business are respectively 48% and 26%. It is found that business ownership is positively related with being a male and with having participated in one or more optional entrepreneurship course (Menzies and Paradi, 2003). Also by a study in Sweden, it was found that participation in business classes or workshops on how to start a business is positively related with more activities in nascent entrepreneurship (Davidsson and Honig, 2003).

Besides courses on entrepreneurship, the completion of a major in entrepreneurship can also have an effect on the decision to become an entrepreneur. It is found that business graduates of a Norwegian business school that have a major in entrepreneurship and graduates that do not have a major in entrepreneurship have different behaviours when it comes to business start-ups. Completing a major in entrepreneurship is positively related with starting a business after education compared to not completing a major in entrepreneurship (Kolvereid and Moen, 1997).

Moreover, entrepreneurship programs influence entrepreneurship as well. The entrepreneurship graduate degree program of the Swinburne University of Technology in Melbourne (Australia) seems to be effective in stimulating entrepreneurship: 87% of the respondents that participated in the program started a venture. The ventures that were started were independent business start-ups or were start-ups within a company (McMullan and Murray, 1998).

In addition, the Berger Entrepreneurship Program at the University of Arizona has a positive effect on being involved with the start of a new business and being self-employed or owning a business. The research was conducted by researchers of the University of Arizona for The Kauffman Center for Entrepreneurial Leadership (The Ewing Marion Kauffman Foundation). The period investigated in this research is 1985 until 1998. The impacts of the program are investigated by considering 105 graduates of the entrepreneurship program and 406 business graduates that did not participate in this program. When comparing both groups, the findings show that graduates of the entrepreneurship program are thrice as likely to start a new business or to be self-employed compared to the group of graduates that did not participate in the

entrepreneurship program. Moreover, this study finds that being a graduate of the entrepreneurship program positively influences the probability of involvement in a new business with 25%. This is 11% when owning a business is considered (Charney and Libecap, 2000).

However, in another study it is found that most graduates of entrepreneurship programs offered by Irish universities and colleges have become employees. For this, longitudinal data was used. The time period that is investigated is 1984 until 1988. Yet, per fifteen graduates one graduate runs his or her own business within ten years after graduation. Also 57% of the graduates would prefer to be self-employed if there was an opportunity. More than half of the graduates in paid-employment stated it is possible that they will start a business in the future and that they are active in searching for business opportunities. Of all graduates that are employees, 15% is part-time involved in entrepreneurship. In this way, entrepreneurship education seems to be positively associated with intentions towards entrepreneurship (Fleming, 1996). More on the relation between entrepreneurship education and entrepreneurial intentions is explained later on.

So far the examples were single country studies. Another study in a multiple country setting is the study of Gibcus et al. (2012). In this study, which was performed for the European Commission, it is found, that entrepreneurship education in higher education institutions and being involved with JADE (European Confederation of Junior Enterprises) positively influences that individuals are entrepreneurs. In their research, entrepreneurship education that is offered in nine higher education institutions in Europe is considered. These nine higher education institutions are located in Sweden, Ireland, Austria, Croatia, the United Kingdom, Finland, Spain, Germany and the Netherlands. Entrepreneurship education offered in these higher education institutions ranges from courses on entrepreneurship until whole entrepreneurship programs. The effect of being involved with JADE is investigated as well. JADE operates internationally and supports European enterprises. The sample consisted of 851 graduates that participated in entrepreneurship education, 288 graduates that were involved with JADE, and 1443 graduates that did not participate in entrepreneurship education and were not involved with JADE (the non-entrepreneurship graduates). In the research, entrepreneurs are defined as individuals that start an enterprise or that are self-employed. They found that, during the time the survey was taken, 8% of the entrepreneurship education graduates, 9% of the JADE graduates and 3% of the non-

entrepreneurship graduates were entrepreneurs. Of the entrepreneurship education and JADE graduates, most businesses are started close before and after graduation. The non-entrepreneurship graduates wait longer with starting their businesses: on average after 2.8 years since graduation. Many of the individuals that were in paid-employment or unemployment at the time the survey was taken indicate they are in some way involved in self-employment or are considering self-employment. This holds for all three groups of graduates.

Thus, several studies show that when individuals have received entrepreneurship education, this seems to impact whether they are entrepreneurs. Furthermore, it is also suggested that the extent to which countries have institutions that foster entrepreneurship education might also affect entrepreneurship. Levie and Autio (2008) showed that in high-income countries, the presence of post-secondary entrepreneurship education and training, which is an Entrepreneurial Framework Condition, increases the new business activity, but it also increases the new business activity aimed at high-growth. The research showed that several relations are present in high-income countries. Namely, entrepreneurship education and training, measured at the post-secondary level, increase the Early Stage Entrepreneurial Activity (TEA) index in a country through the role of perceived opportunities. They also tested for the perception of start-up skills as a mediator in this relation and found no support for this (Levie and Autio, 2008).

Another study on the effects of the institutional environment is the study of Bowen and De Clercq (2008). They investigated whether the institutions in a country affect the entrepreneurial effort of individuals that have the expectation that high-growth will be achieved. The effect of the “extent of educational capital targeted at entrepreneurship” was tested (Bowen and De Clercq, 2008, p. 749). High-growth activities are defined as activities that (are likely to) create a significant number of jobs in the first few years of the business. The variable ‘high-growth entrepreneurship’ is measured per country and it was created by dividing the TEA high-growth index with the TEA index. So, the rate of high-job creation start-ups (based on the expectation of the start-ups that they will supply jobs to 20 individuals, at the minimum, in 5 years) in a country is divided by the total start-up rate in that country. Therefore, the dependent variable measures the proportion of high-growth start-ups per country in the three years that are analyzed (2002 until 2004). The results show which factors of the institutional environment influence that the

entrepreneurs, that are present in a country, are active in activities aimed at high-growth. It is found that more education that concerns entrepreneurship in a country increases the likelihood that individuals' entrepreneurial effort aims for high-growth in this country.

In sum, these studies show that an environment that supports entrepreneurship education can be important in stimulating individuals to be (come) entrepreneurs. The researches of Levie and Autio (2008) and Bowen and De Clercq (2008) focused on the effects of the content of the educational system concerning entrepreneurship in a country. In this way, not only receiving entrepreneurship education can be important in determining whether an individual is an entrepreneur, but the institutional environment can be important in determining this as well. This study will examine the effects of having received entrepreneurship education. Next, research on the effect of entrepreneurship education on entrepreneurial intentions, knowledge and skills is discussed.

Entrepreneurship education and entrepreneurial intentions, skills & knowledge

In this section, previous research on the effect of entrepreneurship education on entrepreneurial intentions will be discussed. After this, findings on the effects of entrepreneurship education on human capital are presented. The aspects of human capital that are considered in this research are entrepreneurial skills and knowledge.

Entrepreneurship education and entrepreneurial intentions

Entrepreneurship education might influence individuals' entrepreneurial intentions. Previous research, which focused on Portuguese university students, stresses the importance of entrepreneurship education in determining the intentions towards becoming an entrepreneur, which was defined as starting up a new business (Rodrigues, Raposo, Ferreira and Paço, 2010). Below, studies on the effect of entrepreneurship education on entrepreneurial intentions are presented.

Among Spanish university students, entrepreneurship education positively influences the perceived feasibility of entrepreneurship. This in turn positively influences intentions towards entrepreneurship and entrepreneurial behaviour. In the research, entrepreneurship education was

measured by “the perceived implication of home university in related actions” (Lanero, Vázquez, Gutiérrez and García, 2011, p. 120). These actions are for example providing advice on the creation of a new firm and activities that affect individuals’ entrepreneurial attitude. The perceived feasibility of entrepreneurship indicates whether students perceived they had the competence to perform certain entrepreneurial activities, e.g. recognizing business opportunities. Entrepreneurial intention concerns the “preferences for self-employment and likelihood of starting a business at the end of higher education” and entrepreneurial behaviour measures the “involvement in specific actions oriented to new firm creation” (Lanero et al., 2011, p. 120). However, no effect of the perceived desirability of entrepreneurship, which measures the indicated chance by students that they will acquire certain entrepreneurial rewards, was found (Lanero et al., 2011).

Several prior studies showed that entrepreneurship courses can motivate individuals to start with entrepreneurial activities. For example, one fourth of the students that took the entrepreneurship course ‘Starting a New Enterprise’ at the Karol Adamiecki University in Poland indicated that they “welcomed an immediate entrepreneurial career on graduation” (Jones, P., Jones, A., Packham and Miller, 2008, p. 597).

Also undergraduate students that were involved in one or more entrepreneurship electives of the Strathclyde University in the United Kingdom are likely to start businesses. Namely, 78% of the respondents indicate that they want to start a business in the future. Of these respondents, 19% wants to do this within five years, 38% wants to do this between five and ten years from when the survey was taken and 43% wants to do this after ten years (Galloway and Brown, 2002).

Moreover, students that participated in entrepreneurship or venture creation courses and students that did not participate in this, of the University of Nebraska-Lincoln in the United States and the Kyonggi University in South Korea, were compared. It is found that “the intention of venture creation and confidence in it” are positively related with entrepreneurship education in both countries (Lee, Chang and Lim, 2005, p. 36).

In another study, the effects an introductory entrepreneurship course of a Midwestern university in the United States, which was followed by students that had majors in business, were investigated (Clouse, 1990). More precisely, the effects of certain decision criteria for starting a business on whether the students consider it as viable to start a business were investigated. These simulated business start-up decisions were made by an exercise before and after participation in the introductory entrepreneurship course. The six decision criteria that were present in the exercise are “projected long-term profitability, market acceptance, projected short-term cash flow, resource availability, competitive pressure, managerial fit” (Clouse, 1990, p. 47). It was found that the introductory entrepreneurship course has an effect on the start-up decisions made in the exercise of most students. After participation in the course, 35 of the 47 students changed the effect that one or more decision criteria had on the start-up of a business. These results suggest that the course and the exercise can help students in their possible future decision to start a business. Through the course students paid more attention on how to attain profitability than just stating they want to reach long-term profitability.

In addition, business graduates who have a major in entrepreneurship, of a Norwegian business school, have different intentions towards entrepreneurship than other graduates that do not have a major in entrepreneurship. Namely, the possession of a major in entrepreneurship is positively related with graduates’ intentions towards entrepreneurship. The entrepreneurial intentions were measured by the likeliness that the graduate will ever start a firm, the preference for self-employment and being in paid-employment, and the likeliness that the graduate will have career in self-employment instead of being in paid-employment (Kolvereid and Moen, 1997).

The studies on the impact of entrepreneurship education on entrepreneurial intentions have used different samples. For example, the sample of used in the research of Clouse (1990) existed out of 47 students. A research that used a larger sample to test for the effect of entrepreneurship education on entrepreneurial intentions is the research of Peterman and Kennedy (2003). They used a sample that included data of students from 17 high schools in Queensland (Australia). Peterman and Kennedy (2003) focused on the effect of a specific entrepreneurship program (Young Achievement Australia enterprise program) on the ‘perception of the desirability’ of entrepreneurship. The perceived desirability is measured by whether they would love being an

entrepreneur, how tense and enthusiastic they would be. Students that participated in the YAA program are compared with students that refused the offer to participate in the program. Pre- and post-measures are used to test for the effect of the program. In the group that did not follow the program, no change in the desire of becoming an entrepreneur was detected. Among the students that participated in the YAA program, the perceived desire of becoming an entrepreneur increased. Thus, the YAA program has a positive influence on the 'perception of the desirability' of entrepreneurship.

Among Spanish university students, an entrepreneurship education program was found to positively influence students' intentions towards becoming self-employed. More specifically, students involved in this program developed higher intentions towards becoming self-employed after this program, and students that did not participate in this program had no increased entrepreneurial intentions (Sánchez, 2011).

Additionally, among science and engineering students of two universities in London and Grenoble, participation in an entrepreneurship program increases entrepreneurial attitudes and intention. This was tested by using pre- and post-measures in a quasi-experimental design in a sample of 250 students of which 124 participated in an entrepreneurship program and 126 did not participate in an entrepreneurship program. It was also noted that inspiration can positively affect the decision to become an entrepreneur. Inspiration could increase entrepreneurial attitudes and intention as well. Entrepreneurship education can contribute to this emotional element. However, aspects such as entrepreneurial knowledge and resources are important to determine entrepreneurial success (Souitaris, Zerbinati and Al-Laham, 2007).

Furthermore, Gibcus et al. (2012) found that entrepreneurship education, offered in higher education institutions, positively influences the intentions of becoming an entrepreneur. Especially JADE graduates are enthusiastic about entrepreneurship. Among the non-entrepreneurship graduates 42% has a preference for self-employment. In comparison, a preference for self-employment is indicated by 55% of the entrepreneurship education graduates and 57% of the JADE graduates. The research showed that participation in entrepreneurship

education, of students in higher educational institutions in Europe, increases the chance that these individuals will become entrepreneurs (Gibcus et al., 2012).

However, other research found a different influence of entrepreneurship education on entrepreneurial intentions. In the research, a JA-YE course offered by a Dutch vocational college is considered in the academic year 2005-2006. More specifically a student mini-company program in which students set up a small business for a short time, is examined. The Dutch school (AVANS Hogeschool) offers nearly similar Bachelor programs at two locations in the Netherlands. However, only at one location the student mini-company program was offered (and mandatory) at the time of the research. A difference-in-difference framework is used to test for the influence of the student mini-company program. There is controlled for that students might attend to the education program where the student mini-company program is offered if they are more appealed towards entrepreneurship before they participated in this program. This was done by an instrumental variables approach in which the distance between the school locations and the place of residence of the students before they started their education at the AVANS Hogeschool was used as an instrument for the chosen location of the school and therefore the type of education followed. The sample consisted of 250 observations: 104 students of the entrepreneurship course and 146 students from the location where the entrepreneurship course was not offered. The students' entrepreneurial intentions were measured by the degree of agreement with the expectation that a business will be started or taken over in the following fifteen years. Attending to the student mini-company program had a negative influence on the intentions of becoming an entrepreneur (Oosterbeek et al., 2010).

In addition, the BizWorld program offered in elementary schools also negatively influences the pupils' intentions for becoming an entrepreneur. The study compared pupils that participated in the BizWorld program with a control group of pupils that did not attend to this program and followed the regular lessons. The sample consisted of 2500 pupils who were in their last year of elementary school in and near Amsterdam. The time period that is investigated is 2010 and 2011. The pupils had to fill in questionnaires before and after participation in the program. In the same time period, the questionnaires were also taken by the pupils that did not participate in the program. The negative effect on entrepreneurial intentions might be interpreted with care due to

the low age of the pupils: the decision to start a business is not something that can be made in the near future (Van Praag et al., 2012).

In sum, entrepreneurship education can positively affect individuals' intentions towards entrepreneurship (Clouse, 1990; Galloway and Brown, 2002; Gibcus et al., 2012; Jones et al., 2008; Kolvereid and Moen, 1997; Lanero et al., 2011; Lee et al., 2005; Peterman and Kennedy, 2003; Sánchez, 2011; Souitaris et al., 2007). However, two studies did not find a positive relation between entrepreneurial intentions and entrepreneurship education. These two exemptions are the study of Oosterbeek et al. (2010) and the study of Van Praag et al. (2012). More specific, Oosterbeek et al. (2010) showed that a JA-YE course offered by a Dutch vocational college has a negative influence on the students' intentions of becoming an entrepreneur. Also the BizWorld program offered in elementary schools negatively influences the pupils' intentions for becoming an entrepreneur (Van Praag et al., 2012).

Thus, the results on the influence of entrepreneurship education on entrepreneurial intentions differ. However, it could be that measuring entrepreneurial intentions among pupils of elementary schools, which was done in the research of Van Praag et al. (2012), is not relevant due to their young age. The program studied by Oosterbeek et al. (2010) might be of low quality compared to the other programs that are studied in previous research. This program could have made the students less optimistic about entrepreneurship by giving them a more realistic view on entrepreneurship. Furthermore, it may be that the students did not appreciate the program, e.g. the students may have considered the earned credit points as too few compared to the effort that was needed to complete the program. Additionally, the groups exist of about ten students. This can be considered as large and might increase free-riding of some students. Lastly, the students' participation is mandatory which can also lower the appreciation of the program. (Oosterbeek et al., 2010). All of the above could have influenced that the specific program studied by Oosterbeek et al. (2010) had a negative influence on entrepreneurial intentions. This is supported by Lena and Wong (2004) who suggest that an individual's attitude towards entrepreneurship education might be important in determining the effect of entrepreneurship education on e.g. new venture creation. This means that a low appreciation of a certain entrepreneurship education program could negatively influence students' intentions towards entrepreneurship. Thus,

entrepreneurship education can have a positive effect on individuals' intentions of becoming an entrepreneur, but that the specific program studied by Oosterbeek et al. (2010) is not effective in increasing entrepreneurial intentions.

In general the studies discussed above conclude that entrepreneurship education positively influences entrepreneurial intentions. This research will take this one step further. It will investigate whether individuals whom indicate their education positively influenced entrepreneurial intentions are more likely to be(come) entrepreneurs. More precisely, this research will test whether individuals are more likely to be self-employed when individuals perceive that their school education made them interested to become an entrepreneur. Based on previous research (Charney and Libecap, 2000; Davidsson and Honig, 2003; Gibcus et al., 2012; Kolvereid and Moen, 1997; McMullan and Murray, 1998; Menzies and Paradi, 2003), the expectation is that entrepreneurship education is positively related with entrepreneurship. The first hypothesis is formulated as follows:

Hypothesis 1.1

Education that raises interest for becoming an entrepreneur is positively related with being self-employed.

Entrepreneurship education and entrepreneurial skills

Besides effects on entrepreneurial intentions, entrepreneurship education can influence individuals' human capital. Business training can improve business knowledge, such as the reinvestment of profits in the firm, and making overviews of sales and expenses (Karlan and Valdivia, 2011). Also one fourth of the students that took the entrepreneurship course 'Starting a New Enterprise' at the Karol Adamiecki University in Poland indicated that it was valuable to develop a business proposal during the course (Jones et al., 2008). Entrepreneurship education could increase the perception of opportunities related to entrepreneurship by improving the cognitive ability of individuals (DeTienne and Chandler, 2004). Previous research on the effects of entrepreneurship education on entrepreneurial skills are presented below.

Choo and Wong (2006), and Robertson et al. (2003) show that a lack of skills is seen as a barrier to entrepreneurship. Entrepreneurial skills might be improved by participation in an entrepreneurship education program. An improved perception of the possession of the skills necessary for entrepreneurship can in turn lead to that more individuals become entrepreneurs.

A study that shows that entrepreneurship education can be effective in improving entrepreneurial skills is the study of Van Praag et al. (2012). They investigated the BizWorld program offered in elementary schools and found that it positively affects the pupils' non-cognitive skills. The program increases the perception of the following skills: 'self-efficacy, need for achievement, risk taking propensity, analyzing skills, persistence ability, pro-activity and creativity'. No effects on 'social orientation ability' and 'motivating ability' were found.

Furthermore, Peterman and Kennedy (2003) found that participation in a specific entrepreneurship program offered students in high school, namely the YAA (Young Achievement Australia) enterprise program, positively influences the 'perception of the feasibility' of entrepreneurship. The perceived feasibility is measured by five questions that concern the perception of how hard it would be to start a business, how sure the students are about the success they will have, how overworked they would be, the knowledge they possess about starting a business and how sure they are about themselves.

Another measure for the perceived feasibility of entrepreneurship is whether students perceive they have the competence to perform certain entrepreneurial activities, e.g. recognizing business opportunities. This is found to be positively influenced by entrepreneurship education among Spanish university students. In the research, entrepreneurship education was measured by "the perceived implication of home university in related actions" (Lanero, Vázquez, Gutiérrez and García, 2011, p. 120), for example providing advice on the creation of a new firm.

Gibcus et al. (2012) also found that entrepreneurship education can increase individuals' entrepreneurial skills. They compared entrepreneurship graduates of higher education institutions, non-entrepreneurship graduates of higher education institutions and JADE graduates. Graduates' skills are measured by their score on the following aspects: 'creativity, analysis, motivation,

networking and adaptability'. These factors are perceived as higher among the entrepreneurship education and JADE graduates compared to the non-entrepreneurship graduates. This means that being involved in entrepreneurship education positively influences entrepreneurial skills.

However, entrepreneurship education is not always found to affect entrepreneurial skills. This is the case for a JA-YE course offered by a Dutch vocational college. The skills that were investigated are: market awareness, creativity and flexibility. No significant effect on perceived entrepreneurial skills was found. This could be explained by that the program could have given students a more realistic view on what it is required for becoming an entrepreneur and this does not match with their perceived entrepreneurial skills. These findings show that the program is not effective (Oosterbeek et al., 2010). The findings might also be explained by how the skills are measured: general skills (market awareness, creativity and flexibility) are considered. If more specific skills were considered, other results could be found. For example, entrepreneurial skills that could have been considered and might give different results are the skill of writing a business plan and administrative skills.

Also Levie and Autio (2008) found that the education Entrepreneurial Framework Conditions (the extent to which education and training for entrepreneurship is present) in a country do not influence individuals' perceived start-up skills. Although, this study focused on the effect of the institutional environment on perceived entrepreneurial skills. In this research participation in entrepreneurship education is of interest.

Besides entrepreneurial skills, entrepreneurial knowledge might also be affected by entrepreneurship education. Below studies on the effect of entrepreneurship education on entrepreneurial knowledge are discussed.

Entrepreneurship education and entrepreneurial knowledge

A lack of knowledge might hinder individuals to enter into entrepreneurship (Knight, 1996). This obstacle might be overcome by participating in entrepreneurship education. It is found that entrepreneurship courses can positively influence entrepreneurial knowledge. For example, students that participated in entrepreneurship or venture creation courses and students that did not

participate in this, of the University of Nebraska-Lincoln in the United States and the Kyonggi University in South Korea, were compared. It is found that “knowledge and ability of venture creation” are positively related entrepreneurship education in both countries (Lee, Chang and Lim, 2005, p. 36).

In addition, Peterman and Kennedy (2003) showed that an enterprise program among high schools students has a positive effect on the knowledge about starting a business. Entrepreneurship education can also affect entrepreneurial knowledge among graduates of higher education institutions. Gibcus et al. (2012) compared entrepreneurship graduates of higher education institutions, non-entrepreneurship graduates of higher education institutions and JADE graduates. Knowledge is measured by ‘understanding role entrepreneurs in society’ and ‘knowledge of entrepreneurship’. These factors are perceived as higher among the entrepreneurship education and JADE graduates compared to the non-entrepreneurship graduates. This means that being involved in entrepreneurship education positively influences entrepreneurial knowledge (Gibcus et al., 2012, p. 51).

However, the BizWorld program offered in elementary schools does not affect the pupils’ cognitive skills. Cognitive skills concern the knowledge on the activities of entrepreneurs are and what is needed for running a firm (Van Praag et al., 2012). There might be questioned whether the cognitive skills are already of interest for individuals of low ages. The individuals that were considered in the research were 11 and 12 years old (Van Praag et al., 2012).

Therefore, previous studies show positive effects of entrepreneurship education on entrepreneurial skills (Gibcus et al., 2012; Peterman and Kennedy, 2003; Van Praag et al., 2012) and knowledge (Gibcus et al., 2012; Lee et al., 2005; Peterman and Kennedy, 2003). However no effect of an entrepreneurship course on entrepreneurial skills is found as well (Oosterbeek et al., 2010). It could be that the course investigated by Oosterbeek et al. (2010) is not effective, but that entrepreneurship in general is effective in improving the perception of entrepreneurial skills. After all, the long-term objective of entrepreneurship education is stimulating entrepreneurship (Van Praag et al., 2012). In addition, the BizWorld program offered in elementary schools does not affect the pupils’ knowledge on what the activities of entrepreneurs are and what is needed

for running a firm (Van Praag et al., 2012). Although, the pupils of the Bizworld Program are of low ages and knowledge on entrepreneurship might not be relevant yet.

Thus, in general the studies discussed above conclude that entrepreneurship education positively influences entrepreneurial skills and knowledge. This research will investigate whether individuals that indicate their education positively influenced entrepreneurial skills and knowledge is related with entrepreneurship: this research will test the relation between having received education that provided skills and know-how for running a business and being self-employed. If individuals have the skills and know-how for running a business, it could be these individuals have more trust in their entrepreneurial abilities and are therefore more likely to be entrepreneurs. Among high-income countries, it is found that whether individuals perceive they have start-up skills positively influences the new business activity that is present in a country (Levie and Autio, 2008). Based on this and previous research on the effect of entrepreneurship education and entrepreneurship (e.g., Charney and Libecap, 2000; Davidsson and Honig, 2003; Gibcus et al., 2012; Kolvereid and Moen, 1997; McMullan and Murray, 1998; Menzies and Paradi, 2003), the expectation is that entrepreneurship education that provides skills and know-how for running a business is positively related with being an entrepreneur. This gives the following hypothesis:

Hypothesis 1.2

Education that provides the skills and know-how for running a business is positively related with being self-employed.

Thus, no difference in the size of the relation described in the first two hypotheses is expected. A priori, the effects of education that raises interest for becoming an entrepreneur and education that provides the skills and know-how for running a business are expected to be the same. Both measures indicate entrepreneurship education and are therefore expected to be positively related with being an entrepreneur. Below research on barriers to entrepreneurship education are discussed and the hypotheses for the indirect effects of entrepreneurship education are formulated.

2.2.2 Entrepreneurship education, perceived barriers and entrepreneurship

Previous research showed that entrepreneurship education can directly influence entrepreneurship (Charney and Libecap, 2000; Davidsson and Honig, 2003; Gibcus et al., 2012; Kolvereid and Moen, 1997; McMullan and Murray, 1998; Menzies and Paradi, 2003). However, the effect of entrepreneurship education on entrepreneurship could also run through other channels than a direct channel. This research aims to show the impact of entrepreneurship education on being an entrepreneur by taking into account the role of perceived barriers to entrepreneurship.

Previous research found several barriers to entrepreneurship. These barriers can be divided into subjective and objective barriers. Subjective barriers are based on perceptions and opinions of individuals. These barriers deal with emotions and feelings. In this way, these barriers might also indicate that individuals perceive wrong facts, e.g. perceiving administrative complexity while the administrative procedures are not that difficult in reality. Entrepreneurship education might cause that individuals decrease their perception of these barriers. This could be done by giving them realistic views on entrepreneurship, but also by increasing their skills and know-how about e.g. administrative procedures. Subjective barriers might also indicate individuals fear something. For example considering entrepreneurship as too risky is a barrier to entrepreneurship found in previous research (Fleming, 1996; Robertson, Collins, Medeira and Slater, 2003; Shinnar, Pruett and Toney, 2009). On the other hand, objective barriers are based on (correct) facts, and are not based on emotions and feelings of a certain individual. Objective barriers are observable and can therefore concern extern factors, such as market entry regulations (Klapper, Laeven, and Rajan, 2006). In the table below, examples of potential barriers to entrepreneurship can be found.

Table 1. Examples of potential barriers to entrepreneurship based on literature

Barrier to entrepreneurship	Type of barrier		Barrier concerns		
	Subjective barrier	Objective barrier	Individuals	Finance	Market
No opportunities for starting a business or no idea for a business (Fleming, 1996; Gibcus et al., 2012; Robertson et al., 2003)	x		x		
Perception of low entrepreneurial competence (Shinnar et al., 2009)	x		x		
Lack of confidence (Choo and Wong, 2006)	x		x		
Family responsibilities/ the family situation (Fleming, 1996; Gibcus et al., 2012)	x		x		
Barriers related to experience that is needed (Fleming, 1996)	x		x		
No possession of relevant knowledge (Knight, 1996; Shinnar et al., 2009)	x		x		
No help available (Robertson et al., 2003)	x		x		
Lack of skills (Choo and Wong, 2006; Robertson et al., 2003)	x		x		
No motivation (Robertson et al., 2003)	x		x		
Risks related to failure (Gibcus et al., 2012)	x		x		
The financial risks of starting a business, e.g. bankruptcy, debt and not receiving a stable income (Robertson et al., 2003)	x			x	
A disadvantageous business environment due to for instance difficulties with (obtaining loans from) banks when starting a company (Knight, 1996; Luthje and Franke, 2003)	x			x	
Considering it as too risky (Fleming, 1996; Robertson et al., 2003; Shinnar et al., 2009)	x			x	
Market entry regulations (Klapper et al., 2006)		x			x
The economic climate (Gibcus et al., 2012; Knight, 1996; Shinnar et al., 2009)		x			x
Legal and social effects (Gibcus et al., 2012)		x			x
A disadvantageous business environment or due to certain state laws (Luthje and Franke, 2003)		x			x
The perception of administrative complexity (Grilo and Thurik, 2005)	x		x		x
Barriers related to finance (Blanchflower and Oswald, 1998; Fleming, 1996; Knight, 1996; Robertson et al., 2003; Shinnar et al., 2009)	x	x		x	

Compliant costs (Choo and Wong, 2006)	x	x		x	
Lack of capital (Choo and Wong, 2006)	x	x		x	
Liquidity constraints (Barth, Yago and Zeidman, 2006)	x	x		x	
Job security of employment (Fleming, 1996)	x	x	x	x	x

Notes: In this table, examples of potential barriers to entrepreneurship (found in previous research) are presented. The barriers listed in this table consider barriers that can hinder individuals from becoming or being an entrepreneur. These barriers are divided into subjective and objective barriers. There is also indicated whether the barriers concern one or more of the three broad categories: individuals, finance and/or the market. The barriers are not ranked in order of importance.

The subjective barriers listed in the table above mainly concern individuals and finance. However, some subjective barriers are also related to the market. Individuals can perceive obstacles concerning e.g. knowledge, skills and financing. These obstacles can hinder individuals from becoming an entrepreneur. Objective barriers to entrepreneurship shown in the table deal with the market conditions. These barriers are not personal, whereas subjective barriers can be seen as personal. In Table 1, some barriers are indicated as being subjective and objective. This is the case for e.g. barriers related to finance; these barriers can concern laws on financing (objective), but these barriers can also indicate an individual's perception on the availability of financial support (subjective).

The institutional environment might also be a barrier to entrepreneurship aimed at high-growth. For example, corruption in a country negatively influences the proportion of entrepreneurs that expect high-growth of their business in a country. This also holds for the funding and private equity aimed at entrepreneurship that is available in a country. In high-income countries a positive influence of regulatory complexity on high-growth entrepreneurship can be detected. This influence is negative in low-income countries. The regulatory complexity in a country includes the cushiness of getting certain licenses, the taxes present in a country and the policies in a country (Bowen and De Clercq, 2008). So, it concerns administrative complexity that the entrepreneurs have to deal with.

Thus, individuals can perceive several different barriers that can hinder them in becoming an entrepreneur. The perceived barriers might be lowered by innovative enterprise teaching (Robertson et al., 2003) or by time and experience (Knight, 1996). Some barriers to

entrepreneurship might be resolved by being in paid-employment for a certain period. Namely, being in paid-employment for a while might give individuals relevant experience and the funds that are needed to start up a business (Fleming, 1996).

However, receiving business support is not always effective in lowering perceived barriers to entrepreneurship. For example, Knight (1996) found that individuals that were involved with a business incubator indicated that these services did not help them to start a business. In the research individuals that aim to start a business were of interest and these individuals were divided in two groups: individuals that started a business and individuals that have not started a business. Both groups have been involved in courses or made use of services of the London Community Small Business Centre. The sample consisted of 1379 individuals. It was found that differences in preparation for starting a business between the two groups can be detected. Namely, individuals that started a business “are more likely to have completed a business plan, have sought more sources of information and have approached more sources of financing” (Knight, 1996, p. 7). Moreover, it was found that individuals perceive several barriers to entrepreneurship, e.g. lack of financing and difficulties with banks (Knight, 1996, p. 7). Yet, individuals that made use of the services of the London Community Business Centre indicated that the program did not help them to start a business (Knight, 1996). The perceived barriers to entrepreneurship might be lowered by time, experience and extra sources of funding to small firms. Monitoring programs of institutions that provide assistance to possible entrepreneurs might be helpful as well. In addition, difficulties with banks might be resolved by changing how banks sustain loans to small firms. Lastly, programs that provide assistance during the start-up of a business to the entrepreneurs might also be helpful (Knight, 1996).

In addition, participation in a self-employment training program might influence the perceived barriers to entrepreneurship. This is investigated by Hatala (2005). In his research, six barriers were studied, which include both intrinsic and extrinsic barriers: the lack of confidence, financial needs, start-up logistics (problems related to the start-up of a business and availability of resources), time constraints and lack of skills, and personal (and family) problems. The study investigated whether a self-employment training program, among the unemployed that were thinking about becoming self-employed, can be seen as an instrument that influences the barriers

to self-employment. More specifically, the sample consisted of unemployed people from the Greater Toronto Area that were getting unemployment insurance or received it in the last three years, and were provided information on the Self-Employment Assistance Program of a self-employment program in a Canadian city. The sample used consisted of 220 individuals. The research found that the means of start-up logistics and time constraints significantly decreased after the self-employment training program. Therefore the self-employment training program lowered some perceived barriers of self-employment (Hatala, 2005). The perception of these barriers might also be influenced by entrepreneurship education.

Lowering perceived barriers to entrepreneurship may make entrepreneurship a more attractive employment option. In this research, there will be investigated whether participation in entrepreneurship education lowers the perceived barriers of entrepreneurship and whether this is related with that more individuals are entrepreneurs. This research focuses on subjective barriers. In this way, an individual's view on something will be considered as a barrier to entrepreneurship. The barriers concern an individual's view on finance, the market and the individual itself. In this way, barriers related to the environment and the individual are considered. The three barriers that will be considered are discussed below.

Perceived barrier to entrepreneurship: availability of financial support

Individuals can perceive the finance that is required to start a business as an obstacle for entering into entrepreneurship (Fleming, 1996). A lack of financial support can be a barrier to entrepreneurship. However, not all studies have shown that it influences entrepreneurship, e.g. Grilo and Thurik (2005) found no effect of this barrier on actual entrepreneurship. Yet, research has found that the availability of financial support is a barrier to entrepreneurship that is perceived by many individuals. For example, not having enough initial capital is seen as a large barrier to entrepreneurship among university students and faculty members. Of the 20 barriers that were ranked in order of importance, the 'lack of initial capital' was ranked on the first place by faculty members and the students ranked it on the second place (Shinnar et al., 2009). Gibcus et al. (2012) show that barriers to entrepreneurship are present among graduates of entrepreneurship education offered in higher education institutions. The largest barrier to entrepreneurship among these graduates is related to finance. Difficulties with raising capital

(Blanchflower and Oswald, 1998) and lack of financing (Knight, 1996) affect whether individuals enter into entrepreneurship. Also difficulties with banks when starting a company are indicated as a barrier to entrepreneurship (Knight, 1996; Luthje and Franke, 2003). Moreover, Choo and Wong (2006) show that a lack of capital is a barrier to entrepreneurship. Thus, finance is a barrier to entrepreneurship (Robertson et al., 2003). Among individuals that aim to start a business and that have been involved in courses or made use of services of the London Community Small Business Centre, the individuals that indeed started a business “have approached more sources of financing” compared to individuals that did not start a business (Knight, 1996, p. 7). Having the capital to start a business can increase the chance the individuals become entrepreneurs. Namely, private capital can contribute the detection of entrepreneurial opportunities (Van Praag, 1999). Therefore the lack of availability of financial support can hinder individuals to enter into entrepreneurship. The perception of the availability of financial support is the first perceived barrier to entrepreneurship that is investigated in this research.

Entrepreneurship education could influence the perceived barrier to entrepreneurship concerning finance. This is in line with that a self-employment training program, offered to unemployed individuals that were thinking about becoming self-employed, is found to decrease the perceived start-up logistics of these individuals (problems related to the start-up of a business and availability of resources) (Hatala, 2005). Therefore, the expectation is that entrepreneurship education might positively influence the perception of the availability of financial support and that, as discussed above, this perception is related with being self-employed. In other words, it is expected that the perceived availability of financial support mediates the effect of entrepreneurship education, that raises interest for becoming an entrepreneur and that provides the skills and know-how for running a business, on being self-employed. The reasoning behind this is that those who have received entrepreneurship education may have better knowledge of how and where to obtain financing. This indicates that individuals are better able to become entrepreneurs and are therefore more likely to be entrepreneurs. The expectation is that both measures of entrepreneurship education are negatively related with perceiving a lack of available financial support. The hypotheses are formulated on the following page.

Hypothesis 2.1

Entrepreneurship education that raises interest for becoming an entrepreneur is negatively related with the perceived lack of financial support and this is in turn positively related with being self-employed.

Hypothesis 2.2

Entrepreneurship education that provides the skills and know-how for running a business is negatively related with the perceived lack of financial support and this is in turn positively related with being self-employed.

In addition, receiving education that provides the skills and know-how for running a business is expected to be more negatively related with the perception of the lack of availability of financial support than receiving education that that raises interest for becoming an entrepreneur. This is explained by that education that provides the skills and know-how for running a business might indicate more that individuals learned skills and know-how that concern the finance of businesses than education that increases entrepreneurial intentions, and education that provides skills and know-how for running a business might therefore be more negatively related with the barrier related to finance. This gives the hypothesis on the following page.

Hypothesis 2.3

Entrepreneurship education that provides the skills and know-how for running a business has a stronger negative relation with the perceived lack of financial support than education that raises interest for becoming an entrepreneur.

Perceived barrier to entrepreneurship: administrative complexity

Certain bureaucratic rules can be seen as a barrier to entrepreneurship, for example the necessity of filling out many (complex) forms and the difficulty of obtaining licenses before becoming an entrepreneur could hinder individuals from becoming an entrepreneur. It was found that red tape has a negative impact on entrepreneurship (OECD, 2006). In OECD countries, many firms and citizens state that 'red tape' should be reduced (OECD, 2010). The administrative complexities (during the start of a business) can be seen as a barrier to entrepreneurship. Although, efforts are

being made to reduce ‘red tape’ among OECD countries (OECD, 2010). The countries therefore acknowledge that administrative complexities should be dealt with. Regulations for simplifying administrative procedures, can solve the administrative complexity that firms have to deal with (OECD, 2010). Poland aims to, for example, simplify licenses by applying an administrative simplification programme (OECD, 2011). Previous research confirms that perceived administrative complexity of individuals negatively influences actual entrepreneurship (Grilo and Thurik, 2005). The paperwork for starting a business and bureaucracy might be perceived as barriers to entrepreneurship. However, one study among university students and faculty members, for example, found that paperwork for starting a business and bureaucracy are not ranked high in both the student and the faculty ranking. Of the 20 barriers that were ranked in order of importance, the faculty members ranked it on the seventeenth place and the students ranked it on the twentieth place (Shinnar et al., 2009).

Previous research found that business training can improve business knowledge, e.g. making overviews of sales and expenses (Karlan and Valdivia, 2011). Entrepreneurship education might also give individuals knowledge on what is needed to start a business. For example, the administrative procedures necessary for starting a business might be explained to the individuals that receive entrepreneurship education. The expectation is therefore that entrepreneurship education can give individuals administrative skills. In this way individuals might perceive less administrative complexity and this might in turn make self-employment a more attractive employment-option, which can consequently be positively related with that individuals are entrepreneurs. In other words, it is expected that the perceived administrative complexity mediates the effect of entrepreneurship education, that raises interest for becoming an entrepreneur and that provides the skills and know-how for running a business, on being self-employed. The following hypotheses are formulated:

Hypothesis 3.1

Entrepreneurship education that raises interest for becoming an entrepreneur is negatively related with perceived administrative complexity and this is in turn positively related with being self-employed.

Hypothesis 3.2

Entrepreneurship education that provides the skills and know-how for running a business is negatively related with perceived administrative complexity and this is in turn positively related with being self-employed.

Besides, the size of the relation is expected to be different for the different entrepreneurship education measures. Education that provides skills and know-how for running a business might also focus on providing administrative skills and may therefore be more strongly related with the perception of administrative complexity than education that raises interest for becoming an entrepreneur. This gives Hypothesis 3.3:

Hypothesis 3.3

Entrepreneurship education that provides the skills and know-how for running a business has a stronger negative relation with perceived administrative complexity than education that raises interest for becoming an entrepreneur.

Perceived barrier to entrepreneurship: risk tolerance

The third barrier to entrepreneurship indicates whether being risk averse can hinder individuals from being self-employed. It is found that being more risk averse has a negative influence on becoming self-employed (Kan and Tsai, 2006). Risks related to failure (Gibcus et al., 2012) and considering it as too risky (Fleming, 1996; Robertson et al., 2003) are barriers to entrepreneurship. Also financial risks of entrepreneurship, like bankruptcy, are barriers to entrepreneurship (Robertson et al., 2003). One study among university students and faculty members, for example found that excessive risk and the fear that it will fail can be perceived as barriers to entrepreneurship. Namely, of the 20 barriers that were ranked in order of importance, the faculty members ranked 'excessively risky' on the third place and the students ranked this on the first place. The students ranked the 'fear of failure' on the fifteenth place and the faculty members ranked this on the seventh place (Shinnar et al., 2009). Thus, an individual's risk tolerance can be important in determining whether this individuals is or wants to become an entrepreneur.

It could be that entrepreneurship education influences risk tolerance. Individuals that have a higher educational attainment, measured by years of education, have a lower risk aversion (Kan and Tsai, 2006). So, educational attainment can influence how risk averse individuals are. The type of educational attainment could also influence whether individuals are entrepreneurs. Especially a specific type education that focuses on entrepreneurship might influence whether individuals are entrepreneurs by changing the perception of whether a business should be started if there is a risk that a business may fail. This could be explained by that more knowledge on entrepreneurship, attained by entrepreneurship education, might lower the risks related to entrepreneurship. Participants of entrepreneurship education may oversee (and assess) the risks of entrepreneurship and might therefore be more likely be entrepreneurs. In addition, Sánchez (2011) found that an entrepreneurship education program, offered to Spanish university students, increased students' risk taking.

If individuals indicate that their education raised interest for becoming an entrepreneur, this could mean that they believe that they will be (more) successful as entrepreneurs. This could consequently result in that they will be less likely to indicate that a business should not be started if there is a risk of failure, which in turn can increase the chance that they will become entrepreneurs. Moreover, if individuals indicate that their education provided them the skills and know-how for running a business, they might become more confident about the success they will have as entrepreneurs. This could consequently result in that they will be less likely to indicate that a business should not be started if there is a risk of failure, which in turn can increase the chance that they are entrepreneurs. This means that the expectation is that risk tolerance mediates the effect of entrepreneurship education, that raises interest for becoming an entrepreneur and that provides the skills and know-how for running a business, on being self-employed. This gives the hypotheses on the following page.

Hypothesis 4.1

Entrepreneurship education that raises interest for becoming an entrepreneur is negatively related with low risk tolerance and this is in turn positively related with being self-employed.

Hypothesis 4.2

Entrepreneurship education that provides the skills and know-how for running a business is negatively related with low risk tolerance and this is in turn positively related with being self-employed.

Thus, both entrepreneurship education measures are expected to be negatively related with risk aversion regarding the start of a business. However, entrepreneurship education that raises interest for becoming an entrepreneur might be more strongly related with risk tolerance than entrepreneurship education that provides the skills and know-how for running a business. This may be explained by that this individual already states he or she has interest to start a business and might therefore be less hold back by the risks. The last hypothesis is formulated as follows:

Hypothesis 4.3

Entrepreneurship education that raises interest for becoming an entrepreneur has a stronger negative relation with low risk tolerance than education that raises interest for becoming an entrepreneur.

To test whether the hypotheses hold, a random sample of individuals will be used. The data that will be used and the methodology are explained below.

3. Data and Method

This chapter will first elaborate on the data that is used and after this the method that is applied in this research will be explained.

3.1 Data

In this research, cross-sectional data from the 2009 Flash Eurobarometer No 283 (Entrepreneurship in the EU and beyond) will be used. The dataset was made for the European Commission (The Gallup Organization, 2009). It includes several variables on entrepreneurship, e.g. variables that measure whether individuals are self-employed and that measure the different kinds of motivations for becoming an entrepreneur. Also data on individuals' perception of barriers to entrepreneurship, education related to entrepreneurship and individuals' willingness to take risks can be found in this dataset. The dataset includes socio-demographics of the individuals as well. In this dataset, observations of 36 countries are present: 27 EU Member States, Croatia, Turkey, Iceland, Norway, Switzerland, the United States, South Korea, Japan and China. The surveys were taken in December 2009 and the dataset exists of a random sample of more than 26.000 individuals. The people that filled in the surveys are 15 years and older. The interviews were mostly done through telephones (The Gallup Organization, 2009). Previous research used forerunners of this dataset, e.g. Bholá, Verheul, Thurik and Grilo (2006) used the 2004 Flash Eurobarometer Survey and data of the 2007 Flash Eurobarometer Survey was used by Verheul, Thurik, Hessels and van der Zwan (2010).

Dependent variable

The dependent variable measures whether individuals are without a professional activity, in paid employment or self-employed (labelled as *entr*). The variables of the 2009 Flash Eurobarometer No 283 that represent entrepreneurship education and the perceived barriers to entrepreneurship, which are the independent variables, are explained below.

Independent variables

In this research entrepreneurship education will be measured by two variables. These variables concern whether the individuals ever participated in entrepreneurship education. The first

variable measures whether their education raised interest to enter into entrepreneurship (*educ1*). The second variable measures whether the respondent has gained the skills and know-how that make him or her able to run a business, through their education (*educ2*). Thus, the entrepreneurship education variables used in this research indicate whether participation in education has given the individuals intentions for becoming an entrepreneur, and has given them the skills and know-how for running a business. The agreement with two statements is considered in these entrepreneurship education variables. The statements are the following:

- “My school education made me interested to become an entrepreneur.”
- “My school education gave me skills and know-how that enable me to run a business.”

Therefore, the variables used for entrepreneurship education indicate whether individuals ever participated in education related to entrepreneurship. In this way, this research contributes to existing research on entrepreneurship education in which the effects of specific entrepreneurship programs were considered. For example, in the research of Oosterbeek et al. (2010) the investigated entrepreneurship program was found to be ineffective. In the studies of Charney and Libcap (2000) and Gibcus et al. (2012) entrepreneurship education was found to positively affect entrepreneurship and entrepreneurship education programs investigated in these researches are therefore effective. This research does not focus on whether a certain entrepreneurship program is of good quality, but it focuses on the effects of entrepreneurship education in general. In this way, generalizations on the effects of participation in entrepreneurship education can be made. The researches of Levie and Autio (2008) and Bowen and De Clercq (2008) focused on the effects of the content of the educational system concerning entrepreneurship in a country. This research focuses on the participation of individuals in entrepreneurship education and not on the institutional environment concerning entrepreneurship education.

The perceived barriers to entrepreneurship that are considered as independent variables in this research are the availability of financial support (*bfin*), administrative complexity (*badm*) and the risk tolerance (*brisk*). The survey includes the following three statements that will be used indicate the perceived barriers to entrepreneurship of individuals:

1. “It is difficult to start one’s own business due to a lack of available financial support”.
2. “It is difficult to start one’s own business due to the complex administrative procedures”.
3. “One should not start a business if there is a risk it might fail.”

These perceived barriers to entrepreneurship are already indicated by previous research. Barriers related to finance are mentioned often in previous studies (e.g. Blanchflower and Oswald, 1998; Choo and Wong, 2006; Fleming, 1996; Gibcus et al., 2012; Knight, 1996; Robertson et al., 2003). For example, difficulties with banks when starting a company can be a barrier to entrepreneurship (Knight, 1996; Luthje and Franke, 2003). Therefore the availability or financial support can hinder individuals to enter into entrepreneurship. The perception of administrative complexity is also a barrier to entrepreneurship (Grilo and Thurik, 2005). It is the second barrier to entrepreneurship that is taken into account in this research. The third barrier to entrepreneurship indicates whether being risk averse can hinder individuals from entering into self-employment. Risks related to failure (Gibcus et al., 2012) and considering it as too risky (Robertson et al., 2003) are barriers to entrepreneurship. Financial risks of entrepreneurship, like bankruptcy, are also barriers to entrepreneurship (Robertson et al., 2003). It could be that entrepreneurship education influences the perception of these barriers. It might be that entrepreneurship education is negatively related with the perception that there is a lack of availability of financial support and is negatively related with the perception of administrative complexity. Also entrepreneurship could make individuals less risk averse and might therefore also influence the third barrier that is considered in this research.

In the table on the following pages, a description of the dependent, independent and control variables that will be used in this research can be found.

Table 2. Description of the dependent, independent and control variables

Variable	Description
Dependent variable	
Being an entrepreneur (entr)	Variable with value 2 if self-employed, 1 if in paid-employment and value 0 if without a professional activity.
Independent variables	
<i>Entrepreneurship education</i>	
Entrepreneurship education 1 (educ1)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: My school education made me interested to become an entrepreneur.
Entrepreneurship education 2 (educ2)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: My school education gave me skills and know-how that enable me to run a business.
<i>Perceived barriers to entrepreneurship</i>	
Perceived barrier related to finance (bfin)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: It is difficult to start one's own business due to a lack of available financial support.
Perceived barrier related to administration (badm)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: It is difficult to start one's own business due to the complex administrative procedures.
Perceived barrier related to risk tolerance (brisk)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: One should not start a business if there is a risk it might fail.
Control variables	
Gender (male)	Dummy variable with value 1 if male and 0 if female.
Age (age)	Exact age (in years)
Low education (lowed)*	Dummy variable with value 1 if 'never been in fulltime education', if age when finishing fulltime education is lower than 15 years or if 'still in fulltime education' and age is lower than 15 years. It takes the value 0 otherwise. The reference category for 'lowed' (and 'highed') is medium educational attainment which is defined as being between 15 and 21 years old when finishing full time education or between 15 and 21 years old and being 'still in full time education'.
High education (highed)*	Dummy variable with value 1 if age when finishing full time education is higher than 21 years or 'still in full time education' and higher age than 21 years. It takes the value 0 otherwise. The reference category for 'highed' (and 'lowed') is medium educational attainment which is defined as being between 15

	and 21 years old when finishing full time education or between 15 and 21 years old and being 'still in full time education'.
Additional education 1 (addeduc1)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: My school education helped me to develop my sense of initiative – a sort of entrepreneurial attitude.
Additional education 2 (addeduc2)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: My school education helped me to better understand the role of entrepreneurs in society.
Metropolitan zone (metro)	Dummy variable with value 1 if type of locality is a 'metropolitan zone' and 0 otherwise. Reference category of 'metro' (and 'urban') is rural zone.
Other town or urban centre (urban)	Dummy variable with value 1 if type of locality is 'other town/urban centre' and 0 otherwise. Reference category of 'urban' (and 'metro') is rural zone.
Difficulties with obtaining information (inf)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: It is difficult to obtain sufficient information on how to start a business.
Self-employed parents (sparent)	Dummy variable with value 1 if the mother, father or both parents are self-employed and value 0 otherwise.
Individual characteristic 1 (char1)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: In general, I am willing to take risks.
Individual characteristic 2 (char2)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: Generally, when facing difficult tasks, I am certain that I will accomplish them.
Individual characteristic 3 (char3)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: My life is determined by my own actions, not by others or by chance.
Individual characteristic 4 (char4)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: If I see something I do not like, I change it.
Individual characteristic 5 (char5)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: The possibility of being rejected by others for standing up for my decisions would not stop me.
Individual characteristic 6 (char6)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: I am an inventive person who has ideas.
Individual characteristic 7 (char7)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: I am optimistic about my future.

Individual characteristic 8 (char8)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: I like situations in which I compete with others.
Individual characteristic 9 (char9)	Dummy variable with value 1 if (strongly) agree with the statement and 0 if (strongly) disagree with the statement: When confronted with difficult tasks I can count on luck and the help of others.
Preference for self-employment (prself)	Dummy variable with value 1 if one prefers being self-employed over different kinds of jobs, and 0 otherwise. The preference for paid employment is the reference category for 'prself' (and 'prnone').
No preference for paid employment or self-employment (prnone)	Dummy variable with value 1 if one prefers 'none of these' (being an employee or being self-employed) over different kinds of jobs, and 0 otherwise. The preference for paid employment is the reference category for 'prnone' (and 'prself').
Several county dummies (be, cz, dk, de, ee, el, es fr, ie, it, cy, lv, lt, lu, hu, mt, nl, at, pl, pt, si, sk, fi, se, uk, bg, hr, ro, tr, no, ch, is, us, kr, jn and cn)	Dummy variables which take the value 1 if Belgium, Czech Republic, Denmark, Germany, Estonia, Greece, Spain, France, Ireland, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Austria, Poland, Portugal, Slovenia, Slovakia, Finland, Sweden, United Kingdom, Bulgaria, Croatia, Romania, Turkey, Norway, Switzerland, Iceland, United States, South Korea, Japan or China, and zero otherwise.

Source: Flash Eurobarometer Survey No 293 (2009)

Notes: The variables are constructed by the variables that are present in the Flash Eurobarometer dataset of 2009 (No 283) dataset. If a variable had unknown observations, the values of these observations are replaced by a dot in STATA. In this way, STATA does not take these observations into account.

*Based on previous research that used the forerunner of the dataset that will be used in this research (Bhola et al., 2006, and Verheul et al., 2006), the variables that indicate the level of educational attainment are created in STATA. These variables are made out of the variable 'age when finished full time education' (D3) from the Flash Eurobarometer dataset of 2009. The research of Bhola et al. (2006) used the Flash Eurobarometer dataset of 2004 and considered someone's age when finishing fulltime education, 'never been in fulltime education' and 'still in fulltime education' when constructing dummies for the level of educational attainment. However, this was not in done in the research of Verheul et al. (2006). They also used the Flash Eurobarometer dataset of 2004. In their research low educational attainment was defined as being younger than 15 years when finishing full time education or 'never been in fulltime education'. They defined high educational attainment as being older than 21 years when finishing fulltime education. So, the observations for 'still in fulltime education' are not considered in their research. Even though, the Flash Eurobarometer of 2009 only contains 683 observations for 'still in fulltime education' of the total of 24,570 observations of the variable, it was decided to take these observations into account when constructing the dummies for educational attainment. This means that in this research, observations for the exact age when finishing fulltime education, 'never been in full time education' and 'still in full time education' are taken into account when creating the variables that indicate the level of educational attainment. In this way, all observations of the variable 'age when finished full time education' are used when constructing the dummies that indicate the level of educational attainment. If the decision was made to only consider someone's age when finishing full time education, 1,053 of the 24,570 observations would not be taken into account. The dummies allow one to make predictions on the influences of an individual's education level as defined in this research and not only consider the effect of one additional year of education.

Control variables

In the regressions, several control variables will be taken into account. Previous research about the effects of these variables on entrepreneurship is discussed below.

Gender

Gender will be taken into account as a control variable. An individual's gender could have an influence on the likeliness of becoming an entrepreneur. Previous research showed that males are more likely to be self-employed than females (Blanchflower, 2000). On average, more males than females are self-employed. This can be explained by that females have lower preferences for self-employment compared to males (Verheul et al., 2006). Moreover, Oosterbeek et al. (2010) investigated the impact of a JA-YE course offered by a Dutch vocational college on students' entrepreneurial competencies and intentions. Differences between males and females were also considered, but the program has a negative effect on the expectation that a business will be started or taken over in the following fifteen years for both sexes. The negative effect is, however, somewhat larger for women than for men. All other results for males and females were comparable. Gibcus et al. (2012) found that females are less likely to become entrepreneurs compared to males. Males consider themselves as better able to become an entrepreneur than females. Namely, females rate their characteristics related to entrepreneurship, entrepreneurial skills and knowledge as less than males. The intentions of becoming an entrepreneur and the preference for self-employment are indicated higher by males than by females. However, it is also found that, among university students, the interest for becoming an entrepreneur does not differ between males and females (Shinnar et al., 2009). These findings indicate that there should be controlled for gender in the regressions. This will be done by including a dummy variable that indicates the gender of the individuals (*male*).

Age

An individual's age can influence the likeliness of becoming an entrepreneur. More specifically, a higher age increases the likeliness that individuals are self-employed (Blanchflower, 2000; Blanchflower et al., 2001). Additionally, age has a positive effect on being involved with the start of a new business (Charney and Libecap, 2000). However, it is also found that a higher age decreases the likeliness that individuals prefer self-employment (Blanchflower et al., 2001).

Furthermore, among graduates of higher education institutions age influences the perceived 'entrepreneurship competence', and the self-employment preference: this preference is higher among younger graduates (Gibcus et al., 2012). Therefore, the variable *age* is taken into account as well in this research.

Educational attainment

Previous research showed that whether individuals are entrepreneurs differs among individuals with different levels of educational attainment. Among females, a higher educational attainment increases the likeliness of entering into self-employment (Dolinsky, Caputo, Pasumarty and Quazi, 1993). Also when considering both males and females, individuals that own a business have a higher educational attainment compared to the general public (Robertson and Sexton, 1994). Additionally, a higher educational attainment, measured by years of education, is positively related with being involved with nascent entrepreneurship (Davidsson and Honig, 2003). Other research found that individuals with the lowest educational attainment are most likely to be self-employed. Although individuals with the highest educational attainment also have a high likeliness to be self-employed compared to individuals that have less educational attainment (Blanchflower, 2000). In addition, Earle and Sakova (2000) show years of schooling has an effect on entrepreneurship. Namely, individuals that are self-employed have less years of schooling compared to employees. It seems like the effect of educational attainment on entrepreneurship could go both ways. However, it is argued that a higher educational attainment can influence entrepreneurship by making individuals more creative (Plaschka and Welsch, 1990). In this research, it is assumed that individuals have on average higher levels of education if these individuals are older when finishing their full time education. Educational attainment is taken into account by two variables in the regressions: low educational attainment (*lowed*) and high educational attainment (*highed*).

Other control variables that consider an individual's education are *addeduc1* and *addeduc2*. The first variable measures whether an individual's education has contributed to evolve his or her sense of initiative. So, it measures whether participation in education has given the individual a kind of entrepreneurial attitude. The second additional education variable measures whether an individual's education has contributed to his or her understanding on the role of entrepreneurs in society. It therefore measures the knowledge that individuals have attained through their

education. These variables might indicate the type of education that individuals have had. Therefore, these variables are taken into account as control variables in the regressions.

Type of locality

The type of locality (urban, metropolitan and rural area) is of influence on entrepreneurial engagement levels (Verheul et al., 2010). This is also supported by Seekins (1992) who found that self-employment rates differ between rural and urban areas. This research will also control for the influence of the type of locality of individuals on being an entrepreneur. The two dummies that will be taken into account in the regressions to control for this are *metro* and *urban*.

Difficulties with obtaining information

The environment in which entrepreneurs have to operate can influence their decision to become an entrepreneur. The influence of whether an individual considers it as hard to get information on how to start a business on being an entrepreneur is investigated before, but no relation was found (Verheul et al., 2010). However, among individuals that aim to start a business and that have been involved in courses or made use of services of the London Community Small Business Centre, individuals that indeed started a business have searched for more information compared to individuals that did not start a business (Knight, 1996). Furthermore, Verheul et al. (2006) show that the perception of sufficient information available has an effect on entrepreneurship. The availability of information on how to set up a business could influence individuals' decision to start a business and is taken into account as a control variable in this research; it is measured by *inf*.

Family background: self-employed parents

Having self-employed parents can influence individuals' decision to enter into entrepreneurship (Verheul et al., 2010). However among university students, having an entrepreneur in the family does not seem to influence students' intentions for becoming an entrepreneur. Almost the same percentages of students are present that indicate that they were thinking about or want to become entrepreneurs when considering students that have entrepreneurs in their family and students that do not have entrepreneurs in their family, these percentages are 18.3% and 14.2% respectively (Shinnar et al., 2009). Other research found that individuals with parents (or close friends) that

own businesses are more likely to be involved with nascent entrepreneurship (Davidsson and Honig, 2003). Individuals might be stimulated by their parents to enter into self-employment when these parents are, for example, successful entrepreneurs. There will be controlled for this by taking into account whether the individuals have at least one parent that is self-employed, which is measured by *sparent*.

Individual characteristics

Personal characteristics could influence the decision to become an entrepreneur as well. For example, Ekelund, Johansson, Jarvelin and Lichtermann (2005) showed a relation between risk aversion and entrepreneurship exists. Also attitudes, e.g. regarding self-reliance and risk, can influence entrepreneurship (Earle, and Sakova, 2000). In addition, according to Van Praag (1999), risk aversion has a negative impact on becoming an entrepreneur. This research takes several individual characteristics into account that could influence individuals' preference for entrepreneurship and therefore also their likeliness to become entrepreneurs. The individual characteristics that will be included are willingness to take risks, confidence related to accomplishing difficult tasks, perceived self-control, whether an individual will change something he or she does not like, the influence of the possibility that other people might reject one's decisions, the perception of being an inventive person, being optimistic about the future, being competitive, and whether an individual can count on luck and help of others when dealing with difficult tasks. These individual characteristics are measured by nine dummy variables (*char1, char2, char3, char4, char5, char6, char7, char8, char9*).

Preference for self-employment

The preference for self-employment is important in determining an individual's self-employment (Verheul et al., 2006). The variables that control for this in the regressions are *prself* and *prnone*.

Countries

Culture can play a role when entrepreneurship is considered (Morrison, 2000). The self-employment rates differ between the different OECD countries (Blanchflower, 2000). The national framework conditions in countries could directly influence entrepreneurship (Wennekers, Van Stel, Thurik and Reynolds, 2005). Therefore, the level of development in different countries

is important in determining the effects of entrepreneurship education. Also preferences for self-employment differ between countries, e.g. in Portugal a higher percentage of the people states they prefer self-employment than in Denmark (Blanchflower et al., 2001). In addition, the number of entrepreneurs present in a country influences the perception of entrepreneurial opportunities and skills (Levie and Autio, 2008). This might in turn influence whether individuals are entrepreneurs. In this research, country dummies (*be, cz, dk, de, ee, el, es fr, ie, it, cy, lv, lt, lu, hu, mt, nl, at, pl, pt, si, sk, fi, se, uk, bg, hr, ro, tr, no, ch, is, us, kr, jn and cn*) will be used to control for these possible effects.

3.2 Descriptive statistics

In this section, descriptive statistics of the variables used in this research are provided. For being an entrepreneur (*entr*) 26,138 observations are present in the sample. For entrepreneurship education 1 (*educ1*), entrepreneurship education 2 (*educ2*), the perceived barrier related to finance (*bfin*), the perceived barrier related to administration (*badm*) and the perceived barrier related to risk tolerance (*brisk*) respectively 25,175, 25,247, 25,247, 24,223, 23,864 and 24,843 observations are present (Table 4).

Of the 26,138 observations for being an entrepreneur (*entr*), 4,345 individuals indicate they are currently entrepreneurs (16.62%), 9,088 individuals are currently in paid employment (34.77%) and 12,075 individuals are currently without a professional activity (48.61%) (Table 5).

Less than half of the total sample (30.99%) indicates they participated in education that raised interest for becoming an entrepreneur. Of the individuals that indicate they followed education which raised their interest for becoming an entrepreneur, 24.16% is currently self-employed. In addition, among the individuals that followed this type of education, 14.64% states they do not perceive a barrier to entrepreneurship related to the availability of financial support, 25.52% states they do not perceive a barrier to entrepreneurship related to administrative complexity and 46.46% states they do not perceive a barrier to entrepreneurship related to risk tolerance. Among the entrepreneurs that did not follow this type of education, these percentages are 15.45%, 24.09% and 46.22% respectively. So, these percentages are comparable (Table 6).

When considering education that provided skills and know-how for running a business, less than half of the total sample (44.29%) indicates they participated in this type of education. This percentage is somewhat higher than the percentage of individuals who indicate that their education raised interest for becoming an entrepreneur, which was 30.99% of the total sample. Of the individuals that indicate they followed education that gave skills and know-how for running a business, 21.56% is currently self-employed. Besides, among the individuals that followed this type of education, 15.67% states they do not perceive a barrier to entrepreneurship related to the availability of financial support, 25.87% states they do not perceive a barrier to entrepreneurship related to administrative complexity and 47.65% states they do not perceive a barrier to entrepreneurship related to risk tolerance. Among the entrepreneurs that did not follow this type of education, these percentages are 14.81%, 23.59% and 45.28% respectively. So, these percentages are comparable as well (Table 7).

A correlation matrix is made of the dependent and independent variables (Table 8). This matrix shows that the two types of entrepreneurship education are positively related with each other at a 1% significance level. Also being an entrepreneur is positively associated with entrepreneurship education at a 1% significance level and is negatively associated with perceived barriers to entrepreneurship at a 1% significance level. Moreover, following entrepreneurship education that raises interest for becoming an entrepreneur is negatively related with perceiving administrative complexity at a 5% significance level. However, this type of education is not associated with perceiving barriers to entrepreneurship related to the availability of financial support and risk tolerance. Participation in education that gave skills and know-how for running a business is negatively related with perceiving administrative complexity and the indicated risk tolerance at a 1% significance level. It is negatively related with the perceived barrier to entrepreneurship which concerns the availability of financial support at a 10% level. Lastly, perceiving a certain barrier to entrepreneurship is positively related with perceiving other barriers to entrepreneurship at a 1% significance level.

The preliminary descriptives suggest that entrepreneurship education is positively related with being an entrepreneur in a direct way. Also entrepreneurship education could be negatively related with (some) perceived barriers to entrepreneurship. These perceived barriers to

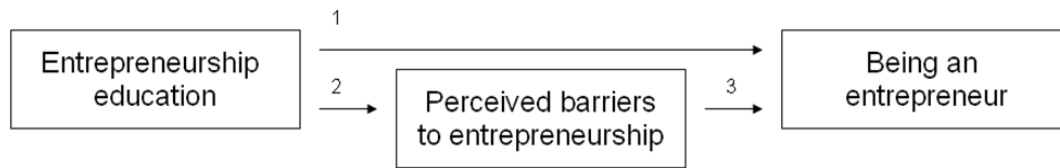
entrepreneurship are negatively related with whether individuals are entrepreneurs. Below, the method used will be explained.

3.3 Method

In this section, the method used will be explained. When considering the variables that indicate entrepreneurship education something has to be noted. Namely, it is asked whether individuals' education raised interest for becoming an entrepreneur and whether individuals attained skills and know-how related to entrepreneurship through their education. Therefore, it is not necessary to use a difference-in-difference framework in this research: the formulation of the questions already takes into account a (possible) change before and after entrepreneurship education.

Regressions will be performed to measure the magnitude of the impact of the relevant variables on whether individuals are entrepreneurs. The dependent variable used in this research is a categorical variable with three possible outcomes for employment. The independent variables used are two entrepreneurship education variables and three variables that indicate the perceived barriers to entrepreneurship. Control variables that are used for this research are gender, age, educational attainment, type of locality, difficulties with obtaining information, self-employed parents, individual characteristics and a preference for a certain type of employment. Also country dummies are included to control for country specific effects. For the analyses, multinomial logit regressions will be performed with the dependent, independent and control variables (Wooldridge, 2002). Marginal effects will be used to estimate the coefficients. Next to investigating direct relationships, this research will take mediation effects into account. Mediation effects are present when an independent variable has an effect on the dependent variable through a mediator. In this way, the indirect relationship between entrepreneurship education and being an entrepreneur will be investigated. The perceived barriers to entrepreneurship are the possible mediators in this relationship. To test whether mediation effects are present, logit regressions that test for the effect of entrepreneurship education on the perceived barriers to entrepreneurship are run. In addition, predicted probabilities are estimated to support and explain the relations found. Also multinomial logit regressions with and without the perceived barriers to entrepreneurship are run. The figure below illustrates the relations that will be investigated in this research.

Figure 1. The direct and indirect effects of entrepreneurship education on being an entrepreneur



In the figure above, arrow 1 indicates the direct effect of entrepreneurship education on being an entrepreneur. Arrows 2 and 3 show the indirect or mediation effects: the perceived barriers to entrepreneurship might mediate the effect of entrepreneurship education on being an entrepreneur.

Gibcus et al. (2012) acknowledge that a self-selection bias is present in their research on entrepreneurship education. Namely, students which were more likely to become entrepreneurs before following the entrepreneurship program might have chosen for entrepreneurship education. The effect of participation in entrepreneurship education is therefore influenced by the program itself, but also by the preferences before attending to the program. However, the effect of self-selection in the study of Gibcus et al. (2012) was not perceived as large. The comparison of personal characteristics, e.g. background related to entrepreneurship before attendance to higher education, revealed that all graduates score about the same on these characteristics. This indicates that the effects of entrepreneurship education found are mostly related to the program itself. An instrumental variables approach may be undertaken to deal with the self-selection bias into entrepreneurship education when running regressions. However, in e.g. the study of Charney and Libecap (2000), no instrumental variables approach is used to correct for the possible self-selection bias of entrepreneurship education. It is not clear whether the effects of this type entrepreneurship education are affected by the program or by preferences the students already had before attending to the program. This could be the case because before students could participate in the program investigated by Charney and Libecap (2000), an application procedure had to be undertaken. This can result in a self-selection bias into entrepreneurship education of the students with the highest preferences for entrepreneurship. Thus the higher percentage of self-employed individuals in the group of graduates of the entrepreneurship program could be explained by the preference of becoming an entrepreneur prior to the start of the program and/or by the program. This makes only comparing the groups not sufficient to test for the true effects of the entrepreneurship program. Charney and Libecap (2000) argue that they investigated the

marginal effects of the entrepreneurship program because they controlled for the individual-specific and socio-economic characteristics of the graduates when running the regressions. In this way, the study does not only compare the average behaviours of the two groups of graduates, but it shows the marginal effects of participating in the entrepreneurship program as well.

In this study, additional regressions are done that aim to deal with the possible self-selection bias of entrepreneurship education by an instrumental variables approach. An instrumental variables approach is applied in the research of Oosterbeek et al. (2010). In this research it is not possible to use the distance to the schools as an instrument. The variable *adeduc2* will be tested as a possible instrument. This variable indicates whether individuals agree with the statement “My school education helped me to better understand the role of entrepreneurs in society”. An instrumental variables approach will be done in a model that considers the following dependent variable: a binary variable that has value 0 for individuals in paid-employment and value 1 for individuals in self-employment (*paidself*). A probit model is suitable for a model with a binary dependent variable (Wooldridge, 2009).

4. Analyses and Results

In this chapter, the results of the empirical research will be presented. First, multicollinearity of the variables is tested. After this, several regressions are run to test for the relation of entrepreneurship education and perceived barriers to entrepreneurship with being self-employed.

4.1 Multicollinearity

Before making the models, multicollinearity of the variables was tested (Table 9). This was done by linear regressions with VIF estimations. Based on the results of these tests, it was found that the country variables are highly correlated with each other. Therefore, STATA will delete one of the country dummies in the regressions.

4.2 Direct relations

Based on previous research, two hypotheses are formulated that test for the direct relation between entrepreneurship education and being self-employed. Multinomial logit models are used to test for the relation between entrepreneurship education and self-employment. After running the multinomial logit regressions, average marginal effects are estimated to interpret the coefficients. The base outcome is being in paid-employment which represents about 35% of the sample (Table 5).

Entrepreneurship education

The results presented in Model 1 (Table 10) show that entrepreneurship education is positively related with being self-employed (at a 1% significance level). More precisely, if an individual (strongly) agrees with the statement “My school education made me interested to become an entrepreneur”, the probability that this individual is self-employed increases, on average by 5.3 percentage point, ceteris paribus ($p < 0.01$). This means that hypothesis 1.1 is supported: education that raises interest for becoming an entrepreneur is positively related with being-self-employed. Also if an individual (strongly) agrees with the statement: “My school education gave me skills and know-how that enable me to run a business”, the probability that this individual is self-employed increases, on average by 3.4 percentage point, ceteris paribus ($p < 0.01$). This means

that education that provides the skills and know-how for running a business is positively related with being self-employed and hypothesis 1.2 is therefore supported.

Perceived barriers to entrepreneurship and control variables

The perceived barriers to entrepreneurship concerning administrative complexity and risk tolerance are negatively related with self-employment at a 1% significance level. If an individual (strongly) agrees with the statement: “It is difficult to start one’s own business due to the complex administrative procedures”, the probability that this individual is self-employed decreases, on average by 3.3 percentage point, *ceteris paribus* ($p < 0.01$). Furthermore, if an individual (strongly) agrees with the statement: “One should not start a business if there is a risk it might fail”, the probability that this individual is self-employed decreases, on average by 1.9 percentage point, *ceteris paribus* ($p < 0.01$). The perceived availability of financial support is negatively related with self-employment at a 5% significance level. More specifically, if an individual (strongly) agrees with the statement: “It is difficult to start one’s own business due to a lack of available financial support”, the probability that this individual is self-employed decreases, on average by 2.0 percentage point, *ceteris paribus* ($p < 0.05$). The perceived barriers to entrepreneurship related to finance, administration and risk tolerance are therefore negatively related with being self-employed (Table 10).

Several control variables were included in the models that test the relation between entrepreneurship education and self-employment. In Table 10, the results considering the influences of the control variables on being self-employed can be found. The expectation was that being a male increases the likeliness that an individual is self-employed. This is confirmed by empirical analysis in this research: if an individual is a male, the probability of being self-employed increases, on average by 6.2 percentage point, *ceteris paribus* ($p < 0.01$). An individual’s age was expected to have a positive influence on being self-employed. However, it was found that age has a small negative effect on being self-employed. Namely, if an individual is one year older, the probability that this individual is self-employed decreases, on average by 0.1 percentage point, *ceteris paribus* ($p < 0.01$). In addition, low educational attainment compared to medium educational attainment was not found to have an effect on being self-employed. However, high educational attainment has a positive effect on being self-employed compared to

having a medium educational attainment: if an individual has a high educational attainment compared to a medium educational attainment, the probability that this individual is self-employed increases, on average by 1.4 percentage point, *ceteris paribus* ($p < 0.05$). Variables that might indicate the type of education that individuals have had are also included in the regressions. Whether an individual's education has contributed to evolve his or her sense of initiative is not related with being self-employed. So participation in education that has given the individual a kind of entrepreneurial attitude is not related with self-employment. However, another variable that could indicate the type of education, is related with being self-employed. Namely, if an individual's education has contributed to his or her understanding on the role of entrepreneurs in society, the probability that this individual is self-employed decreases on average by 3.9 percentage point, *ceteris paribus* ($p < 0.01$). This indicates that the knowledge that individuals have attained through their education could be related with being self-employed. The expectation was that the type of locality (urban, metropolitan and rural area) is of influence on whether individuals are self-employed. This is confirmed, for example if an individual indicates its type of locality is other town or urban centre, the probability that this individual is self-employed decreases, on average by 1.5 percentage point compared to a rural zone, *ceteris paribus* ($p < 0.05$). This indicates the environment is important in determining whether someone is self-employed. In addition, whether an individual considers it as hard to get information on how to start a business has a marginally significant influence on being self-employed. More precise, if an individual (strongly) agrees with that it is difficult to obtain sufficient information on how to start a business, the probability that this individual is self-employed decreases, on average by 1.1 percentage point, *ceteris paribus* ($p < 0.10$). If an individual has at least one parent that is self-employed, the probability that this individual is self-employed increases, on average by 5.5 percentage point, *ceteris paribus* ($p < 0.01$). This shows that individuals might be stimulated by their parents to enter into self-employment. Individual characteristics were expected to influence the decision to become an entrepreneur as well. Some individual characteristics were found to influence whether an individual is self-employed. The first individual characteristic measures whether an individual (strongly) agrees with "In general, I am willing to take risks". If an individual (strongly) agrees with this statement, the probability that this individual is self-employed increases, on average by 3.7 percentage point, *ceteris paribus* ($p < 0.01$). Moreover, if an individual (strongly) agrees with "My life is determined by my own actions, not by others or by chance", the probability that this

individual is self-employed increases, on average by 2.8 percentage point, *ceteris paribus* ($p < 0.01$). Also other individual characteristics are positively related with self-employment. Namely, if an individual (strongly) agrees with “I am an inventive person who has ideas”, the probability that this individual is self-employed increases, on average by 3.3 percentage point, *ceteris paribus* ($p < 0.01$). In addition, if an individual (strongly) agrees with “I am optimistic about my future”, the probability that this individual is self-employed increases, on average by 2.4 percentage point, *ceteris paribus* ($p < 0.01$). Furthermore, if an individual (strongly) agrees with “When confronted with difficult tasks I can count on luck and the help of others”, the probability that this individual is self-employed decreases, on average by 2.7 percentage point, *ceteris paribus* ($p < 0.01$). An individual characteristic that is only marginally significant concerns whether an individual (strongly) agrees with “If I see something I do not like, I change it”. If an individual (strongly) agrees with this statement, the probability that this individual is self-employed increases, on average by 1.7 percentage point, *ceteris paribus* ($p < 0.10$). Some individual characteristics were not found to be related with being self-employed. Whether an individual (strongly) agrees with the following statements is not related with being self-employed: “Generally, when facing difficult tasks, I am certain that I will accomplish them”, “The possibility of being rejected by others for standing up for my decisions would not stop me” and “I like situations in which I compete with others”. The preference for self-employment is related with being self-employed. Namely, if an individual indicates he or she prefers being self-employed over different kinds of jobs, the probability that this individual is self-employed increases, on average by 19.7 percentage point compared to if this individual had a preference for paid employment, *ceteris paribus* ($p < 0.01$). Also if an individual prefers neither being an employee nor being self-employed compared to having a preference for paid employment, this is also positively related with being self-employed. Namely if an individual prefers “none of these” compared to preferring paid employment, the probability of being self-employed increases, on average by 7.4 percentage point, *ceteris paribus* ($p < 0.01$). Lastly, it is confirmed that some countries have a significant impact on whether individuals in a certain country are self-employed.

4.3 Mediation effects

It could be that entrepreneurship education is indirectly related with being self-employed through perceived barriers to entrepreneurship. Nine hypotheses (hypothesis 2.1 until 4.3) are formulated to test for possible mediation effects and compare these possible mediation effects between the two education measures.

Mediator variable: perceived barrier related to finance

Model 2 shows whether entrepreneurship education is related with perceived financial support (Table 11). Education that gave skills and know-how for running a business is related with the perceived barrier to entrepreneurship, concerning the availability of financial support. More specifically, if an individual indicates his or her education provided skills and know-how for running a business, the probability that this individual perceives a lack of financial support, decreases, on average by 1.8 percentage point, *ceteris paribus* ($p < 0.01$). Additionally, the perceived availability of financial support was found to be negatively related with self-employment ($p < 0.05$) (Table 10). Therefore, hypothesis 2.2 is supported. This means that entrepreneurship education that provides the skills and know-how for running a business is negatively related with the perceived lack of financial support and this is in turn positively related with being self-employed. The mean of the predicted probabilities for the perceived barrier related to finance is rather high, namely 0.8398 (Table 12). This represents the chance that an individual will perceive this barrier. However, education that raised interest for becoming an entrepreneur is not related with the perceived barrier to entrepreneurship related to finance. This means hypotheses 2.1 and 2.3 are rejected.

Mediator variable: perceived barrier related to administration

Another perceived barrier that could serve as a mediator variable in the relation between entrepreneurship education and self-employment is the perception of administrative complexity. It was found that the perceived barrier to entrepreneurship concerning administrative complexity is negatively related with self-employment ($p < 0.01$), and the mean of the predicted probabilities for the perceived barrier related to administration is 0.7403 (Table 10 and 12). However, Model 3 shows that both variables that measure entrepreneurship education are not related with the perceived barrier to entrepreneurship concerning administrative complexity (Table 13). Therefore, hypotheses 3.1, 3.2 and 3.3 are rejected.

Mediator variable: perceived barrier related to risk tolerance

The last possible mediator that is tested in this research concerns risk tolerance. The perceived barrier to entrepreneurship concerning risk tolerance was found to be negatively related with self-employment ($p < 0.01$) (Table 10). Model 4 (Table 14) shows that no relation between education that provided skills and know-how for running a business and risk tolerance is present. Thus, no support for hypotheses 4.2 and 4.3 was found. However, entrepreneurship education which raises interest for becoming an entrepreneur, and risk tolerance are related. Namely, if an individual (strongly) agrees with that his or her school education raised interest for becoming an entrepreneur, the probability that this individual (strongly) agrees with that a business should not be started if there is a risk of failure, increases, on average by 2.3 percentage point, *ceteris paribus* ($p < 0.05$). This means hypothesis 4.1 is not supported. It seems entrepreneurship education that raises interest for becoming an entrepreneur is positively related with low risk tolerance and this in turn seems to be negatively associated with being self-employed. The mean of the predicted probabilities for the perceived barrier related to risk tolerance is 0.5326 (Table 12). This predicted probability is lower than the mean of the predicted probabilities of the other barriers. Namely, the mean of the predicted probabilities for the perceived barrier related to finance is 0.8398 and this is 0.7403 for the perceived barrier related to administration (Table 12). This might explain the positive relation between education that raises interest for becoming an entrepreneur and risk tolerance: the mean of the predicted probabilities for risk tolerance is not that high, and this suggests that the positive relation between entrepreneurship education that raises interest for becoming an entrepreneur and risk tolerance might be smaller than found during the empirical analyses.

Additional mediation effects analyses

Models that exclude one perceived barrier (the perceived financial availability, the perceived administrative complexity or the indicated risk tolerance) are constructed to test whether the indirect effect also runs through the direct effect. Model 5, 6 and 7 exclude one barrier in the regression (Table 15, 16 and 17). All these models show that the coefficients for entrepreneurship education 1 and 2 do not differ (much) when comparing these with the coefficients of both entrepreneurship education variables in Model 1 (which includes all variables for entrepreneurship education, perceived barriers and control variables). The differences are almost

negligible. This means that the direct effect and the indirect effect of entrepreneurship education on being self-employed are two separate effects.

Table 3. Overview of the results on the hypotheses

Hypothesis	Supported or rejected
Direct effects	
1.1 Education that raises interest for becoming an entrepreneur is positively related with being self-employed.	Supported
1.2 Education that provides the skills and know-how for running a business is positively related with being self-employed.	Supported
Mediation effects	
<i>Mediator variable: perceived barrier related to finance</i>	
2.1 Entrepreneurship education that raises interest for becoming an entrepreneur is negatively related with the perceived lack of financial support and this is in turn positively related with being self-employed.	Rejected
2.2 Entrepreneurship education that provides the skills and know-how for running a business is negatively related with the perceived lack of financial support and this is in turn positively related with being self-employed.	Supported
2.3 Entrepreneurship education that provides the skills and know-how for running a business has a stronger negative relation with the perceived lack of financial support than education that raises interest for becoming an entrepreneur.	Rejected ¹
<i>Mediator variable: perceived barrier related to administration</i>	
3.1 Entrepreneurship education that raises interest for becoming an entrepreneur is negatively related with perceived administrative complexity and this is in turn positively related with being self-employed.	Rejected
3.2 Entrepreneurship education that provides the skills and know-how for running a business is negatively related with perceived administrative complexity and this is in turn positively related with being self-employed.	Rejected
3.3 Entrepreneurship education that provides the skills and know-how for running a business has a stronger negative relation with perceived administrative complexity than education that raises interest for becoming an entrepreneur.	Rejected
<i>Mediator variable: perceived barrier related to risk tolerance</i>	
4.1 Entrepreneurship education that raises interest for becoming an entrepreneur is negatively related with low risk tolerance and this is in turn positively related with being self-employed.	Rejected ²
4.2 Entrepreneurship education that provides the skills and know-how for running a business is negatively related with low risk tolerance and this is in turn positively related with being self-employed.	Rejected
4.3 Entrepreneurship education that raises interest for becoming an entrepreneur has a stronger negative relation with low risk tolerance than education that raises interest for becoming an entrepreneur.	Rejected ³

¹ Education that raises interest for becoming an entrepreneur is not related with the perceived lack of financial support, but entrepreneurship education that provides the skills and know-how for running a business is negatively related with the perceived lack of financial support.

² It seems entrepreneurship education that raises interest for becoming an entrepreneur is positively related with low risk tolerance and this in turn seems to be negatively associated with being self-employed.

³ No relation between education that provided skills and know-how for running a business and risk tolerance is present, but entrepreneurship education that raises interest for becoming an entrepreneur is positively related with low risk tolerance.

An overview of the results on the hypotheses can be found in Table 3. In sum the results show that entrepreneurship education is positively related with being an entrepreneur through a direct channel. Moreover, only one measure for entrepreneurship education, which is education that provides the skills and know-how for running a business, is related with perceived financial support. It was found that entrepreneurship education that provides the skills and know-how for running a business is negatively related with the perceived lack of financial support and this is in turn positively related with being self-employed. Additionally, entrepreneurship education was not found to be related with the perceived administrative complexity. Lastly, no relation between education that provided skills and know-how for running a business and risk tolerance is present. However, it seems entrepreneurship education that raises interest for becoming an entrepreneur is positively related with low risk tolerance and this in turn seems to be negatively associated with being self-employed.

4.4 Additional analyses: Instrumental variables approach

It could be that individuals self-select themselves into entrepreneurship education; individuals with preferences for self-employment might be more likely to participate in entrepreneurship education. Additional bivariate probit regressions are run which aim to correct for the possible self-selection into entrepreneurship education. The dependent variable in these regressions is *paidself*. This variable measures whether individuals are in paid-employment (value 0) or self-employed (value 1). This means that individuals without a professional activity are not included in the regressions. In total, 13,433 observations for *paidself* are present in the dataset of which 67.65% is in paid employment and 32.35% is self-employed.

It could be that ‘additional education 2’ (*addeduc2*) can serve as an instrument to correct for the possible self-selection into entrepreneurship education. This variable indicates whether an individual’s education contributed to a better understanding of the role that entrepreneurs have in the society.

Model 8 shows whether ‘additional education 2’ can serve as an instrument for entrepreneurship education which is measured by education that raised interest for becoming an entrepreneur (Table 18). The Wald test of $\rho=0$ gives $\chi(1)=6.1448$ and $\text{Prob}>\chi^2=0.0132<0.05$. Therefore,

the variable that indicates whether an individual's education contributed to a better understanding of the role that entrepreneurs have in the society seems to be a good instrument to correct for the possible self-selection bias into entrepreneurship education when only taking individuals in paid-employment and self-employed individuals into account. Model 9 shows whether 'additional education 2' can serve as an instrument for entrepreneurship education measured by education that provides skills and know-how for running a business (Table 19). The Wald test of $\rho=0$ gives $\chi^2(1)=16.1299$ and $\text{Prob}>\chi^2=0.0001<0.05$. Therefore, the variable that indicates whether an individual's education contributed to a better understanding of the role that entrepreneurs have in the society again seems to be a good instrument to correct for the possible self-selection bias into entrepreneurship education when only individuals in paid-employment and self-employed individuals are considered. However, a selection of the sample (individuals in paid employment and self-employed individuals) is taken into account in the regressions. Therefore, no conclusions of these additional analyses will be made, otherwise this would introduce bias.

5. Conclusion and Discussion

This research focused on the relation between entrepreneurship education and being self-employed. This relation was investigated by using data from the 2009 Flash Eurobarometer No 283, which contains data of 36 countries. The first research question is formulated as follows:

Is entrepreneurship education directly related with self-employment?

For the empirical analyses, entrepreneurship education was measured by two variables: education that raises interest for becoming an entrepreneur and education that provides skills and know-how for running a business. Using multinomial logit models, it was found that both entrepreneurship education variables are positively related with being self-employed. This is in line with previous research on the relation between entrepreneurship education and entrepreneurship (e.g., Kolvereid and Moen, 1997; McMullan and Murray, 1998; Menzies and Paradi, 2003).

Mediator variables in the relation between entrepreneurship education and self-employment were tested as well. The second research question is the following:

Do perceived barriers to entrepreneurship (availability of financial support, administrative complexity and risk tolerance) mediate the effect of entrepreneurship education on self-employment?

When applying (multinomial) logit regressions, the following results on the perceived barriers to entrepreneurship as possible mediators were found. The first perceived barrier to entrepreneurship is related to finance. Finance is a well recognized barrier to entrepreneurship in previous research (e.g., Blanchflower and Oswald, 1998; Fleming, 1996; Gibcus et al., 2012). The results indicate entrepreneurship education that provides the skills and know-how for running a business is negatively related with the perceived lack of financial support, and this is in turn positively related with being self-employed. This means the perceived financial support can be seen as a mediator in the relation between education that provides skills and know-how for running a business and being self-employed. This may be explained by that those who have received entrepreneurship education may have better knowledge of how and where to obtain financing. The participants of entrepreneurship education might have thought of and found

solutions for financing during their education. This might indicate that participants have had more time to think of sources for financing than individuals that did not participate in entrepreneurship education. However, when considering education that raises interest for becoming an entrepreneur, the perceived financial support was not found to be a mediator in the relation between entrepreneurship education and being self-employed. This might be explained by that only education that provides the skills and know-how for running a business gives individuals better knowledge of how and where to obtain financing, and that this does not hold for entrepreneurship education that raised interest for starting a business.

Secondly, the perceived barrier to entrepreneurship related to administration is considered. Red tape has a negative impact on entrepreneurship (OECD, 2006). However, the perceived administrative complexity was not found to be a mediator in the relation between entrepreneurship education and self-employment. This indicates that entrepreneurship education is not successful in tackling this barrier to entrepreneurship. Yet, Shinnar et al. (2009) found that the administrative complexity, measured by paperwork for starting a business and bureaucracy, is not seen as a large barrier to entrepreneurship among university students and faculty members. This indicates that this barrier might not be as relevant as the other perceived barriers to entrepreneurship in explaining self-employment.

Thirdly, the perceived barrier to entrepreneurship related to risk tolerance was examined. Previous research found that being more risk averse has a negative influence on becoming self-employed (Kan and Tsai, 2006). In this research, it was tested whether risk tolerance is a mediator in the relation between entrepreneurship education and being self-employed. Sánchez (2011) found that an entrepreneurship education program, offered to Spanish university students, increased students' risk taking. The expectation therefore was that entrepreneurship education is negatively related with low risk tolerance and this is in turn positively related with being self-employed. However, it was found that entrepreneurship education that raises interest for becoming an entrepreneur is positively related with low risk tolerance and this in turn is negatively associated with being self-employed. Evidently, entrepreneurship education considered in this research, is not negatively related with low risk tolerance when the start of a business is considered. It could be that certain entrepreneurship education programs make

students less risk averse, but entrepreneurship in general was not found to be negatively related with low risk tolerance. This might be explained by that entrepreneurship education can give individuals a more realistic view on entrepreneurship (Oosterbeek et al., 2010). In this way, individuals might be more aware of the risks when starting a business and may therefore be less likely to state they will start a business if there is a risk of failure. No relation between education that provided skills and know-how for running a business and risk tolerance is present. Apparently, having skills and know-how for running a business is not related to risk tolerance when starting a business.

Thus, this research contributes to the existing literature on the relation between entrepreneurship education and entrepreneurship. It was found that entrepreneurship education and self-employment are positively related. In addition, indirect effects of entrepreneurship education on self-employment were considered. So, this research focused on direct effects of entrepreneurship education but mediation effects were also tested. The following indirect relations were found to hold. Firstly, entrepreneurship education that provides the skills and know-how for running a business is negatively related with the perceived lack of financial support and this is in turn positively related with being self-employed. Also, entrepreneurship education that raises interest for becoming an entrepreneur is positively related with low risk tolerance and this in turn is negatively associated with being self-employed. This means that perceived financial support and risk tolerance can serve as mediators. Since entrepreneurship education is positively related with entrepreneurship through a direct channel, stimulating entrepreneurship might be done through entrepreneurship education. In this way, stimulating entrepreneurship can help to improve individual and economic welfare.

This research is subject to several limitations. Firstly, the independent variables (entrepreneurship education and perceived barriers to entrepreneurship) are based on individuals' agreements with statements. Therefore, these variables represent individuals' opinions about the statements. For example, it could be that individuals with the same education rate the statements on entrepreneurship education differently due to a different opinion on the effectiveness of the entrepreneurship education program. This research therefore focused on perceived barriers to entrepreneurship, but also on perceived entrepreneurship education. Also self-employed

individuals might be more inclined to state their education contributed to developing entrepreneurial intentions, skills and know-how than individuals who are not self-employed.

Moreover, this research showed that entrepreneurship education in general is positively related with self-employment. Though, considering the effects of specific entrepreneurship education programs can have advantages. Future research should focus on which programs have the intended effects. In this way there can be determined which programs should be stimulated most and which programs should be adjusted to become (more) effective.

Besides, a self-selection bias could be present. Individuals that are interested in becoming an entrepreneur may be more likely to participate in education that stimulates them in becoming an entrepreneur than individuals who are not interested in becoming an entrepreneur. An attempt was made to deal with this possible self-selection bias by an instrumental variables approach applied in bivariate probit regressions. However, future research might strive to perform an instrumental variables approach with multinomial logit models so that individuals without a professional activity, individuals in paid-employment and self-employed individuals can be taken into account.

Entrepreneurship education might be differently related with opportunity and necessity entrepreneurs. For example, previous research found that “entrepreneurship education positively relates to engagement in opportunity-driven entrepreneurial activities, which suggests that entrepreneurship education can be an important instrument for fostering opportunity-based entrepreneurship” (Verheul et al., 2010, p. 17-18). Entrepreneurship education was measured by the agreement with the statement that individuals’ education contributed to giving them a sense of initiative or in other words an entrepreneurial attitude (Verheul et al., 2010). Previous studies also found that perceived barriers to entrepreneurship differ between opportunity and necessity entrepreneurs (Bhola, Verheul, Thurik and Grilo, 2006; Verheul et al., 2010). This research investigated entrepreneurship in general. In future research, the effects of entrepreneurship education on being an entrepreneur through certain motivations might be investigated.

Another limitation of this research is that it only took the skills and know-how for running a business obtained by education into account. Other human capital variables were included in the regressions as well, e.g. age was taken into account (which might indicate experience) and variables that indicate an individual's educational attainment were included. However, no variables that directly measure individuals' human capital (skills, traits, knowledge and experience) related to entrepreneurship were included in the regressions. Prior research found that these human capital measures related to entrepreneurship can be important in determining whether an individual is or becomes an entrepreneur. For example, prior experience with self-employment is positively related with being involved with nascent entrepreneurship (Davidsson and Honig, 2003). In addition, an individual's network might be important in the start of a business. This is something in which an individual's experience could be more influential than education and training in research (Levie and Autio, 2008). Future research may take more human capital measures, possibly related with whether individuals are entrepreneurs, into account.

Furthermore, it is assumed that individuals have on average a higher educational attainment if these individuals are older when finishing their full time education. Possible exceptions on this are neglected. It could be, for example, that some individuals have used additional years for finishing their education, but this does not necessarily mean they are higher educated. Future research could take a variable into account that measures the level of education instead of age when finishing full time education, so that the level of educational attainment is measured in a direct way instead of an indirect way (through an individual's age when finishing fulltime education) as is done in this research.

Additionally, in a previous study it is stated that barriers could differ between different populations and "specific populations require specific materials and support to facilitate the process of developing and nurturing a business idea" (Hatala, 2005, p. 67). It is recommended future research takes these possible differences, in e.g. perceived barriers, between different populations into account.

Moreover, a marginal note is that entrepreneurship education might have different influences among individuals of different ages. For example, the desire of becoming entrepreneur may be

important in determining the choices that will be made concerning e.g. future education among high school students. For older individuals, entrepreneurship education might have an influence on the choices that will be made on career choices, e.g. becoming an entrepreneur, in the short term (Peterman and Kennedy, 2003).

Another note is that not all entrepreneurial activities are beneficial for society. For example, some entrepreneurs do not become successful and do not create jobs (Van Praag, 1999). In the research of Bowen and De Clercq (2008) a specific type of entrepreneurship was already considered. Namely, entrepreneurs that expect high-growth of their business are of interest in the study. They found a positive effect of the presence of education on entrepreneurship in a country on the proportion of entrepreneurs that aim for high-growth compared to the total number of entrepreneurs in that country. Possibly policymakers want to stimulate entrepreneurship directed towards high-growth. This type of entrepreneurship might contribute more to economic growth compared to entrepreneurs without high-growth objectives. Also creative entrepreneurs might be important for the economy. These entrepreneurs may contribute to the growth of the economy by their innovations. In future research there might be investigated to what extent entrepreneurship education influences entrepreneurship that is directed to e.g. job-creation.

Also the policies aimed to stimulate entrepreneurship should take the optimal level of entrepreneurship in a country into account. This indicates an increase in the self-employment rate does not have to be beneficial for a society. In fact, the study of Blanchflower (2000) on OECD countries found that a higher self-employment rate decreased the economy's real growth rate. However as mentioned before, different types of entrepreneurship might have different effects on the economy. In determining the effect of the self-employment rate on an economy's real growth rate, one should keep in mind that different kinds of entrepreneurs could have different impacts on the economy's real growth rate. For example, policy makers could focus on stimulating innovative, creative and/or highly educated individuals in becoming entrepreneurs. These individuals might be most successful in e.g. creating jobs and may therefore positively contribute to the economy's real growth rate. Thus, one should think of which individuals should be stimulated to become entrepreneurs.

Lastly, in this research, the effect of entrepreneurship education on being an entrepreneur is investigated. However, it could be that there is more behind the relation that is tested. For example, entrepreneurship education may cause sorting of students that have different entrepreneurial abilities. This is recognized by Von Graevenitz, Harhoff and Weber (2010). They tested the effect of an obligatory entrepreneurship course offered by a German university by using pre- and post-measures. In their research, they explain that the students learned about their entrepreneurial abilities through the course. In this way, the course caused sorting of the students. Students that were not certain about their entrepreneurial abilities learned from the course whether becoming an entrepreneur would fit them. The experience with the program will determine the entrepreneurial intentions of the students. Namely, the intentions towards entrepreneurship will be lower among students who learn, due to the program, that becoming an entrepreneur is not suitable for them in comparison with the students that learn they are suitable for entrepreneurship. Therefore, it might be the case that entrepreneurship education gives individuals the opportunity to learn about whether entrepreneurship suits them. Future research might focus on whether entrepreneurship education has an effect on whether individuals learn about how suitable entrepreneurship is for them instead of only focusing on whether it is positively related with that individuals are entrepreneurs. In this way, only individuals that have an aptitude for entrepreneurship might be stimulated and more successful entrepreneurship may be the consequence of this.

Despite the limitations, this research has shown that entrepreneurship education is positively related with being self-employed through a direct channel. Also mediator variables were found: the perceived financial support and risk tolerance are mediators in the relation between a certain measure for entrepreneurship education and being self-employed. These findings pave the way for many future research possibilities.

6. References

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Annex

Table 4. Summation of the dependent, independent and control variables

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Being an entrepreneur	26,138	.680	.742	0	2
Entrepreneurship education 1	25,175	.310	.462	0	1
Entrepreneurship education 2	25,247	.443	.497	0	1
Perceived barrier related to finance	24,223	.848	.359	0	1
Perceived barrier related to administration	23,864	.756	.430	0	1
Perceived barrier related to risk tolerance	24,843	.540	.498	0	1
Gender	26,168	.418	.493	0	1
Age	26,030	49.661	17.538	15	97
Low education	24,570	.122	.327	0	1
High education	26,168	.287	.453	0	1
Additional education 1	25,263	.537	.499	0	1
Additional education 2	25,161	.501	.500	0	1
Metropolitan zone	26,105	.227	.419	0	1
Other town or urban centre	26,105	.430	.495	0	1
Difficulties with obtaining information	23,169	.577	.494	0	1
Self-employed parents	25,315	.281	.449	0	1
Individual characteristic 1	25,597	.607	.488	0	1
Individual characteristic 2	25,431	.833	.373	0	1
Individual characteristic 3	25,527	.856	.351	0	1
Individual characteristic 4	25,314	.831	.375	0	1
Individual characteristic 5	25,142	.803	.398	0	1
Individual characteristic 6	25,604	.801	.399	0	1
Individual characteristic 7	25,542	.781	.414	0	1
Individual characteristic 8	25,470	.539	.498	0	1

Individual characteristic 9	25,595	.647	.478	0	1
Preference for self-employment	25,489	.459	.498	0	1
No preference for paid employment or self-employment	25,489	.044	.205	0	1
Belgium	26,168	.038	.192	0	1
Czech Republic	26,168	.038	.192	0	1
Denmark	26,168	.019	.137	0	1
Germany	26,168	.038	.192	0	1
Estonia	26,168	.020	.140	0	1
Greece	26,168	.038	.192	0	1
Spain	26,168	.039	.193	0	1
France	26,168	.038	.192	0	1
Ireland	26,168	.019	.137	0	1
Italy	26,168	.039	.193	0	1
Cyprus	26,168	.019	.138	0	1
Latvia	26,168	.019	.137	0	1
Lithuania	26,168	.019	.137	0	1
Luxembourg	26,168	.019	.138	0	1
Hungary	26,168	.038	.192	0	1
Malta	26,168	.019	.138	0	1
The Netherlands	26,168	.038	.192	0	1
Austria	26,168	.019	.137	0	1
Poland	26,168	.038	.192	0	1
Portugal	26,168	.038	.192	0	1
Slovenia	26,168	.019	.137	0	1
Slovakia	26,168	.020	.139	0	1
Finland	26,168	.019	.137	0	1
Sweden	26,168	.019	.137	0	1
United Kingdom	26,168	.038	.192	0	1
Bulgaria	26,168	.019	.137	0	1
Croatia	26,168	.019	.137	0	1
Romania	26,168	.019	.137	0	1
Turkey	26,168	.019	.137	0	1
Norway	26,168	.019	.137	0	1
Switzerland	26,168	.019	.138	0	1
Iceland	26,168	.019	.137	0	1
United States	26,168	.039	.193	0	1
South Korea	26,168	.038	.192	0	1
Japan	26,168	.038	.192	0	1
China	26,168	.038	.192	0	1

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Table 5. Tabulation of 'Being an entrepreneur' (entr)

entr	Frequency	Percentage	Cumulative
0	12,705	48.61	48.61
1	9,088	34.77	83.38
2	4,345	16.62	100.00
Total	26,138	100.00	

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Table 6. Frequencies and percentages of 'Entrepreneurship education 1' (whether an individual's education raised interest for becoming an entrepreneur)

	No education that raised interest for entrepreneurship	Education that raised interest for entrepreneurship	Total
Total sample	17,374 (69.01%)	7,801 (30.99%)	25,175 (100%)
Entrepreneurship			
Without a professional activity	8,278 (47.69%)	3,746 (48.06%)	12,024 (47.81%)
In paid employment	6,709 (38.65%)	2,166 (27.79%)	8,875 (35.29%)
Self-employed	2,370 (13.65%)	1,883 (24.16%)	4,253 (16.91%)
Total	17,357 (100.00%)	7,795 (100.00%)	25,152 (100.00%)
Perception of barriers: availability of financial support			
Not perceiving this barrier	2,467 (15.45%)	1,097 (14.64%)	3,564 (15.19%)
Perceiving this barrier	13,503 (84.55%)	6,395 (85.36%)	19,898 (84.81%)
Total	15,970 (100.00%)	7,492 (100.00%)	23,462 (100.00%)
Perception of barriers: administrative complexity			
Not perceiving this barrier	3,782 (24.09%)	1,897 (25.52%)	5,679 (24.55%)
Perceiving this barrier	11,917 (75.91%)	5,537 (74.48%)	17,454 (75.45%)
Total	15,699 (100.00%)	7,434 (100.00%)	23,133 (100.00%)
Perception of barriers: low risk tolerance			
Not perceiving this barrier	7,620 (46.22%)	3,514 (46.46%)	11,134 (46.29%)
Perceiving this barrier	8,867 (53.78%)	4,050 (53.54%)	12,917 (53.71%)
Total	16,487 (100.00%)	7,564 (100.00%)	24,051 (100.00%)

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Table 7. Frequencies and percentages of 'Entrepreneurship education 2' (whether an individual's education has provided him or her with the skills and know-how for running a business)

	No education that gave skills and know-how for running a business	Education that gave skills and know-how for running a business	Total
Total sample	14,065 (55.71%)	11,182 (44.29%)	25,247 (100.00%)
Entrepreneurship			
Without a professional activity	6,961 (49.53 %)	5,077 (45.45%)	12,038 (47.72%)
In paid employment	5,218 (37.13%)	3,685 (32.99%)	8,903 (35.30%)
Self-employed	1,875 (13.34%)	2,408 (21.56%)	4,283 (16.98%)
Total	14,054 (100.00%)	11,170 (100.00%)	25,224 (100.00%)
Perception of barriers: availability of financial support			
Not perceiving this barrier	1,908 (14.81%)	1,669 (15.67%)	3,577 (15.20%)
Perceiving this barrier	10,977 (85.19%)	8,980 (84.33%)	19,957 (84.80%)
Total	12,885 (100.00%)	10,649 (100.00%)	23,534 (100.00%)
Perception of barriers: administrative complexity			
Not perceiving this barrier	2,983 (23.59%)	2,734 (25.87%)	5,717 (24.62%)
Perceiving this barrier	9,664 (76.41%)	7,836 (74.13%)	17,500 (75.38%)
Total	12,647 (100.00%)	10,570 (100.00%)	23,217 (100.00%)
Perception of barriers: low risk tolerance			
Not perceiving this barrier	6,024 (45.28%)	5,159 (47.65%)	11,183 (46.34%)
Perceiving this barrier	7,280 (54.72%)	5,668 (52.35%)	12,948 (53.66%)
Total	13,304 (100.00%)	10,827 (100.00%)	24,131 (100.00%)

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Table 8. Correlation matrix of the dependent and independent variables (Spearman's rho)

	1.entr	2.educ1	3.educ2	4. bfin	5. badm
1. Entrepreneurship/entr (without a professional activity=0/in paid employment=1/self-employed=2)					
2. Education that raised interest for entrepreneurship/educ1 (no=0/yes=1)	0.045***				
3. Education that gave skills and know-how for running a business/educ2 (no=0/yes=1)	0.072***	0.450***			
4. Perceived barrier: availability of financial support/bfin (no=0/yes=1)	-0.058***	0.011	-0.012*		
5. Perceived barrier: administrative complexity/badm (no=0/yes=1)	-0.103***	-0.016**	-0.026***	0.262***	
6. Perceived barrier: risk tolerance/brisk (no=0/yes=1)	-0.135***	-0.002	-0.024***	0.122***	0.141***

Source: Flash Eurobarometer Survey No 293 (2009), STATA 11.0

Notes: The number of observations range from 22,982 until 25,224. This might be caused by that different missing values for each variable could be present. More precisely, the following number of observations are present for each correlation: spearman entr educ1= 25,152, spearman entr educ2 = 25,224, spearman entr bfin = 24,198, spearman entr badm = 23,837, spearman entr brisk = 24,817, spearman educ1 educ2 = 24,834, spearman educ1 bfin = 23,462, spearman educ1 badm= 23,133, spearman educ1 brisk = 24,051, spearman educ2 bfin = 23,534, spearman educ2 badm = 23,217, spearman educ2 brisk = 24,131, spearman bfin badm = 22,982, spearman bfin brisk = 23,562 and spearman badm brisk = 23,234.

***Statistically significant at 1%

** Statistically significant at 5% level

*Statistically significant at 10% level

Table 9. VIF values of the independent and control variables

Variable	
	Being an entrepreneur
China	5.21
United States	4.68
Japan	4.34
Greece	4.18
Spain	4.04
France	3.97
South Korea	3.93
Germany	3.82
United Kingdom	3.65
The Netherlands	3.62
Portugal	3.60
Hungary	3.49
Czech Republic	3.44
Poland	3.38
Italy	3.23
Belgium	3.09
Turkey	2.71
Ireland	2.59
Luxembourg	2.54
Slovakia	2.47
Slovenia	2.47
Bulgaria	2.46
Cyprus	2.39
Denmark	2.34
Finland	2.34
Romania	2.30
Croatia	2.28
Austria	2.25
Switzerland	2.25
Norway	2.23
Latvia	2.18
Malta	2.14
Lithuania	2.13
Sweden	2.12
Iceland,	1.92
Additional education 2	1.62
Additional education 1	1.57
Entrepreneurship education 1	1.55
Entrepreneurship education 2	1.52
Metropolitan zone	1.51
Other town or urban centre	1.41
Difficulties with obtaining information	1.24
Perceived barrier related to administration	1.23
Low education	1.23
Age	1.23
Individual characteristic 6	1.20
Individual characteristic 8	1.20
Perceived barrier related to risk tolerance	1.20

Individual characteristic 1	1.20
High education	1.20
Preference for self-employment	1.17
Individual characteristic 2	1.16
Individual characteristic 4	1.15
Perceived barrier related to finance	1.15
Individual characteristic 7	1.14
Individual characteristic 5	1.12
Self-employed parents	1.11
Individual characteristic 9	1.10
Individual characteristic 3	1.09
No preference for paid employment or self-employment	1.08
Gender	1.07

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: For 'Being an entrepreneur' (entr) the Mean VIF = 2.27. In the linear regression, the variable indicating Estonia (ee) was omitted because of collinearity.

Table 10. Explaining self-employment from entrepreneurship education, barriers to entrepreneurship and control variables

Model 1.	Being an entrepreneur (value 0)		Being an entrepreneur (value 2)		Being an entrepreneur (prediction value 2)	
	Coefficient	Robust Std. Err.	Coefficient	Robust Std. Err.	dy/dx	Delta-method St. Error
Independent variables						
Entrepreneurship education 1	.274***	.053	.531***	.061	.053***	.007
Entrepreneurship education 2	-.010	.049	.252***	.057	.034***	.007
Perceived barrier related to finance	.019	.060	-.143**	.065	-.020**	.008
Perceived barrier related to administration	.133***	.051	-.184***	.057	-.033***	.007
Perceived barrier related to risk tolerance	.168***	.043	-.061	.052	-.019***	.006
Control variables						
Gender	-.424***	.041	.258***	.049	.062***	.006
Age	.065***	.002	.021***	.002	-.001***	.000
Low education	.855***	.081	.320***	.108	-.013	.012
High education	-.121***	.047	.045	.054	.014**	.007
Additional education 1	-.068	.049	-.074	.060	-.005	.007
Additional education 2	.112**	.050	-.238***	.060	-.039***	.007
Metropolitan zone	-.189***	.058	-.208***	.067	-.015*	.008
Other town or urban centre	-.104**	.047	-.164***	.057	-.015**	.007
Difficulties with obtaining information	.021	.044	-.074	.052	-.011*	.006
Self-employed parents	.136***	.047	.482***	.053	.055***	.006
Individual characteristic 1	-.061	.044	.248***	.056	.037***	.007
Individual characteristic 2	-.404***	.060	-.188**	.078	.001	.009
Individual characteristic 3	-.044	.060	.188**	.075	.028***	.009
Individual characteristic 4	.088	.058	.167**	.072	.017*	.009
Individual characteristic 5	.056	.052	.094	.067	.009	.008
Individual characteristic 6	-.039	.054	.226***	.073	.033***	.009
Individual characteristic 7	-.073	.051	.142**	.067	.024***	.008
Individual	-.075*	.043	.043	.053	.011	.006

characteristic 8						
Individual	.068	.044	-.167***	.052	-.027***	.006
characteristic 9						
Preference for self-employment	.410***	.043	1.678***	.055	.197***	.006
No preference for paid or self-employment	.748***	.128	.922***	.176	.074***	.021
Belgium	-.844***	.151	-1.335***	.213	-.123***	.026
Czech Republic	-1.053***	.147	-.368**	.158	.019	.019
Denmark	-1.893***	.176	-1.525***	.205	-.081***	.026
Germany	-1.436***	.148	-.890***	.155	-.025	.018
Estonia	-1.248***	.210	-.599***	.216	.001	.026
Greece	-.830***	.146	-.638***	.150	-.031***	.018
Spain	-.976***	.149	-.824***	.156	-.047**	.019
France	-1.472***	.137	-1.689***	.168	-.130***	.020
Ireland	-1.125***	.168	-1.215***	.198	-.089***	.024
Italy	-1.287***	.157	-.723***	.159	-.013	.019
Cyprus	-1.293***	.190	-.749***	.189	-.016	.022
Latvia	-.849***	.193	-.720***	.223	-.041	.027
Lithuania	-1.329***	.189	-.822***	.213	-.023	.026
Luxembourg	-1.051***	.161	-1.300***	.217	-.105***	.026
Hungary,	-1.043***	.150	-.546***	.168	-.005	.020
Malta	-.703***	.183	-1.275***	.258	-.124***	.032
The Netherlands	-1.441***	.146	-.893***	.156	-.026	.019
Austria	-1.138***	.176	-.914***	.209	-.048*	.025
Poland	-1.213***	.150	-.781***	.159	-.0254	.019
Portugal	-1.508***	.153	-1.078***	.162	-.046**	.019
Slovenia	-.892***	.163	-1.330***	.219	-.119***	.027
Slovakia	-.899***	.171	-.575***	.206	-.018	.025
Finland	-1.093***	.175	-.170	.185	.048**	.021
Sweden	-1.577***	.189	-.975***	.203	-.028	.025
United Kingdom	-1.089***	.147	-1.007***	.165	-.064***	.020
Bulgaria	-1.005***	.175	-.985***	.202	-.066***	.024
Croatia	-.698***	.178	-.810***	.220	-.063**	.026
Romania	-.392**	.191	-.586***	.217	-.053**	.025
Turkey	.560***	.190	.533**	.217	.035	.023
Norway	-1.96***	.193	-.931***	.195	.003	.024
Switzerland	-1.470***	.178	-1.132***	.206	-.056**	.025
Iceland	-2.486***	.237	-.896***	.205	.042	.026
United States	-1.023***	.148	-.579***	.143	-.011	.016
South Korea	1.101***	.189	.199	.175	-.0458**	.019
Japan	-1.025***	.151	-.569***	.156	-.009	.018
Constant	-2.121***	.167	-2.519***	.183		
Log pseudolikelihood	-13835.587					
Observations	16166				16166	
Wald chi2(122)	4313.73					
Prob > chi2	0.0000					
Pseudo R2	0.1879					

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: A multinomial logit regression is used to test for the direct relation of entrepreneurship education and self-employment. In the regressions, value 1 of 'Being an entrepreneur' (which indicates being in paid employment) is

used as the base value. After running the multinomial logit regression, the average marginal effects of entrepreneurship education, perceived barriers to entrepreneurship and the control variables on being self-employed are estimated. When estimating the average marginal effects, outcome 2 of 'Being an entrepreneur' (which stands for self-employment) is predicted. The estimates for the average marginal effects can be found in the last two columns of the table. Model 1 therefore shows the direct relations between entrepreneurship education and being self-employed. Due to collinearity the variable *cn* (China) was omitted from the regressions.

***Statistically significant at 1%

** Statistically significant at 5% level

*Statistically significant at 10% level

Table 11. Explaining perceived financial support from entrepreneurship education, perceived administrative complexity, risk tolerance and control variables

Model 2.	Perceived barrier related to finance		Perceived barrier related to finance	
	Coefficient	Robust Std. Err.	dy/dx	Delta-method St. Error
Entrepreneurship education 1	.069	.061	.008	.007
Entrepreneurship education 2	-.160***	.056	-.018***	.006
Perceived barrier related to administration	1.061***	.051	.122***	.006
Perceived barrier related to risk tolerance	.470***	.0511	.054***	.006
Gender	-.184***	.048	-.021***	.006
Age	.000	.002	.000	.000
Low education	-.048	.094	-.006	.011
High education	-.104*	.053	-.012*	.006
Additional education 1	-.015	.058	-.002	.007
Additional education 2	.075	.059	.009	.007
Metropolitan zone	.020	.067	.002	.008
Other town or urban centre	-.080	.057	-.009	.007
Difficulties with obtaining information	.720***	.053	.083***	.006
Self-employed parents	-.107**	.053	-.012**	.006
Individual characteristic 1	.024	.053	.003	.006
Individual characteristic 2	-.008	.071	-.001	.008
Individual characteristic 3	.101	.070	.016	.008
Individual characteristic 4	.015	.066	.002	.008
Individual characteristic 5	.119*	.061	.014*	.007
Individual characteristic 6	.049	.065	.006	.007
Individual	-.168	.065	-.019	.007

characteristic 7				
Individual characteristic 8	.032	.051	.004	.006
Individual characteristic 9	-.015	.051	-.002	.006
Preference for self-employment	.070	.050	.008	.006
No preference for paid or self-employment	-.497***	.124	-.057***	.014
Country dummies	included		included	
Constant	.446***	.163		
Log pseudolikelihood	-6068.8137			
Observations	16180		16180	
Wald chi2(60)	1841.68			
Prob > chi2	0.0000			
Pseudo R2	0.1437			

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: A logit regression is used to test for the relation between entrepreneurship education and the perceived barrier related to finance. After running the logit regression, the average marginal effects are estimated. The estimates for the average marginal effects can be found in the last two columns of the table. Due to collinearity the variable *cn* (China) was omitted from the regressions.

***Statistically significant at 1%

** Statistically significant at 5% level

*Statistically significant at 10% level

Table 12. Predicted probabilities of 'Perceived barrier related to finance', 'Perceived barrier related to administration' and 'Perceived barrier related to risk tolerance'

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Perceived barrier related to finance, predicted	16535	.8398	.1372	.2076	.9854
Perceived barrier related to administration, predicted	16570	.7403	.1919	.1057	.9711
Perceived barrier related to risk tolerance, predicted	16391	.5326	.2041	.0351	.9366

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: The predicted probabilities are estimated after running the logit regressions with 'Perceived barrier related to finance', 'Perceived barrier related to administration' and 'Perceived barrier related to risk tolerance' as dependent variables. Values for the predicted probabilities range from zero to one. In this case, it estimates the chance that an individual perceives a certain barrier.

Table 13. Explaining perceived administrative complexity from entrepreneurship education, perceived financial support, risk tolerance and control variables

Model 3.	Perceived barrier related to administration		Perceived barrier related to administration	
	Coefficient	Robust Std. Err.	dy/dx	Delta-method St. Error
Entrepreneurship education 1	.048	.053	.007	.008
Entrepreneurship education 2	-.036	.050	-.006	.008
Perceived barrier related to finance	1.055***	.051	.164***	.008
Perceived barrier related to risk tolerance	.328***	.044	.051***	.007
Gender	-.041	.041	-.006	.006
Age	.005***	.001	.001***	.000
Low education	-.070	.080	-.011	.012
High education	-.068	.046	-.010	.007
Additional education 1	.040	.051	.006	.008
Additional education 2	-.008	.051	-.001	.008
Metropolitan zone	-.223***	.057	-.035***	.009
Other town or urban centre	-.122**	.049	-.019**	.008
Difficulties with obtaining information	1.469***	.043	.228***	.006
Self-employed parents	.018	.046	.003	.007
Individual characteristic 1	-.023	.046	-.004	.007
Individual characteristic 2	.051	.062	.008	.010
Individual characteristic 3	.028	.061	.004	.009
Individual characteristic 4	.132**	.057	.021**	.009
Individual characteristic 5	.049	.054	.008	.008
Individual characteristic 6	-.049	.056	-.008	.009
Individual characteristic 7	-.155***	.054	-.024***	.008
Individual characteristic 8	-.119***	.045	-.019***	.007
Individual characteristic 9	.126***	.044	.020***	.007
Preference for self-employment	-.239***	.0434	-.037***	.007
No preference for paid or self-employment	-.344***	.113	-.053***	.018

Country dummies	included		included	
Constant	-1.509***	.145		
Log pseudolikelihood	-7719.6696			
Observations	16180		16180	
Wald chi2(60)	2519.07			
Prob > chi2	0.0000			
Pseudo R2	0.1662			

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: A logit regression is used to test for the relation between entrepreneurship education and the perceived barrier related to administration. After running the logit regression, the average marginal effects are estimated. The estimates for the average marginal effects can be found in the last two columns of the table. Due to collinearity the variable *cn* (China) was omitted from the regressions.

***Statistically significant at 1%

** Statistically significant at 5% level

*Statistically significant at 10% level

Table 14. Explaining risk tolerance from entrepreneurship education, perceived financial support, perceived administrative complexity and control variables

Model 4.	Perceived barrier related to risk tolerance		Perceived barrier related to risk tolerance	
	Coefficient	Robust Std. Err.	dy/dx	Delta-method St. Error
Entrepreneurship education 1	.111**	.046	.023**	.009
Entrepreneurship education 2	.014	.043	.003	.009
Perceived barrier related to administration	.322***	.044	.067***	.009
Perceived barrier related to finance	.463***	.051	.096***	.011
Gender	-.132***	.036	-.027***	.007
Age	.014***	.001	.003***	.000
Low education	.168**	.066	.035**	.014
High education	-.469***	.040	-.097***	.008
Additional education 1	-.013	.044	-.003	.009
Additional education 2	.168***	.044	.035***	.009
Metropolitan zone	-.183***	.050	-.038***	.010
Other town or urban centre	-.087**	.041	-.018**	.009
Difficulties with obtaining information	.523***	.038	.108***	.008
Self-employed parents	-.051	.040	-.011	.008
Individual characteristic 1	-.262***	.039	-.054***	.008
Individual characteristic 2	.025	.052	.005	.011

Individual characteristic 3	.116**	.052	.024**	.011
Individual characteristic 4	.050	.051	.010	.011
Individual characteristic 5	-.098**	.047	-.020**	.010
Individual characteristic 6	-.082*	.049	-.017*	.010
Individual characteristic 7	-.081*	.046	-.017*	.009
Individual characteristic 8	.040	.038	.008	.008
Individual characteristic 9	.146***	.038	.030***	.008
Preference for self-employment	-.363***	.037	-.075***	.008
No preference for paid or self-employment	-.144	.105	-.030	.022
Country dummies	included		included	
Constant	-2.206***	.142		
Log pseudolikelihood	-9728.1633			
Observations	16180		16180	
Wald chi2(60)	2283.84			
Prob > chi2	0.0000			
Pseudo R2	0.1300			

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: A logit regression is used to test for the relation between entrepreneurship education and the perceived barrier related to risk tolerance. After running the logit regression, the average marginal effects are estimated. The estimates for the average marginal effects can be found in the last two columns of the table. Due to collinearity the variable *cn* (China) was omitted from the regressions.

***Statistically significant at 1%

** Statistically significant at 5% level

*Statistically significant at 10% level

Table 15. Explaining self-employment from entrepreneurship education, perceived administrative complexity, risk tolerance and control variables

Model 5.	Being an entrepreneur (value 0)		Being an entrepreneur (value 2)		Being an entrepreneur (prediction value 2)	
	Coefficient	Robust Std. Err.	Coefficient	Robust Std. Err.	dy/dx	Delta-method St. Error
Independent variables						
Entrepreneurship education 1	.281***	.053	.535***	.061	.053***	.007
Entrepreneurship education 2	-.010	.048	.253***	.057	.034***	.007
Perceived barrier related to administration	.114**	.049	-.237***	.055	-.039***	.007
Perceived barrier related to risk tolerance	.179***	.043	-.068	.051	-.021***	.006
Control variables						
Gender	-.423***	.041	.266***	.0482	.063***	.006
Age	.066***	.002	.021***	.002	-.001***	.000
Low education	.849***	.080	.331***	.107	-.011	.012
High education	-.132***	.046	.048	.053	.015**	.007
Additional education 1	-.058	.049	-.071	.059	-.006	.007
Additional education 2	.098**	.050	-.241***	.060	-.038***	.007
Metropolitan zone	-.164***	.057	-.189***	.067	-.015*	.008
Other town or urban centre	-.092**	.046	-.152***	.056	-.014**	.007
Difficulties with obtaining information	.037	.043	-.067	.051	-.011*	.006
Self-employed parents	.136***	.047	.490***	.052	.056***	.006
Individual characteristic 1	-.073*	.043	.235***	.055	.036***	.007
Individual characteristic 2	-.406***	.059	-.192**	.077	.001	.009
Individual characteristic 3	-.036	.060	.174**	.074	.025***	.009
Individual characteristic 4	.077	.057	.173**	.071	.018**	.009
Individual characteristic 5	.051	.052	.089	.066	.009	.008
Individual characteristic 6	-.039	.054	.207***	.072	.030***	.009
Individual characteristic 7	-.078	.051	.159**	.066	.026***	.008
Individual characteristic 8	-.080*	.043	.041	.052	.011**	.006
Individual characteristic 9	.062	.043	-.168***	.051	-.026***	.006

Preference for self-employment	.414***	.043	1.672***	.055	.196***	.006
No preference for paid or self-employment	.750***	.126	.887***	.175	.070***	.021
Country dummies	included		included		included	
Constant	-2.121***	.161	-2.605***	.177		
Log pseudolikelihood	-14120.925					
Observations	16521				16521	
Wald chi2(120)	4412.45					
Prob > chi2	0.0000					
Pseudo R2	0.1888					

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: In the multinomial logit regression the perceived barrier related to finance is not taken into account. In the regressions, value 1 of 'Being an entrepreneur' (which indicates being in paid employment) is used as the base value. After running the multinomial logit regression, the average marginal effects are estimated. When estimating the average marginal effects, outcome 2 of 'Being an entrepreneur' (which stands for self-employment) is predicted. The estimates for the average marginal effects can be found in the last two columns of the table. Due to collinearity the variable *cn* (China) was omitted from the regressions.

***Statistically significant at 1%

** Statistically significant at 5% level

*Statistically significant at 10% level

Table 16. Explaining self-employment from entrepreneurship education, perceived financial support, risk tolerance and control variables

Model 6.	Being an entrepreneur (value 0)		Being an entrepreneur (value 2)		Being an entrepreneur (prediction value 2)	
	Coefficient	Robust Std. Err.	Coefficient	Robust Std. Err.	dy/dx	Delta-method St. Error
Independent variables						
Entrepreneurship education 1	.291***	.053	.527***	.061	.051***	.007
Entrepreneurship education 2	-.024	.048	.249***	.057	.034***	.007
Perceived barrier related to finance	.061	.058	-.175***	.064	-.027***	.008
Perceived barrier related to risk tolerance	.177***	.043	-.055	.051	-.019***	.006
Control variables						
Gender	-.409***	.041	.261***	.048	.061***	.006
Age	.066***	.002	.021***	.002	-.001***	.000
Low education	.853***	.080	.336***	.107	-.011	.012
High education	-.125***	.046	.045	.054	.014**	.007
Additional education 1	-.060	.048	-.070	.059	-.005	.007
Additional education 2	.099**	.050	-.237***	.060	-.038***	.007

Metropolitan zone	-.192***	.057	-.196***	.067	-.013*	.008
Other town or urban centre	-.103**	.046	-.166***	.056	-.015**	.007
Difficulties with obtaining information	.075*	.042	-.105**	.050	-.019***	.006
Self-employed parents	.153***	.047	.501***	.052	.056***	.006
Individual characteristic 1	-.050	.043	.263***	.056	.038***	.007
Individual characteristic 2	-.400***	.059	-.190**	.077	.001	.009
Individual characteristic 3	-.052	.059	.177**	.074	.027***	.009
Individual characteristic 4	.096*	.057	.164**	.071	.015*	.009
Individual characteristic 5	.052	.052	.094	.066	.009	.008
Individual characteristic 6	-.038	.053	.233***	.072	.033***	.009
Individual characteristic 7	-.075	.051	.151**	.066	.025***	.008
Individual characteristic 8	-.086**	.043	.043	.052	.011*	.006
Individual characteristic 9	.074*	.043	-.171***	.051	-.027***	.006
Preference for self-employment	.400***	.042	1.692***	.055	.198***	.006
No preference for paid or self-employment	.752***	.126	.925***	.175	.074***	.021
Country dummies	included		included		included	
Constant	2.130***	.165	-2.609***	.181		
Log pseudolikelihood	-14130.124					
Observations	16556				16556	
Wald chi2(120)	4414.00					
Prob > chi2	0.0000					
Pseudo R2	0.1887					

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: In the multinomial logit regression the perceived barrier related to administration is not taken into account. In the regressions, value 1 of 'Being an entrepreneur' (which indicates being in paid employment) is used as the base value. After running the multinomial logit regression, the average marginal effects are estimated. When estimating the average marginal effects, outcome 2 of 'Being an entrepreneur' (which stands for self-employment) is predicted. The estimates for the average marginal effects can be found in the last two columns of the table. Due to collinearity the variable *cn* (China) was omitted from the regressions.

***Statistically significant at 1%

** Statistically significant at 5% level

*Statistically significant at 10% level

Table 17. Explaining self-employment from entrepreneurship education, perceived financial support, perceived administrative complexity and control variables

Model 7.	Being an entrepreneur (value 0)		Being an entrepreneur (value 2)		Being an entrepreneur (prediction value 2)	
	Coefficient	Robust Std. Err.	Coefficient	Robust Std. Err.	dy/dx	Delta-method St. Error
Independent variables						
Entrepreneurship education 1	.275***	.053	.536***	.061	.054***	.007
Entrepreneurship education 2	-.012	.048	.243***	.057	.033***	.007
Perceived barrier related to finance	.040	.059	-.145**	.065	-.022***	.008
Perceived barrier related to administration	.142***	.050	-.187***	.056	-.034***	.007
Control variables						
Gender	-.423***	.041	.249***	.048	.061***	.006
Age	.066***	.002	.021***	.002	-.002***	.000
Low education	.843***	.080	.314***	.107	-.013	.012
High education	-.142***	.046	.053	.053	.016**	.007
Additional education 1	-.064	.049	-.076	.060	-.006	.007
Additional education 2	.114**	.050	-.245***	.060	-.040***	.007
Metropolitan zone	-.197***	.057	-.200***	.067	-.014*	.008
Other town or urban centre	-.105**	.046	-.165***	.056	-.015**	.007
Difficulties with obtaining information	.039	.044	-.075	.052	-.013**	.006
Self-employed parents	.134***	.047	.482***	.052	.056***	.006
Individual characteristic 1	-.075*	.043	.251***	.056	.038***	.007
Individual characteristic 2	-.402***	.059	-.192**	.078	.000	.009
Individual characteristic 3	-.035	.060	.184**	.074	.027***	.009
Individual characteristic 4	.090	.057	.174**	.071	.017**	.009
Individual characteristic 5	.049	.052	.087	.066	.008	.008
Individual characteristic 6	-.050	.054	.229***	.072	.034***	.009
Individual characteristic 7	-.072	.051	.146**	.066	.024***	.008
Individual characteristic 8	-.073*	.043	.046	.052	.011*	.006
Individual characteristic 9	.073*	.043	-.165***	.051	-.027***	.006

Preference for self-employment	.399***	.042	1.681***	.055	.198***	.006
No preference for paid or self-employment	.764***	.127	.920***	.175		
Country dummies	included		included		included	
Constant	-2.118***	.167	-2.525***	.182	.073***	.021
Log pseudolikelihood	-14018.62					
Observations	16377				16377	
Wald chi2(120)	4332.23					
Prob > chi2	0.0000					
Pseudo R2	0.1875					

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: In the multinomial logit regression the perceived barrier related to risk tolerance is not taken into account. In the regressions, value 1 of 'Being an entrepreneur' (which indicates being in paid employment) is used as the base value. After running the multinomial logit regression, the average marginal effects are estimated. When estimating the average marginal effects, outcome 2 of 'Being an entrepreneur' (which stands for self-employment) is predicted. The estimates for the average marginal effects can be found in the last two columns of the table. Due to collinearity the variable *cn* (China) was omitted from the regressions.

***Statistically significant at 1%

** Statistically significant at 5% level

*Statistically significant at 10% level

Table 18. Instrumental variables approach with entrepreneurship education 1: explaining being in paid employment or being self-employed from entrepreneurship education, perceived barriers to entrepreneurship and control variables

Model 8.	In paid employment or self-employed		Entrepreneurship education 1	
	Coefficient	Robust Std. Err.	Coefficient	Robust Std. Err.
Entrepreneurship education 1	-.049	.138		
Additional education 2			.753***	.037
Entrepreneurship education 2	.201***	.049	.664***	.035
Perceived barrier related to finance	-.080**	.040	.039	.044
Perceived barrier related to administration	-.110***	.035	.018	.039
Perceived barrier related to risk	-.042	.032	.036	.034
Gender	.148***	.030	.132***	.032
Age	.014***	.001	-.002	.001
Low education	.186***	.070	.160**	.076
High education	.066**	.033	.054	.035
Additional education 1	.027	.052	.725***	.038
Metropolitan zone	-.127***	.0412	-.009	.045

Other town or urban centre	-.101***	.035	-.064*	.039
Difficulties with obtaining information	-.047	.033	.091**	.036
Self-employed parents	.303***	.033	.053	.036
Individual characteristic 1	.131***	.035	.092**	.038
Individual characteristic 2	-.104**	.049	.070	.055
Individual characteristic 3	.112***	.046	.098*	.052
Individual characteristic 4	.084*	.044	.008	.050
Individual characteristic 5	.021	.041	-.079*	.044
Individual characteristic 6	.140***	.045	.053	.050
Individual characteristic 7	.059	.042	.009	.045
Individual characteristic 8	.047	.033	.130***	.035
Individual characteristic 9	-.089***	.032	.063*	.035
Preference for self-employment	1.029***	.033	.436***	.034
No preference for paid or self-employment	.512***	.110	.150	.121
Country dummies	included			
Constant	-1.543***	.116	-2.055***	.128
/athrho	.212**	.086		
rho	.209	.082		
Wald test of rho=0:				
chi2(1)	6.1448			
Prob > chi2	0.0132			
Log pseudolikelihood (full model)	-9026.9696			
Observations	9448			
Wald chi2(120)	4416.47			
Prob > chi2	0.0000			

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: Model 8 exists of a bivariate probit regression. This regression was run to find an instrument that corrects for the (possible) self-selection into entrepreneurship education (which is measured by whether an individual's school education raised interest for becoming an entrepreneur). Due to collinearity the variable *cn* (China) was omitted.

***Statistically significant at 1%

** Statistically significant at 5% level

*Statistically significant at 10% level

Table 19. Instrumental variables approach with entrepreneurship education 2: explaining being in paid employment or being self-employed from entrepreneurship education, perceived barriers to entrepreneurship and control variables

Model 9.	In paid employment or self-employed		Entrepreneurship education 2	
	Coefficient	Robust Std. Err.	Coefficient	Robust Std. Err.
Entrepreneurship education 2	-.432***	.129		
Additional education 2			.734***	.034
Entrepreneurship education 1	.443***	.050	.704***	.036
Perceived barrier related to finance	-.101**	.040	-.130***	.041
Perceived barrier related to administration	-.111***	.034	-.005	.036
Perceived barrier related to risk	-.038	.032	.037	.032
Gender	.132***	.030	-.005	.030
Age	.015***	.001	.006***	.001
Low education	.126*	.071	-.229***	.068
High education	.083**	.033	.133***	.033
Additional education 1	.088*	.050	.579***	.034
Metropolitan zone	-.130***	.041	-.030	.0418
Other town or urban centre	-.093***	.035	.003	.035
Difficulties with obtaining information	-.074**	.032	-.099***	.033
Self-employed parents	.294***	.033	.018	.034
Individual characteristic 1	.131***	.034	.054	.034
Individual characteristic 2	-.087*	.049	.124**	.048
Individual characteristic 3	.106**	.045	.040	.045
Individual characteristic 4	.098**	.044	.094**	.044
Individual characteristic 5	.030	.041	.013	.040
Individual characteristic 6	.151***	.044	.114***	.044
Individual characteristic 7	.073*	.041	.082**	.041
Individual characteristic 8	.042	.032	.053	.032
Individual characteristic 9	-.091***	.032	.003	.0322
Preference for self-employment	.979***	.034	.080**	.031

No preference for paid or self-employment	.519***	.108	.209*	.112
Country dummies	included		included	
Constant	-1.530***	.117	-1.905***	.121
/athrho	.353***	.088		
rho	.339	.078		
Wald test of rho=0:				
chi2(1)	16.1299			
Prob > chi2	0.0001			
Log pseudolikelihood (full model)	-9756.1097			
Observations	9448			
Wald chi2(120)	4861.45			
Prob > chi2	0.0000			

Source: Flash Eurobarometer Survey No 293 (2009); STATA 11.0

Notes: Model 9 exists of a bivariate probit regression. This regression was run to find an instrument that corrects for the (possible) self-selection into entrepreneurship education (which is measured by whether an individual's school education gave skills and know-how for running a business). Due to collinearity the variable *cn* (China) was omitted from the regressions.

***Statistically significant at 1%

** Statistically significant at 5% level

*Statistically significant at 10% level