



THE EFFECT OF HUMAN CAPITAL ON SELF- EMPLOYMENT AND THE DIFFERENCE BETWEEN OPPORTUNITY AND NECESSITY SELF-EMPLOYMENT

A study focusing on Western Europe

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Abstract

This thesis looks into different characteristics and determinants of self-employment. Furthermore, a distinction will be made between opportunity and necessity self-employment. I ought to find the effect of human capital, consisting of education and experience, on (opportunity) self-employment when controlling for demographic and perceptual variables. This relationship is important since Kuratko (2005) showed that self-employment can be taught. The effect of education on self-employment is mostly important in the high-wage sector (Honig, 1996) and therefore the study focuses on Western Europe. This includes Austria, Belgium, France, Germany, Ireland, the Netherlands, Switzerland and the United Kingdom. The results reveal that self-employed individuals have more human capital compared to wage workers. However, the results for opportunity versus necessity self-employment are inconclusive. Moreover, some demographic variables have a somewhat surprisingly effect on self-employment.

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Introduction

Entrepreneurship is shown to be an important contributor to the economy since it drives innovation, competition and economic growth (Wennekers & Thurik, 1999). A lack of entrepreneurship will even lead to reduced economic growth (Audretsch, Carree, van Stel & Thurik, 2002). Hence, it is a popular area of investigation and researchers have focused on the characteristics and determinants of entrepreneurship and entrepreneurs. An entrepreneur is someone “who starts and is successful in a venture and/or project that leads to profit (monetary or personal) or benefits society” (Solomon & Winslow, 1988, p. 164). Miller (1983) emphasizes innovation, risk-taking and pro-active behaviour as typical behaviour characteristics of entrepreneurs. Entrepreneurs are seen as the main source of providing the economy with new ideas, products and ways of doing things (Iyigun & Owen, 1998). This is an important research area since it might explain why the level of entrepreneurial activity differs across countries and over time (Raposo & do Paço, 2011). It might also explain why many people begin the process of starting their own business but fail to succeed.

After looking into the literature about characteristics and determinants of self-employment, education seems to be an important determinant. In the last decade education has evolved as a popular determinant of self-employment but no clear relationship has yet been found. For example, in Spain less than 50 percent of the self-employed have any post-compulsory education while, on the other hand, Denmark has the best educated self-employed individuals with over 93 percent having post-compulsory education (Cowling, 2000). Scholars mention that the probability of becoming self-employed is the same for the least educated as well as for the most educated individuals (Blanchflower, 2000; Carr, 1996). Moreover, Thomas (2009) claims that higher educated individuals are less likely to become self-employed since they expect better opportunities in wage employment. Due to the high risk involved in self-employment and the risk averse nature of most individuals, wage employment seems to be the safer option. Block and Sandner (2009) reason lower education levels of self-employed individuals from a time perspective. Some individuals are very determined at becoming self-employed and consequently invest less time in formal education and more time in realizing their business plan.

However, it remains unclear whether the relationship between education and self-employment is purely negative. In this thesis, I argue that higher levels of education will, in the current economy, increase the probability for an individual to become self-employed. I will build on previous literature suggesting a positive relationship between the level of education and the probability of becoming self-employed (Evans & Leighton, 1990; Robinson & Sexton, 1994; Arenius & Minniti, 2005). Their studies show that self-employed individuals have higher levels of education than those who do not work for themselves. I will build on human capital theory, which maintains that knowledge provides individuals with increases in their cognitive abilities, which are brain-based skills, leading to more productive and efficient potential activity (Schultz, 1959; Block & Sandner, 2009). From this theory we can conclude that individuals with more or higher quality human capital are better at perceiving and exploiting profitable opportunities for new economic activity, if they occur (Davidsson & Honig, 2003; Shane, 2000). Human capital consists of, according to Deakins and Whittam, knowledge, skills, experience, and most important for this thesis, education (as cited in Van

Gelderens, Thurik & Bosma, 2005, p. 366). Formal education may “assist in the accumulation of explicit knowledge that may provide skills useful to entrepreneurs” (Davidsson & Honig, 2003, p. 306). Other components of human capital include experience and non-formal education (Davidsson & Honig, 2003). The importance of entrepreneurial human capital differs between countries based on their income (Lyigun & Owen, 1998). In the model developed by Lyigun and Owen (1998) “individuals choose to allocate fewer resources towards self-employment in a more developed economy because good, safe alternatives to this risky activity exist” (p. 454). In other words, it might be that entrepreneurs in countries with a higher GDP have less entrepreneurial human capital.

This thesis is structured as follows. First, I will give an overview of previous literature suggesting a positive relationship between the level of education and self-employment. I will look into different characteristics and determinants of self-employment such as human capital, demographic- and perceptual variables. In the second part, multiple logit regressions will be performed to find the relationship between these variables and the choice to become self-employment versus wage employment. Subsequently, the same characteristics and determinants will be analysed for opportunity versus necessity self-employment. Finally, a hierarchical model will be built including all the human capital, demographic- and perceptual variables. All tests will be performed using STATA.

Theoretical background

The probability that an individual enters the self-employment sector depends on different variables. These determinants have been widely investigated by multiple scholars. A popular statement goes as follows:

“Entrepreneurship tends to be a young man’s game” - (Arenius & Minniti, 2005, p. 234).

In this statement gender and age are introduced as determinants of self-employment. Most scholars found that, worldwide, males are more likely to become self-employed compared to females (Blanchflower & Meyer, 1994). Age is shown to be an important determinant of self-employment but scholars disagree among their relationship. Some argue that younger individuals are more likely to become self-employed whereas others mention a higher amount of self-employed among the elderly. Gender and age are examples of demographic variables explaining the choice to involve in self-employment. Not only human capital and demographic variables are important to consider when looking at one’s choice to become self-employed but also perceptual variables. Perceptual variables are subjective variables describing perceptions and beliefs of the individual (Arenius & Minniti, 2005). The first focus will be on human capital consisting of, in this thesis, education and experience.

To get back to the point, the relationship between education and self-employment is unclear. Some argue for a negative relationship whereas other are certain about a positive relationship. This relationship is becoming more important to investigate since governments and universities are spending much more on entrepreneurship education and training (Katz, 2003; Kuratko, 2005). But what if the relationship between education and self-employment is indeed negative as proposed by Thomas (2009)?

The expenses on increasing the self-employment rate via education would be wasted. That being the case, it is important to prove that the level of education will actually have a positive significant effect on self-employment. For a long time, men thought that individuals are born as entrepreneurs. Creating them was simply not possible, but nowadays it is becoming clear that entrepreneurship can, indeed, be taught (Kuratko, 2005). In line with this recent theory, different programmes have been established between higher-education institutions and the local businesses in order to stimulate entrepreneurship among students (Arnold, Schalk, Bosley & Overbeek, 2002; Fukugawa, 2005). Accordingly, different scholars have mentioned a higher probability of becoming self-employment for individuals with higher educational attainment.

Self-employed individuals with higher educational attainment are associated with higher probabilities of success. According to a study by the U.S. Department of Commerce, 46 percent of new firms discontinued or changed hands within 1.5 years and 71 percent within 4.5 years (Churchill, 1955). A report of Dun and Bradstreet (1967) shows that 67 percent of new businesses discontinue within 4 years. New established business surviving longer than five years in Germany only accounts to 50 percent (Fritsch, Brixly & Falck, 2006). Aldrich concludes the same, noticing only half of all aspiring business founders succeed in creating new organizations that are ever recorded in public record (as cited in Davidsson & Honig, 2003, p.311). Self-employed individuals with higher educational attainment are associated

with higher probabilities of success. Provided that this is true, education can help to increase these alarming low survival rates. Governments and economies want the self-employed to succeed. If self-employed succeed in running their business they are more likely to hire other employees which will decrease the unemployment rate (Congregado, Golpe & Carmona, 2010). Given the current crisis and the high unemployment rate in most countries, a decrease in the unemployment rate is critical. In short, if education can contribute to increase the survival rate of businesses, it must be stimulated even more.

Human capital

“Education and training are significant entrepreneurial variables related to knowledge, skills, motivation, self-confidence and the ability to provide solutions to short-and long-term business planning issues” (Skuras, Meccheri, Moreira, Rosell & Stathopoulou, 2005, p. 69).

Shane and Venkataraman (2000) state that the process of discovering entrepreneurial opportunities together with the process of exploitation these opportunities results in entrepreneurship.

Education

Davidsson and Honig (2003) performed a study in Sweden in order to get more insight in the influences of human capital and social capital on nascent entrepreneurs. In their study they measured human capital using multiple variables:

- Education: measured in number of years
- Specific training: if the respondent had ever attended any classes or workshops on starting a new business
- Experience: measured by the total years of full time paid work experience in any field

Using a binomial logistic regression, Davidsson and Honig (2003) found that the years of education has a positive effect on nascent entrepreneurship.

Robinson and Sexton (1994) show that self-employed have almost one full year more education than their counterpart, 14.57 years against 13.58 years. They also conclude that the general level of education will increase the probability of becoming self-employed. A significant positive relationship was found where an additional year of education increases the probability of becoming self-employed by 0.8 percent. Lucas' (1978) model explains that education further improves an individual's managerial ability and hence increases the tendency to be self-employed.

Moutray (2007) performed a study to investigate whether individuals with a baccalaureate degree and graduate experience are more likely to become self-employed than individuals with a much lower level of education. He found that individuals with post-baccalaureate experience are up to 8.3 percent more likely to become self-employed instead of being a wage worker. Evans and Leighton (1989) agree with the finding that individuals with graduate experience are more likely to be self-employed. They argue that these individuals are more likely to have selected themselves into occupations in which self-employment is more common.

Another benefit of education is the stimulation of the level of autonomy, independence and self-confidence (Raposo & do Paço, 2011). According to literature, one of the most argued reasons why individuals choose to become self-employed is independence. Research by Watson, Hogarth-Scott and Wilson (1998) reveals that the most argued motivations for self-employment are grouped as entrepreneurial factors. These factors include being independent, using your own creative skills, doing enjoyable work and frustrated with previous job.

In general, self-employment involves a high risk which makes it an unattractive career choice. The failure rate among new business is enormously high. If the business fails the individuals may “lose their job, their savings, their home if as often happens it is used as security on a loan, and perhaps even their marriage because of the stresses and strains” (Blanchflower, 2000, p. 472). Individuals with a higher educational attainment may be less risk averse since they finished college and have higher levels of self-confidence. They might see higher levels of education as a guarantee for a successful business and as a consequence choose to pursue this activity. Furthermore, individuals with higher levels of education are associated with higher chances of success. Hence, knowing your odds of success are bigger compared to individuals with lower levels of education might stimulate your choice to become self-employed.

Literate provide contradictions for the above and shows a negative relationship between education and self-employed. The opportunity cost of self-employed is high since the earnings of wage employment are higher (Lucas, 1978) and more secure. Secondly, the dedication of self-employed lowers their time spent in education (Riley, 1979).

First of all, individuals in more developed countries face a higher opportunity cost of becoming self-employed (Iyigun & Owen, 1998). More developed economies with improving technology increase the return to being a professional, a wage-worker, as well as the return to being self-employed. Since being a professional is safer, individuals will most likely choose this option, and spent time in education to accumulate professional skills. By way of contrast, Iyigun and Owen (1998) claim that entrepreneurial skills are learned by doing while professional skills are accumulated by spending time in education. Currently, it is becoming clear that “entrepreneurship, or certain facets of it, can be taught” (Kuratko, 2005, p. 580). As a consequence, the findings of their study might not be representative anymore.

Carroll and Mosakowski (1987) show a negative statistically significant effect of occupational education on self-employment. Individuals with higher levels of occupational education are, according to Carroll and Mosakowski (1987), less likely to become self-employed at labour-force entry.

One of the most argued reasons why individuals with a higher level of education are less likely to become self-employed stems from their opportunities in wage employment. Better educated individuals might have more interesting alternatives in the wage employment (Block & Sandner, 2009) where they would earn more than as self-employed (Lucas, 1978). It is generally known that self-employment is less secure than wage employment. The operations of small firms face higher inherent risks compared to operations of large firms or the public sector (Storey, 1994). As mentioned before, most individuals are risk averse and, most logically, would choose to enter wage employment instead of self-employment.

However, I argue that self-employed individuals are mostly the individuals who are willing to take risks. Therefore, this argument may be weakened. Another reason for the negative relationship between education and self-employment is the dedication of real entrepreneurs. Individuals who are certain about their choice to become self-employed will start pursuing this option at a younger age. Whereas other people go to college or start working in a company, these determined self-employed individuals will invest time in

realizing their business plan. To put it another way, they invest less time and/or money in formal education which results in a negative impact of level of education on self-employment duration (Riley, 1979).

In summary, higher educated individuals are less likely to become self-employed for two reasons. First, higher educated individuals have better opportunities in wage employment and earnings in this sector are more secure. Second, the individuals who are very determined at becoming self-employed will start to pursue this career option at a younger age and therefore spent less time in education. However, individuals becoming self-employed are most likely to ones who are willing to take risks and therefore do not choose to enter the safer wage employment option. Individuals with a higher educational attainment are more likely to succeed and this reduces their fear of failure. Blanchflower (2000) believes in both a positive and negative relationship. He mentioned that the most educated and the least educated individuals have the highest probabilities of becoming self-employed. I argue that higher educated individuals are more eager compared to their lower educated counterpart. Therefore, combined with their higher chances of success, higher educated individuals are more likely to involve in self-employment.

Hypothesis 1: A higher level of education increases the probability of an individual to become self-employed.

Experience

The study performed by Davidsson and Honig (2003) in Sweden concludes that work experience, measured by total years of full time paid work experience in any field, has a positive effect on nascent entrepreneurship. Tacit knowledge acquired from previous start-up experience has the largest positive effect on nascent entrepreneurship. This type of experience is also positively related to successful exploitation, as mentioned by Shane and Venkataraman (2000).

According to Cooper, Woo and Dunkelberg (1988), the combination of college education and prior industry experience is optimal for achieving success. Bates (1995) found the same results, where years of work experience along with graduate education are positively correlated with entry in self-employment. One might think that, since education and experience seem to be positively related to self-employment, having some education and some experience has a larger positive effect on self-employment compared to having only education or experience. The opposite is shown by Cooper et al. (1988), namely, the combination of inexperience and little education is worse than education or experience alone.

However, experience can be measured in different ways. On the one hand, one can measure experience as total work experience, as done by Davidsson and Honig (2003). On the other hand, having experience in wage employment is different than having experience from a previous start-up. It might be that individuals with previous start-up experience have higher probabilities of becoming self-employed (again) compared to individuals with experience in wage employment. Spending time in an entrepreneurial venture develops entrepreneurial

skills (Iyigun & Owen, 1998). In either case, having experience seems to be positively related to self-employment.

Hypothesis 2: Individuals with more experience are more likely to enter self-employment.

Demographic variables

Demographic variables are important to consider when researching self-employment and especially the choice to enter self-employment. Gender, age, marital status, family background and financial status are the most often used demographic variables. Based on the available dataset I will include gender, age, family background and financial status as demographic variables. Including demographic variables will most likely have an effect on the relationship between human capital, i.e. education and experience, and the probability of becoming self-employed. Either the effect of human capital will become stronger or weaker when controlling for demographic variables.

Gender

In the self-employment sector males are dominant, presenting over 60 percent of the total self-employed in the majority of countries (Cowling, 2000). The participation rate of females in self-employment is systematically lower than the rate of males (Arenius & Minniti, 2005). Their results reveal that women are only half as likely to start a new business as men. The OECD (1998) records that female self-employment rates are generally lower than those of males.

Hypothesis 3: Males are more likely to become self-employed compared to females.

Age

The relationship between age and self-employment is slightly more difficult since results from different scholars differ in their conclusion. Child (1972) found that the relationship is negative since younger individuals are more willing to take risks and therefore show more entrepreneurial behaviour. Bonnett and Furnham (1991) conclude the same negative relationship since younger individuals have less perception of success or failure and therefore are less frightened of starting up their own business. Age may also serve as a proxy for an individual's attitude towards risk (Le, 1999). Older individuals are more risk averse and want to avoid the stress self-employment involves. Hence, younger individuals are more likely to becoming self-employed compared to their older counterpart.

The opposite is suggested by Blanchflower and Meyer (1994) concluding that younger individuals show less entrepreneurial behaviour since they lack the necessary experience to start their own business which is due to the fact that they barely start their working lives. Cowling (2000) proves this statement by showing that the majority of the self-employed, in EU countries, are aged between 41 and 45 years. Moutray (2007) argues that individuals younger than 30 or 40 years old are more likely to work in wage employment, whereas individuals over 60 years old are more likely the ones becoming self-employed.

So, there exists a two-way relationship between age and self-employment. On the one hand younger individuals seem to be more likely to become self-employed where, on the other hand, the elderly are more often the ones becoming self-employed. This results in a U-shaped relationship, where the probability of becoming self-employed peaks at a younger age after which the relationship becomes negative till a certain age and start increasing again.

Hypothesis 4: The relationship between age and self-employment is peaks at a younger age after which it decreases and start increasing again.

Family background

Entrepreneurial family and friends are seen as an important component of social capital (Davidsson & Honig, 2003). One's family background can be divided into two parts:

- the occupation of one's parents
- the household size or number of children.

Whether one of your parents is self-employed can highly influence your choice to become self-employed. Having a family with an entrepreneurial background will at first increase the likelihood of becoming an entrepreneur (Lerner & Haber, 2001). At second, individuals raised in an entrepreneurial family background are "aware of the challenges they will have to face, and are better prepared to seek and give solutions to the problems that will arise" (Skuras et al., 2005, p. 70). Specifically, the labour status of one's father is important. Children of self-employed parent are, at a later age, likely to inherit rights of ownership to the family firm which makes them the new owner and, hence, self-employed (Carroll & Mosakowski, 1987).

The second part regards the household size or the number of children. Having more children in the family (i.e. a larger household size) increases one's likelihood of entering (male) self-employment (Blanchflower, 2000).

According to literature, both having an entrepreneurial family as well as more children would increase one's odds of involving in self-employment. Having more children is equal to a larger household size and hence this relationship is positive.

Hypothesis 5: Individuals with an entrepreneurial family and a larger household size are more likely to become self-employed.

Income

A lot of individuals want to become self-employed. For instance, a national survey of adults working in the United States reveals that more than fifty percent of this working population wants to be self-employed someday (Steinmetz & Wright, 1989). And yet most of them remain active in the wage employment. The process of starting up a business is difficult and most individuals struggle with the financial capital constraints which acts as an entry barrier to self-employment (Evans & Jovanovic, 1989).

In a study in the U.S., current employees are more likely to switch to self-employment if they have greater family assets (Evans & Jovanovic, 1989). In other words, the decision to become self-employed is positively related to one's household income (Kihlstrom & Laffont, 1979; Evans & Jovanovic, 1989). Bates' (1995) results reveal that entry in self-employment is strongly associated with possession of \$100,000 or more of household net worth. In a study performed by Robinson and Sexton (1994), individuals who have sources of income within the family other than their own are more likely to become self-employed.

Others argue for a U-shaped relationship where on the one hand individuals with low incomes may see chances for higher returns in the self-employment option (Arenius & Minniti, 2005). On the other hand, individuals with higher incomes have lower financial barriers and therefore they are more likely to become self-employed.

I argue that individuals with higher incomes are more likely to become self-employed since they have a safety net. As mention before, becoming self-employed involves risk and most people are risk averse. They might fear to lose their savings if the business fails. However, individuals with higher incomes have, most likely, more savings and therefore may lose, in proportion, less if the business fails.

Hypothesis 6: Individuals with higher incomes are more likely to become self-employed.

Perceptual variables

As mentioned before, perceptual variables are subjective variables. They describe personal perceptions and judgements about the environment and their selves. One might think about role models, self-confidence, opportunity recognition and risk propensity.

Knowing other self-employed

Individuals meet different role models in the course of their lives. Role models are important because they can enhance self-efficacy (Begley & Boyd, 1987). In the early years of one's life, the biggest role models are one's parents. These effects are taken into account in the variable family background. At later ages, one can find a role model in different persons. For example, knowing other self-employed individuals. Minniti (2004) argued that the presence of role models and their ability to reduce ambiguity can increase an individuals' confidence. Self-employed role models might stimulate one's intention to pursue a career in the self-employment sector (Lent, Brown & Hackett, 1994). For this reason, the relationship between knowing other self-employed individuals and becoming self-employed seems to be positive.

Hypothesis 7: Knowing other self-employed increases one's likelihood of becoming self-employed.

Good opportunities

The environment plays a significant role in one's decision to become self-employed. As already mentioned by Shane and Venkataraman (2000), the process of discovering entrepreneurial opportunities together with the process of exploitation these opportunities result in self-employment. According to Kirzner, the discovering process is a necessary condition for entrepreneurial action (as cited in Arenius & Minniti, 2005, p. 235). Therefore, individuals who believe in good opportunities for self-employment are more likely to discover these opportunities and exploit them.

Hypothesis 8: Believing in good opportunities for self-employment increases one's odds for becoming self-employed.

Confidence in one's skills and ability

An individual must have confidence in his or her skills and abilities before starting their own business. In order to achieve the desired outcome, the entrepreneur must, most likely, repeat several attempts to exercise control over the process before actually having this control (Gartner, 1985). Individuals who "perceive themselves as possessing the necessary skills are almost 6.4 times more likely to be nascent entrepreneurs than those who do not believe to have the necessary skills" (Arenius & Minniti, 2005, p. 239). Therefore, having self-confidence is positively related to the decision to become self-employed.

Hypothesis 9: Having confidence in your own skills and ability increases your odds of becoming self-employed.

Fear of failure

Most people are naturally risk-averse, but the process of starting your own business involves a high amount of risk. Individuals fear failure and self-employment is linked with failure. Starting your own business can result in a large pay off, but most individuals do not succeed in running their own business. Hence, individuals who have a higher fear of failure will not be likely to become self-employed (Weber & Milliman, 1997).

Hypothesis 10: A higher fear of failure decreases the probability of becoming self-employed.

Probability of success and growth

“In general, higher education of self-employed people should improve the growth opportunities of their firms” – Kangasharju & Pekkala, 2002, p. 217

The number of individuals who want to start their own business differs from the number of individuals who actually started their own business. The main reason why individuals fear the self-employment activity is the high risk involved. Even if they choose to pursue the self-employment option, the chances of success are not very high. Not all those who start their own business succeed in doing so, which is reflected by a very low rate of survival (Cooper et al., 1988; Schutjens & Wever, 2000). According to a report by Dun and Bradstreet (1967) less than a third of new firms survive and 67 percent of new businesses discontinue within four years. Another study concludes that about 54 percent of new businesses survive a year and a half, and only 25 percent survive six years (Van de Ven, Hudson & Schroeder, 1984). Gender differences regarding survival exist, where women are less likely to survive compared to men (Taylor, 1999; Kangasharju & Pekkala, 2002).

Hence, if an individual wants to become self-employed he or she may be able to increase their odds of success. As suggested by Angrist and Krueger, spending more time in education improves the overall success of individuals (as cited in Kangasharju & Pekkala, 2000, p. 216). Human capital theory namely suggests that the higher the level of education and the more closely the type of education matches with the requirements of entrepreneurship, the more successful the venture will be (Becker, 1962; Schultz, 1961). According to Ployhart and Moliterno (2011) individuals with a greater level of human capital, i.e. knowledge, skills and other competences, will achieve greater performance outcomes than individuals with lower levels of human capital. In the European Union’s rural milieu human capital is identified as one of the main factors that positively effects the growth and chance for success for enterprises (Skuras et al., 2005).

Robinson and Sexton (1994) conclude that higher levels of education increase both the probability of becoming self-employed and the success of individuals in that sector in terms of the earnings (p. 154). Research in the Basque region of Spain confirms this and shows that the majority of new business experiencing growth in sales, employment and profit are the businesses established and managed by entrepreneurs with college degrees and with special interest in business education programs (Peña, 2002). Individuals with higher levels of formal education are more successful since they are more likely to tolerate ambiguity and can handle complex situations more easily (Dollinger, 1985). Tolerating ambiguity is important for an entrepreneur if he or she wants to obtain superior results (Entrialgo, Fernandez & Vazquez, 2000). Coduras, Urbano, Rojas & Martinez (2008) argue that knowledge is “an instrument to graduated entrepreneurs which creates more rational and well developed initiatives that have more possibilities to survive and grow” (p. 396).

Other factors influencing the probability of success and growth include environmental factors and personal factors such as age. On the one hand, start-ups that are managed by younger individuals are more likely to grow which may be due to their willingness to take risks. On the other hand, start-ups managed by older individuals are more likely to survive (Rueda-Armengot, Esamilla-Solano & Plaza-Casado, 2014).

Different arguments can be made with respect to the environmental factors. Environmental factors such as the beliefs, values and attitudes of a society determine the behaviour of its members and can therefore have a serious impact on the decision to become self-employed (Shapiro & Sokol, 1982). Cultural and social norms are indicators of the degree to which a society considers entrepreneurial activity desirable (Shane, 1992,1993; Davidsson, 1995; Hayton, George & Zahra, 2002). When looking at environmental factors it is extremely important to recognise the importance of institutions which North (1990) did by formulating the institutional approach. This institutional approach says that “institutions are the constraints that shape human interaction” (North, 1990, p.3).

The number of procedures, time and cost of starting a business are environmental factors since they are mostly linked to the country or residence. In most countries, the legal system defines the procedures one must take to legally start up their own business. Djankov, La Porta, Lopez-De-Silanes and Shleifer show that these variables, procedures, time and cost, are negatively linked with self-employment (as cited in Alvarez, Urbano, Coduras & Ruiz-Navarro, 2011, p. 125).

Entrepreneurship education

There is a difference between educational attainment of individuals and real entrepreneurship education. According to the European Commission entrepreneurship education can be defined as follows: *“Entrepreneurship refers to an individual’s ability to turn ideas into action. It includes creativity, innovation and risk taking, as well as the ability to plan and manage projects in order to achieve objectives. This supports everyone in day-to-day life at home and in society, makes employees aware of the context of their work and better able to seize opportunities, and provides a foundation for entrepreneurs establishing a social or commercial activity”* (Commission of the European Communities, 2006; p. 4).

Entrepreneurship education is evolving since the 1970s when the University of Southern California launched the first Master of Business Administration (MBA) concentration in entrepreneurship in 1971 (Kuratko, 2005). The availability of entrepreneurship courses grew rapidly as shown by Solomon, Weaver and Fernald (as cited in Kuratko, 2005, p. 582). Only in the United States, entrepreneurship education “has exploded to more than 2,200 courses at over 1,600 schools; 277 endowed positions; 44 refereed academic journals, mainstream management journals devoting more issues (some special issues) to entrepreneurship; and over 100 established and funded centres” (Kuratko, 2005, p. 583).

Galloway and Brown (2002) report that individuals who have taken university level courses in entrepreneurship have higher intentions to start a business. Individuals who have taken these courses may also be better in opportunity identification (DeTienne & Chandler, 2004). Contrasting, Oosterbeek, Van Praag and Ysselstein (2010) found that students who completed an entrepreneurship course had lower levels of intentions to start a business. Others found a negative relationship between entrepreneurship education and entrepreneurial human capital as well (Mentoor & Friedrich, 2007; Honig & Karlsson, 2004).

Opportunity versus necessity entrepreneurship

The group of self-employed can be split into multiple categories. First there are own-account workers versus the employers. Own-account workers are self-employed individuals who do not hire any other employees whereas the self-employed employer does. A second distinction that can be made is between opportunity and necessity entrepreneurship. This distinction is mainly based on the motivation to become self-employed. Opportunity entrepreneurship can be defined as “selection into entrepreneurship as the result of a pursuit of a specific entrepreneurial opportunity” (Block & Wagner, 2006). Necessity entrepreneurs are, as the word self says, self-employed individuals due to the lack of employment options (Wagner, 2005).

Research has been done whether the duration in self-employment differs between opportunity and necessity entrepreneurs. One might think that necessity entrepreneurs will only stay in self-employment for a short period of time since they will change to wage employment when opportunities occur.

Block and Sandner (2009) performed a study in Germany to answer this question. They found that necessity entrepreneurs are less likely to start a new business in a profession in which they are educated compared to opportunity entrepreneurs. Another finding regards the age of self-employed individuals. Necessity entrepreneurs are significantly older than opportunity entrepreneurs (Block & Sandner, 2009; Wagner, 2005).

Regarding the level of human capital of self-employed individuals, I do expect to find a difference between opportunity and necessity entrepreneurs. Opportunity entrepreneurs become self-employed because they really want to. Hence, they are likely to have prepared more and better for their entry into self-employment (Block & Sander, 2009). They have, most likely, spent more in the human capital necessary to succeed at a business owner or they may have attended a business course before starting their venture.

Necessity entrepreneurs, on the other hand, become self-employed due to a lack of employment options. I expect that opportunity entrepreneurs have more human capital, but I am not sure if this includes the education component. It may be that opportunity entrepreneurs have more experience but less education than necessity entrepreneurs.

Hypothesis 11: The level of human- and social capital of opportunity entrepreneurs is slightly higher than necessity entrepreneurs.

Data and methodology

In this thesis I want to find a relationship between the level of education and the probability of self-employment. In order to do so, I will use a GEM based dataset. The GEM stands for Global Entrepreneurship Monitor and it is the world's foremost study of entrepreneurship. It consists of 17 years of data with over 200,000 interviews a year in more than 100 countries. To get the information needed, there are more than 500 specialists in entrepreneurship research, over 300 academic and research institutions and more than 200 funding institutions. GEM looks at the entrepreneurial behaviour and attitudes of individuals in all these countries and the national context and how that impacts entrepreneurship.

For my research, I use the Adult Population Survey of 2012 on individual level. Entrepreneurship education is a phenomenon getting more attention nowadays. As the most recent data I could download on the GEM website is year 2012 I choose to use this year. According to GEM, the Adult Population Survey (APS) tracks the entrepreneurial attitudes, activity and aspirations of individuals. This survey is administered to a minimum of 2000 adults in each country. In the field of self-employment, the GEM is the most important source for research. It contains multiple indicators important to consider when investigating self-employment. With this in mind, I excluded all the variables I consider not to be relevant for my research. In this research I do not make a distinction between nascent entrepreneurs, baby businesses and/or established businesses. All types of self-employment are included in the sample.

The APS individual level data consist of individuals in countries all over the world. This must be narrowed down to do a more specific research. I excluded all countries outside the European Union to start with. Countries in the European Union are easier to compare to each other in contrast to countries from all over the world. Including all countries in the European Union would result in too much observations with outliers. Some countries in the European Union are less developed and employment is most in the primary and secondary sector. Education plays a significant role in the high-wage sector (Honig, 1996), and hence I should include richer and more well developed countries. With this in mind, I choose to include countries from Western Europe. According to the United Nations, Western Europe is defined as: Austria, Belgium, France, Germany, Liechtenstein, Luxembourg, Monaco, the Netherlands and Switzerland. Besides, others argue that Ireland and the United Kingdom just as Spain and Portugal should be considered as a part of Western Europe as well. While Liechtenstein and Monaco are indeed included in the dataset, it does not provide any observations neither for wage workers nor for the self-employed. Therefore, I decided to include Ireland and the United Kingdom as part of Western Europe for this analysis. The OECD website provides data on different topics, including education. As an illustration I want to emphasize education spending. Education spending is either measured as US dollars per student or as percentage of GDP. In order to show the difference between countries for the year 2012 I will use percentage of GDP as measurement of education spending. That is, the U.K. spends, compared to the other Western European countries, most of its GDP on education (4.4 percent). In this list of Western European countries, Austria and Germany are spending least on education as percentage of GDP (3.1 percent). Additionally, the OECD provides information of the population's tertiary education attainment. The population is

divided into four categories based on their age. Information about the population with tertiary education can be found in table 1.

Table 1: Population with tertiary education, % in same age group, 2012

Country	25-34 years-old	35-44 years-old	45-54 years-old	55-64 years-old
Austria	36.1	32.1	25.5	21.0
Belgium	43.0	40.2	32.4	25.3
France	42.9	37.6	23.9	19.6
Germany	29.0	29.5	27.7	26.4
Ireland	49.2	46.0	32.4	24.9
Netherlands	43.0	37.0	30.7	27.9
Switzerland	40.6	41.0	35.0	28.7
United Kingdom	47.9	45.1	37.2	32.6

Source: <https://data.oecd.org/eduatt/population-with-tertiary-education.htm>

Only including Western Europe resulted in 24,400 observations. The first ten hypothesis regard the probability of becoming self-employed. I will compare the self-employed against wage employers. The group of unemployed, students or retired will be dropped from the sample since they are not economically active and hence should not be included in the occupational choice question. Excluding all individuals who are not a waged worker neither self-employed leaves the total number of observations on 12,602. From these 12,602 observations, most individuals are living in Austria (2,678) followed by Germany (2,497), France (1,800), The Netherlands (1,684), Ireland (1,054), the United Kingdom (1,033), Belgium (933) and the least individuals living in Switzerland (923).

Analysis is done in multiple steps. First of all, I will look at the probability of becoming self-employed versus wage employment using the first ten hypotheses. Subsequently, the wage employers will be excluded from the sample. The variable "omreason" indicates the reason why an individual chooses to become self-employed. Only individuals who had either opportunity or necessity reasons to become self-employed will be included. Next, the first nine hypotheses will be tested for the probability of becoming self-employed as opportunity or necessity. Afterwards a hierarchical model will be build using human capital, demographic and perceptual variables. Eventually results will be compared in order to see what the effect of education is on self-employment and on opportunity versus necessity self-employment.

Part I: Probability of becoming self-employed

The purpose of this part is determining the variables influencing one's choice to become self-employed. Education is a central part and I want to investigate whether demographic and perceptual variables reduce or strengthen its effect. Therefore, all the ten hypothesis will first be tested separately and thereafter a hierarchical model will be build including all the human capital, demographic and perceptual variables. When building the hierarchical model, demographic variables will be used as control variables just as the perceptual variables.

Dependent variable

As previously stated, the dependent variable must measure the probability of becoming self-employed versus wage employment. Therefore, a dummy variable is constructed named "SELF".

SELF = 0, if wage worker

SELF = 1, if self-employed

Independent variable

Education and experience are the independent variables. Human capital consists both of education and experience. Before starting this section, I want to express that answers as "refused" and "don't know" had negative values and are recoded as missing values.

Human capital

Human capital consists, as described above, of two components (in this study). First I will look at education followed by experience.

Education

The dataset provides two variables to measure an individual's level of education. First, the GEM harmonized educational attainment which can take the values of a) cannot code, b) none, c) some secondary, d) secondary degree, e) post-secondary and f) graduate experience. The second variable is the UN harmonized educational attainment. This variable is more extensive and can take the values of -2) missing, 0) pre-primary education, 1) primary education or first stage of basic education, 2) lower secondary or second stage of basic education, 3) (upper) secondary education, 4) post-secondary non-tertiary education, 5) first stage of tertiary education and 6) second stage of tertiary education.

Since the UN measurement of educational attainment is more extensive and gives us more detail, I will exclude the GEM harmonized educational attainment variable from the dataset.

Experience

Unfortunately, the dataset does not provide us with a clear variable to measure someone's experience. However, respondents were asked whether they have, in the past 12 months, sold, shut down, discontinued or quit a business he or she managed, any form of self-employment or selling goods or services to anyone. From the sample 12,277 individuals did

not and 283 individuals did. Since I have a lot of observations for this variable, I will use it as an indicator of someone's experience.

Control variables

Demographic variables

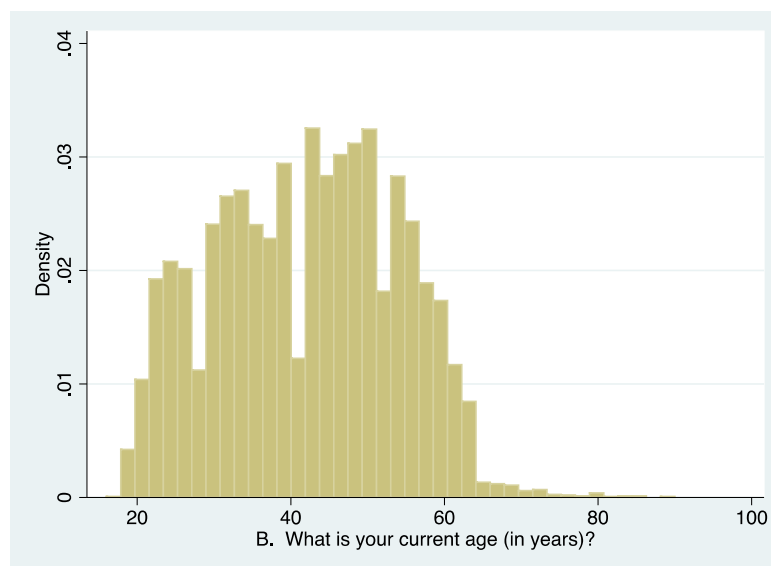
Demographic variables are personal statistics such as gender, age, marital status, financial status and household size. Demographic variables are important to include when doing research since they most likely have an effect on the relationship between variables. Marital status is, unfortunately, not included in the available dataset.

Gender

The dataset provided the variable gender, taking value 0 for males and 1 for females. To interpret the output more easily, I constructed the variable female. Female is a dummy variable which takes value 1 in the dataset for females and 0 for males. In the selected sample, approximately 60 percent is male and, obviously, the remaining 40 percent female.

Age

Respondents were asked their age. The age ranges from 16 years old to 90 years old. The mean equals 42 years old.



Since age is expected to have a non-linear relationship with the dependent variable, age squared is included in the model.

Family background

The dataset provides a variable measuring the household size of an individual and the occupation of the mother and father of the individual. The occupation of the parents might be important to consider when investigating one's choice to become self-employed. After running descriptive statistics, it seems that for all 12,602 individuals none coded the occupation of their father or mother. Hence, these variables must be excluded of the sample and an individual's family background is measured only by his or her household size. The

variable household size regards the permanent household, including the respondent. More than 89 percent of the sample had a household with a maximum of four persons.

Income

The income of the respondents is recoded into thirds. A variable “highinc” was created in order to see if the individual has a high income. Someone is said to have a high income if his or her income is included in the upper 33% of the population. Almost 50 percent of the individuals were categorised as high income individuals.

Country

In this research Western Europe includes: Austria, Belgium, France, Germany, Ireland, the Netherlands, Switzerland and the United Kingdom. According to the graph, most individuals live in Austria, Germany, France and the Netherlands.

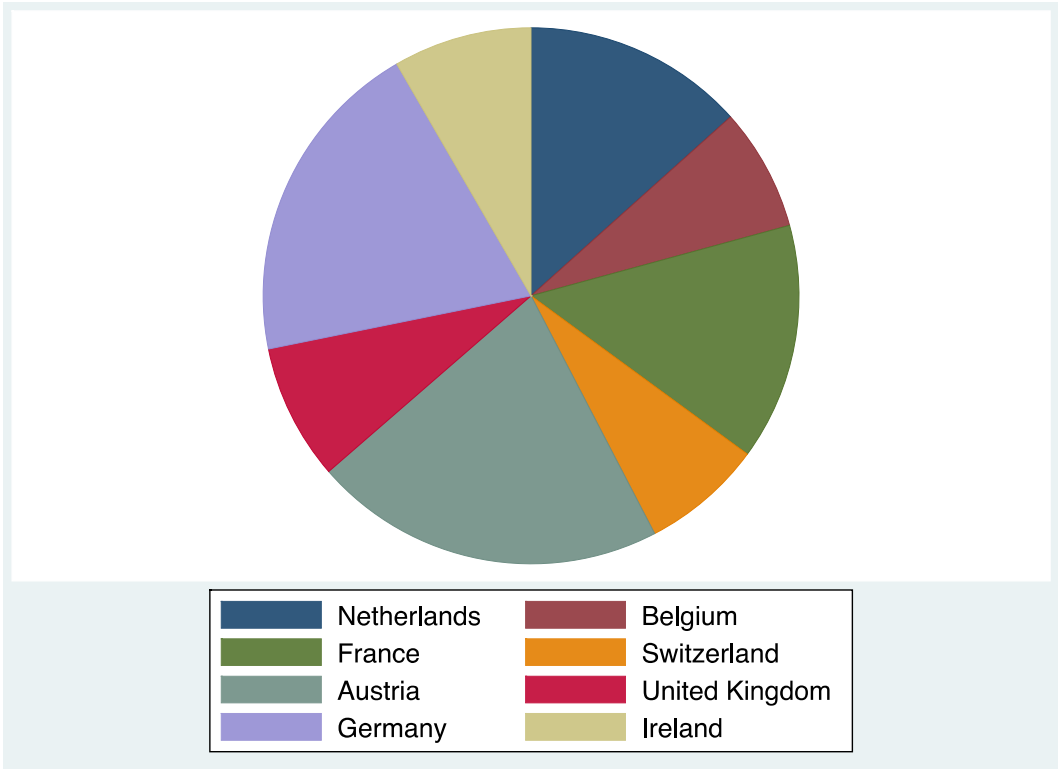


Table 2: Unique country numbers

Country	Unique country number
Austria	43
Belgium	32
France	33
Germany	49
Ireland	353
Netherlands	31
Switzerland	41
United Kingdom	44

Perceptual variables

Knowing other self-employed

Respondents were asked whether they personally know someone who started a business in the past two years. Almost 65 percent did not know someone who started a business personally, but more than 35 percent actually did.

Self-confidence

In order to derive whether someone is self-confident, respondents were asked whether they have the knowledge, skills and experience required to start a new business. The pattern here is almost fifty-fifty, where 49.73 percent of the respondents did not believe they have what it takes and the remaining 50.27 percent were self-confident believing they have the knowledge, skills, and experience required to start a new business.

Good opportunities available

Respondents were asked whether they believe if there will be good opportunities for starting a business in the area where they live in the next six months. Almost 60 percent did not believe good opportunities will be available.

Fear of failure

It is proven that self-employment is a risky activity and most people are risk-averse. Hence, the question that remains is if fear of failure would prevent someone from starting a business. One would expect that most people answer yes. Hence, fear of failure does prevent someone from starting their own business. But, the pattern is almost equally distributed. Of the 12,144 valid answers, 6,917 answers were negative and 5,227 answers were positive.

To summarize, I will provide a table of descriptive variables and descriptive statistics (Table 3). Moreover, the correlation matrix can be found in Appendix 1.

Table 3: Descriptive variables and statistics (Part I)

Variable name	Description	Number of observations	Mean	Standard deviation	Min	Max
Self-employed	Indicator of whether an individual is either self-employed (1) or a wage worker (0)	12,602	0.178	0.382	0	1

UN harmonized educational attainment	Indicator of educational attainment (0: pre-primary, 1: primary, 2: lower secondary, 3: (upper) secondary, 4: post-secondary non-tertiary, 5: first stage of tertiary, 6: second stage of tertiary)	11,612	3.475	1.108	0	6
Experience	Indicator of experience	12,560	0.023	0.148	0	1
Female	Indicator of whether an individual is female (1) or male (0)	12,602	0.391	0.488	0	1
Age	Age in years	12,529	42.068	11.867	16	90
Household size	The permanent household size of an individual	12,498	2.809	1.381	1	21
High income	Indicator of whether an individual is categorised as high income	10,611	0.473	0.499	0	1
Country	Indicator of country of origin of the respondent	12,602	66.206	86.889	31	353
Knowing other self-employed	Indicator of whether an individual knows someone who started a business: yes (1) or no (0)	12,508	0.366	0.482	0	1
Believing in good opportunities	Indicator of whether an individual believes good	10,157	0.406	0.491	0	1

	opportunities for starting a business will exist: yes (1) or no (0)					
Self-confidence	Indicator of whether an individual is self-confident: yes (1) or no (0)	12,157	0.503	0.500	0	1
Fear of failure	Indicator of whether fear of failure would prevent an individual from starting a business: yes (1) or no (0)	12,144	0.430	0.495	0	1

Now that I have the dependent and independent variables needed, I can start performing some regressions. I will use a logit model since the dependent variable is a categorical one. "Self" is a dummy variable taking value 1 for self-employed individuals and 0 for wage workers (either full or part time). A logistic regression is used to predict the odds of, in this case, being self-employed on the values of the independent variables. It takes the form:

$$\Pr(y = 1|x_1, x_2) = \frac{\exp(\beta_0 + \beta_1 \cdot x_1 + \beta_2 \cdot x_2)}{1 + \exp(\beta_0 + \beta_1 \cdot x_1 + \beta_2 \cdot x_2)}$$

All regressions will be run using STATA. First, all the ten hypothesis will be tested separately including country effects and robust standard errors. To test these hypothesis, robust logit regression will be used. Secondly a hierarchical model will be built with robust standard errors. This model will include step by step add all the variables. First only the human capital variables will be included, followed by including the demographic variables that should be controlled for and finally adding the perceptual variables.

Part II: Those involved in self-employment

After looking at the probability of self-employed versus wage employment, I am interested in the self-employed only. I want to distinguish between opportunity and necessity entrepreneurs. As mentioned in the theoretical framework, opportunity entrepreneurs are really dedicated to this option. They want to become self-employed and they want to accomplish things on their own. Therefore, they might have other levels of human capital and/or other demographic or perceptual variables compared to necessity entrepreneurs. Since necessity entrepreneurs are only self-employed because they actually had to, they might only see this option as a short stop in the middle of their journey. First of all, the first ten hypotheses will be tested for opportunity versus necessity entrepreneurs. Secondly, hypothesis eleven will be tested whether opportunity entrepreneurs have higher levels of human capital compared to necessity entrepreneurs when controlling for demographic and perceptual variables.

Therefore, all wage employees are excluded from the sample which left me with 2,239 individuals who are actually involved in self-employment. The reason why these individuals became self-employed is considered in order to distinguish them in necessity and opportunity entrepreneurs.

Dependent variable

Only including individuals who responded to the GEM harmonized work status as self-employed are included in the sample. From the 12,602 individuals either involved in wage employed or self-employment, only 2,239 individuals are involved in self-employment, which is less than 20 percent. For my analysis, an important distinction to be made is between necessity and opportunity entrepreneurs. The dataset does not provide a variable that indicates if these individuals are opportunity or necessity self-employed. Although, this distinction is made for those individuals only involved in total early-stage entrepreneurial activity. But I am interested in the total amount of self-employed, hence I need another variable to indicate this distinction.

The variable "OMREASON" indicates the reason why someone was involved in the start-up. Available answers consist of 1) taking advantage of business opportunity, 2) no better choices for work, 3) combination of the above, 4) have a job but seeking better opportunities and 5) other. For this variable are 1,483 valid answers and 756 are missing. Taking advantage of business opportunity and having a job but seeking better opportunities are labelled as opportunity reasons. Having no better choices for work is labelled as necessity reasons. A combination of taking advantage and no better choices of work is excluded as well as the "other" category.

I need to create a dummy variable, opportunity entrepreneurs, which takes value 1 for individuals who became self-employed because they were taking advantage of a business opportunity or because they had a job but were seeking better opportunities. This dummy variable must take value 0 if the individual became self-employed because there were no better choices for work.

Oppself = 1 if ((omreason==1|omreason==4))

Oppself = 0 if ((omreason==2))

Only including the self-employed who had either opportunity or necessity reasons are included in the sample for part II. In total 1,038 of the self-employed gave either opportunity or necessity reasons for their involvement in the start-up.

Independent variable

All independent variables will be the same as in part I, only the descriptive statistics will be different. Since I already described all the variables, I will provide a table with the new descriptive statistics when including only individuals involved in self-employment (Table 4).

Table 4: Descriptive variables and statistics (Part II)

Variable name	Description	Number of observations	Mean	Standard Deviation	Min	Max
Opportunity self-employment	Involved in this start-up because (1) taking advantage of business opportunity or seeking better opportunities or because (2) no better choices for work	1,038	0.750	0.433	0	1
UN harmonized educational attainment	Indicator of educational attainment (0: pre-primary, 1: primary, 2: lower secondary, 3: (upper) secondary, 4: post-secondary non-tertiary, 5: first stage of tertiary, 6: second stage of tertiary)	956	3.633	1.065	0	6
Experience	Indicator of experience	1,036	0.027	0.162	0	1
Female	Indicator of whether an individual is	1,038	0.402	0.490	0	1

	female (1) or male (0)					
Age	Age in years	1,033	47.154	11.080	19	90
Household size	The permanent household size of an individual	1,033	2.934	1.368	1	10
High income	Indicator of whether an individual is categorised as high income	849	0.545	0.498	0	1
Country	Indicator of country of origin of the respondent	1,038	77.501	102.645	31	353
Knowing other self-employed	Indicator of whether an individual knows someone who started a business: yes (1) or no (0)	1,034	0.508	0.500	0	1
Believing in good opportunities	Indicator of whether an individual believes good opportunities for starting a business will exist: yes (1) or no (0)	873	0.482	0.489	0	1
Self-confidence	Indicator of whether an individual is self-confident: yes (1) or no (0)	1,022	0.857	0.350	0	1
Fear of failure	Indicator of whether fear of failure would prevent an individual from starting a business:	1,014	0.194	0.396	0	1

	yes (1) or no (0)					
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Results

Part I: Probability of becoming self-employed

Since the sample consists of individuals in multiple countries, one must consider country effects. Therefore, the country variable is added in every single regression. In general, the probability of becoming self-employed in Austria, Belgium, France, Germany, Switzerland and in the United Kingdom is lower compared to becoming self-employed in the Netherlands. The effects of living in Austria and Switzerland are not significant. Living in Ireland increases the likelihood of becoming self-employed compared to living in the Netherlands, although this effect is not significant.

The results are obtained by performing logit regression in STATA. Country effects are included in every single regression as well as in the hierarchical model. Also, robust standard errors are used instead of “normal” standard errors.

Since I performed a logit regression, I can only interpret the sign of the effects and not the magnitude. In order to interpret the magnitude, I must calculate the marginal effects. The output of the separate hypothesis regarding human capital variables, i.e. education and experience, is shown in Table 5. The number (1 and 2) and in the following tables, 3-10, refer to the hypothesis tested. Furthermore, the coefficient and robust standard errors are shown. The significance level is split into three categories: one percent, five percent and ten percent.

The first hypothesis says that higher levels of education are associated with greater probabilities of becoming self-employed. At a significance level of five percent, having primary education, post-secondary non-tertiary education, and second stage of tertiary education increase the probability of becoming self-employed compared to having pre-primary education. Moreover, the effects of lower secondary education, (upper) secondary education and first stage of tertiary education are positive but not significant at a ten percent level. By way of contrast I cannot conclude if individuals with second stage of tertiary education are more likely to become self-employed compared to individuals with first stage of tertiary education. For this I need to calculate the marginal effects. Still, individuals with education are more likely to become self-employed compared to individuals who only attained pre-primary education and hence hypothesis one is accepted.

Having experience means that someone has, in the past twelve months, sold, shut down, discontinued or quit a business he or she managed, any form of self-employment or selling goods or services to anyone. According to the model, individuals who did are more likely to become self-employed compared to individuals who did not. That is, having experience increases one’s probability of becoming self-employed at a one percent significance level and, therefore, hypothesis two is accepted.

Table 5: Relationship between human capital variables and self-employment

VARIABLES	(1)	Lower secondary education	(Upper)	Post-secondary non-tertiary education	First stage of tertiary education	Second stage of tertiary education	(2)
	Primary education		secondary education				Experience
Coefficient	0.756**	0.256	0.090	0.598**	0.262	0.719**	0.967***
(Standard Error)	(0.347)	(0.295)	(0.288)	(0.290)	(0.291)	(0.325)	(0.131)
Constant	-1.447***	-1.447***	-1.447***	-1.447***	-1.447***	-1.447***	-1.200***
	(0.291)	(0.291)	(0.291)	(0.291)	(0.291)	(0.291)	(0.058)
Observations	11,612	11,612	11,612	11,612	11,612	11,612	12,560
Pseudo R2	0.0348	0.0348	0.0348	0.0348	0.0348	0.0348	0.0311
Log pseudolikelihood	-5297.9159	-5297.9159	-5297.9159	-5297.9159	-5297.9159	-5297.9159	-5689.4423

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The following information regards the relationship between demographic variables and self-employment and the output is shown in Table 6.

The third hypothesis suggest that males are more likely to become self-employed compared to females. Despite multiple literature suggests so, my output reveals that being female increases the likelihood of becoming self-employed compared to being male. Thus, the third hypothesis is rejected at a five percent significance level.

According to hypothesis four, the effect of age on self-employment is not only positive but also negative. Only including age in the regression gives a positive effect, which is significant at a one percent significance level (see Footnote 1). Consequently, one would say that older individuals are more likely to become self-employed. But granting that age has a non-linear relationship with self-employment, age squared is included in the regression. When including age and age squared, the effect of age stays positive but becomes insignificant. The effect of age squared is positive as well and, more important, significant at a one percent level. Respondents were asked to indicate to which age range they belong. Ranges were classified at 18-24 years old, 25-34 years old, 35-44 years old, 45-54 years old, 55-64 years old and 65-120 years old. Since all these effects, except the 18-24 years' age range, are not significant, I will not use this variable in the other regressions.

Literature does not provide so much information about the effect of one's household size on the choice of becoming self-employed. The information provided suggests a positive relationship between the number of children and the probability of becoming self-employed. Though it does provide more information about the relationship between the occupation of the parents and the chances for becoming self-employed. Unfortunately, the

variables indicating the occupation of one's parents did not have any observations and I can only use the household size as an indicator of one's family background. The greater the household size the greater probability for the individual to become self-employed (see Footnote 2). But, in the same way as age, the effect of household size is expected to be nonlinear to self-employment and household size squared should be created. When including both in the model the effects are positive. Though neither effects are significant.

Individuals with a higher income are more likely to become self-employed since their safety net is bigger. My data confirms that individuals who have a high income are more likely to become self-employed compared to individuals whose income is in the lowest 33 tile or the middle 66 tile. Without country effects this effect is significant at a one percent significance level, however, I do have to include country effects and therefore the effect of having high income on the probability of becoming self-employed is positive but not significant.

Table 6: Relationship between demographic variables and self-employment

VARIABLES	(3) Female	(4) Age ¹	Age squared	(5) Household size ²	Household size squared	(6) High income
Coefficient (Standard Error)	0.109** (0.049)	0.004 (0.013)	0.000*** (0.000)	0.060 (0.039)	0.002 (0.005)	0.059 (0.055)
Constant	-1.207*** (0.059)	-2.966*** (0.111)	-2.190*** (0.269)	-1.392*** (0.075)	-1.367*** (0.091)	-1.252*** (0.071)
Observations	12,602	12,529	12,529	12,498	12,498	10,611
Pseudo R2	0.0272	0.0644	0.0644	0.0288	0.0288	0.0274
Log pseudolikelihood	-5735.3975	-5487.1668	-5487.1668	-5676.3994	-5676.3994	-4636.5407

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The last part consists information about perceptual variables and their results are shown in Table 7

Knowing other self-employed, believing in good opportunities, self-confidence and fear of failure were grouped as perceptual variables. I expect the first three to have a positive effect on self-employment, while fear of failure is expected to have a negative effect. The model

¹ Age based on the regression between self-employment age and age squared. Only including age in the regressions gives a coefficient of 0.043, robust standard error 0.0021 and significance level of 1 percent

² Household size based on the regression between self-employment household size and household size squared. Only including household size in the regression gives a coefficient of 0.077, a robust standard error of 0.0171 and significance level of 1 percent

confirms our expectations. Knowing other self-employed individuals increases the likelihood of becoming self-employed compared to not knowing other self-employed. Individuals who believe good opportunities for self-employment will exist in the next six months are more likely to become self-employed compared to individuals who do not. Last but not least, individuals who believe in their own skills, knowledge and abilities have greater probabilities of becoming self-employed compared to individuals who are not that self-confident. All these effects are significant at a one percent significance level. Finally, individuals who fear failure were expected to be less likely to become self-employed compared to people who fear failure less. This is confirmed by the model at a one percent significance level. All in all, the effect of all perceptual variables is precisely as hypothesized.

Table 7: Relationship between perceptual variables and self-employment

VARIABLES	(7) Knowing other self- employed	(8) Good opportunities	(9) Self- confidence	(10) Fear of failure
Coefficient (Standard Error)	0.699*** (0.048)	0.543*** (0.053)	1.655*** (0.058)	-1.149*** (0.057)
Constant	-1.495*** (0.063)	-1.339*** (0.067)	-2.247*** (0.073)	-0.798*** (0.061)
Observations	12,508	10,157	12,157	12,144
Pseudo R2	0.0452	0.0410	0.1140	0.0707
Log pseudolikelihood	-5588.2883	-4637.5931	-5066.0996	-5302.7807

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

To summarize, individuals with higher levels of education than pre-primary education and experience are more likely to become self-employed than a wage worker. Females are also more likely to become self-employed. Older individuals are more likely to involve in self-employment than in wage employment. Individuals who know other self-employed, believe in good opportunities, have self-confidence and do not fear failure have higher probabilities of becoming self-employed.

Part II: Opportunity versus necessity self-employment

All individuals not living in the Netherlands have lower probabilities of becoming self-employed as an opportunity. In this part, the effect of living in Austria and Switzerland is significant as well. Living in Ireland decreases the likelihood of involving in opportunity-self-employment whereas it increases the probability of involving in self-employment in general.

Just as in the first part, the first table in this part (Table 8) will show information regarding human capital variables. A dummy variable has been created to distinguish between opportunity and necessity self-employed individuals. I expect individuals involved in opportunity self-employment to have a higher level of education and more experience compared to necessity self-employed. The output for education is not significant at a ten percent significance level. Hence, I cannot conclude what the effect of education is. Likewise, the effect of experience on opportunity self-employment is not significant at a ten percent significance level and I cannot conclude the relationship between experience and opportunity self-employment

Table 8: Relationship between human capital variables and opportunity self-employment

VARIABLES	(1)				(2)		
	Primary education	Lower secondary education	(Upper) secondary education	Post-secondary non-tertiary education	First stage of tertiary education	Second stage of tertiary education	Experience
Coefficient	-0.460	0.091	0.341	0.519	0.766	-0.196	-0.099
(Standard Error)	(0.923)	(0.823)	(0.790)	(0.798)	(0.798)	(0.941)	(0.412)
Constant	1.529*	1.529*	1.529*	1.529*	1.529*	1.529*	1.959***
	(0.802)	(0.802)	(0.802)	(0.802)	(0.802)	(0.802)	(0.206)
Observations	956	956	956	956	956	956	1,036
Pseudo R2	0.0488	0.0488	0.0488	0.0488	0.0488	0.0488	0.0354
Log pseudolikelihood	-506.06474	-506.06474	-506.06474	-506.06474	-506.06474	-506.06474	-561.93641

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

The next information regards the relationship between demographic variables and opportunity self-employment and results are shown in Table 9

In Part I was surprisingly shown that females are more likely to become self-employment. On the other hand, females are less likely to become self-employed as an opportunity. Hence, being female decreases the probability of involving in opportunity self-employment compared to being male at a ten percent significance level.

Only including age in the model gives the opposite result from the model investigating the probability of becoming self-employment. Whereas age increases the likelihood of becoming self-employed, it decreases the likelihood of becoming self-employed for opportunity reasons (see Footnote 3). But, this effect is not significant at a ten percent significance level. Taken the non-linear relationship between age and self-employment into account, and hence including age and age squared in the model, age (squared) decreases (increases) the probability of becoming self-employed as an opportunity. These effect are not significant at a ten percent significance level.

The effect of household size on the probability of becoming self-employed is positive but not significant (see Footnote 4). In contrast to the effect of household size on the probability of becoming self-employed as opportunity, which is indeed positive but not significant at a ten percent significance level. Including household size and household size squared results in both positive effects, but neither effects are significant.

Individuals with higher incomes are more likely to involve in self-employment in general, and are more likely to become so for opportunity reasons. This effect is significant at a one percent significance level.

Table 9: Relationship between demographic variables and opportunity self-employment

VARIABLES	(3) Female	(4) Age ³	Age squared	(5) Household ⁴ size	Household size squared	(6) High income
Coefficient (Standard Error)	-0.277* (0.149)	-0.067 (0.047)	0.001 (0.001)	0.037 (0.204)	0.008 (0.029)	0.821*** (0.167)
Constant	2.093*** (0.222)	3.462*** (1.077)	3.462*** (1.077)	1.766*** (0.371)	1.766*** (0.371)	1.461*** (0.226)
Observations	1,038	1,033	1,033	1,033	1,033	849
Pseudo R2	0.0382	0.0372	0.0372	0.0384	0.0384	0.0639
Log pseudolikelihood	-561.93231	-561.13992	-561.13992	-559.3643	-559.3643	-450.74765

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

³ Age based on the regression between self-employment age and age squared. Only including age in the regression gives a coefficient of -0.0033, a robust standard error of 0.0066 and not significant at a 10 percent level

⁴ Household size based on the regression between household size and household size squared. Only including household size in the regression gives a coefficient of 0.0892, a robust standard error of 0.0550 and a not significant at a 10 percent level

The last information regards the relationship between perceptual variables and opportunity self-employment and results are shown in Table 10

The effects of knowing other self-employed, believing in good opportunities, having self-confidence and fear of failure on the probability of becoming self-employed as an opportunity are all the same as the for the probability of becoming self-employed versus wage employment, except the significance level of fear of failure. Knowing other self-employed is positively related to one's involvement into opportunity self-employment. Individuals who believe in good opportunities for self-employment are more likely to become self-employed for opportunity reasons compared to individuals who do not believe in good opportunities. Individuals with a higher level of self-confidence have greater probabilities to involve in opportunity self-employment compared to individuals with less self-confidence. These effects are all significant at a one percent significance level. And last but not least, individuals who fear failure are less likely to involve in opportunity self-employment compared to individuals who don't fear failure at a five percent significance level.

Table 10: Relationship between perceptual variables and opportunity self-employment

VARIABLES	(7) Knowing other self- employed	(8) Good opportunitie s	(9) Self- confidence	(10) Fear of failure
Coefficient (Standard Error)	0.417*** (0.150)	0.517*** (0.168)	0.744*** (0.193)	-0.452** (0.186)
Constant	1.743*** (0.221)	1.859*** (0.243)	1.312*** (0.253)	2.053*** (0.214)
Observations	1,034	873	1,022	1,014
Pseudo R2	0.0423	0.0487	0.0460	0.0409
Log pseudolikelihood	-558.45538	-463.56961	-547.76139	-549.51696

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

According to hypothesis eleven, individuals who became self-employed as an opportunity should have higher levels of human capital. I can neither accept nor reject this hypothesis since the effects of both education and experience are not significant.

To summarize all the effect before building the hierarchical model a table is provided with an overview of the hypothesis.

Table 11: Hypotheses

Hypothesis	Part I	Part II
<i>Hypothesis 1: A higher level of education increases the probability of an individual to become self-employed (as an opportunity)</i>	Accepted	Not significant
<i>Hypothesis 2: More experience increases the probability of becoming self-employed (as an opportunity)</i>	Accepted	Not significant
<i>Hypothesis 3: Males are more likely to become (opportunity) self-employed than females.</i>	Rejected	Accepted
<i>Hypothesis 4: The relationship between age and (opportunity) self-employment is positive until a certain age after which this relationship becomes negative</i>	<u>Only age</u> positive at 1 percent significance level <u>Age & age squared</u> Age positive & insignificant Age2 positive & significant	<u>Only age</u> Negative & insignificant <u>Age & Age squared</u> Age negative & insignificant Age2 positive & insignificant
<i>Hypothesis 5: Individuals with an entrepreneurial family and larger household size are more likely to become self-employed (as an opportunity)</i>	Not significant	Not significant
<i>Hypothesis 6: Individuals with higher incomes are more likely to become self-employed (as an opportunity)</i>	Not significant	Accepted
<i>Hypothesis 7: Knowing other self-employed increases one's likelihood of becoming self-employed (as an opportunity)</i>	Accepted	Accepted
<i>Hypothesis 8: Having confidence in your own skills and ability increases your odds of becoming self-</i>	Accepted	Accepted

<i>employed (as an opportunity)</i>		
<i>Hypothesis 9: Believing in good opportunities for self-employment increases one's odds for becoming self-employed (as an opportunity)</i>	Accepted	Accepted
<i>Hypothesis 10: A higher fear of failure decreases the probability of becoming self-employed (as an opportunity)</i>	Accepted	Accepted

Hierarchical model

As a final point, I want to build a hierarchical model where I will, step by step, include all the variables. The results might be different than testing the hypothesis separately.

Part I

Model 1

First I tested all the hypotheses separately, including the relationship between education and self-employment. In the first model of the hierarchical model the relationship regards self-employment and only education. Therefore, the results will be similar to each other. This means, at a significance level of five percent, having primary education, post-secondary non-tertiary education and second stage of tertiary education increases the probability of becoming self-employed compared to having pre-primary education. The other levels of education positively affect the self-employment probability but are not significant.

Model 2

Experience will be added to the regression in this second model. This model thus contains all the human capital variables. In the separate regression, experience increases the probability of becoming self-employed at a one percent significance level. The results remain the same. Having primary education, post-secondary non-tertiary education and second stage of tertiary education significantly increase the probability of becoming self-employed. Individuals with experience in the self-employment sector are more likely to become self-employed compared to individuals with no experience in this sector at a one percent significance level.

Model 3

In the third model the first demographic variable will be introduced to the regression, namely gender. The effects of education and experience remain unchanged compared to the second model. Being female increases the probability of becoming self-employed, however this effect is not significant. This effect was significant in the separate regression. This means, when education and experience are added to the relationship between gender and self-employment there is not enough evidence to say that females are more likely to become self-employed compared to males.

Model 4

The effect of age and age squared will be included in this model. The output shows some changes compared to the previous model:

- The effects of having post-secondary non-tertiary education and second stage of tertiary education become significant at a one percent significance level compared to a five percent significance levels in the three previous models;
- The effect of having lower secondary education becomes significant for the first. This effect is now significant at a ten percent significance level;
- The effect of having first stage of tertiary education becomes significant for the first time. This effect is now significant at a five percent significance level.

This model has more evidence to suggest a positive relationship between education and self-employment compared to the previous ones. Experience remains to be significantly positively related to self-employment. The effect of female remains insignificant just as age. In the separate regression the effect of both age as well as age squared were positive. In this model, the effect of age is negative and age squared stays positive. However, only the effect of age squared is positive at a one percent significance level.

Model 5

Household size is included in model 5. The results regarding education, experience, age and age squared are the same as in model 4. What changes is that the effect of being female becomes significant at a five percent significance level. This result is the same as in the separate regression but different compared to model 3 and 4 where this effect was not significant. Therefore, this model has more evidence for a positive relationship between being female and becoming self-employed compared to the previous. In the separate regression, household size and household size squared were positively related to self-employment but not significant. In this model, a larger household significantly increases the probability of becoming self-employed. However, the effect of household size squared is negative but not significant.

Model 6

In model 6 all the human capital and demographic variables are included. Outstanding are the significance levels of the education effects. All of them are positively significant at a one percent significance level, except lower and upper secondary education which are positively significant at a five percent significance level. Hence, this model has even more evidence for a positive relationship between education and self-employment than model 4 and 5. No surprise regarding experience, which still increases the probability of becoming self-employed at a one percent significance level. Compared to the previous model the effect of gender is not significant anymore. The effects of age, age squared, household size and household size squared are similar to the previous model. The added variable, high income, is negatively related to self-employment. That is, individuals with a high income are less likely to become self-employed compared to individuals with a lower income at a one percent significance level, ceteris paribus. This effect is surprising since it was positive in the separate regression.

Another surprise in this model is that the coefficients of the education variable are almost doubled compared to the all the previous models. This might be explained by an interaction between higher income and education. It may be that, in general, higher levels of income are associated with higher educational levels and therefore the coefficient changed dramatically.

Table 12: Effect of human capital and demographic variables on self-employment

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Primary education	0.756** (0.347)	0.836** (0.347)	0.835** (0.347)	0.807** (0.350)	0.801** (0.353)	1.505*** (0.486)
Lower secondary education	0.256 (0.295)	0.317 (0.294)	0.315 (0.295)	0.493* (0.296)	0.479 (0.297)	1.110** (0.445)

(Upper) secondary education	0.0909 (0.288)	0.159 (0.287)	0.156 (0.288)	0.458 (0.288)	0.432 (0.290)	1.058** (0.439)
Post-secondary non-tertiary education	0.598** (0.290)	0.658** (0.289)	0.649** (0.290)	0.908*** (0.291)	0.884*** (0.292)	1.533*** (0.442)
First stage of tertiary education	0.262 (0.291)	0.324 (0.289)	0.316 (0.290)	0.628** (0.291)	0.607** (0.292)	1.302*** (0.443)
Second stage of tertiary education	0.719** (0.325)	0.783** (0.324)	0.785** (0.324)	0.929*** (0.325)	0.935*** (0.327)	1.529*** (0.475)
Experience		0.980*** (0.135)	0.989*** (0.136)	0.994*** (0.142)	0.992*** (0.147)	1.004*** (0.170)
Female			0.076 (0.051)	0.077 (0.053)	0.116** (0.053)	0.086 (0.060)
Age				-0.002 (0.013)	-0.018 (0.014)	-0.014 (0.016)
Age2				0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Household size					0.154*** (0.048)	0.199*** (0.048)
Household size2					-0.002 (0.006)	-0.007 (0.006)
High income						-0.197*** (0.064)
Belgium	-0.700*** (0.119)	-0.703*** (0.119)	-0.708*** (0.119)	-0.806*** (0.121)	-0.814*** (0.123)	-0.871*** (0.140)
France	-0.981*** (0.098)	-0.971*** (0.099)	-0.979*** (0.099)	-0.938*** (0.102)	-0.969*** (0.103)	-1.007*** (0.113)
Switzerland	-0.082 (0.100)	-0.082 (0.101)	-0.079 (0.100)	-0.215** (0.103)	-0.187* (0.104)	-0.202* (0.112)
Austria	0.050 (0.077)	0.042 (0.077)	0.036 (0.078)	0.051 (0.080)	0.082 (0.081)	-0.010 (0.090)
United Kingdom	-0.442*** (0.105)	-0.433*** (0.105)	-0.439*** (0.106)	-0.526*** (0.109)	-0.539*** (0.109)	-0.533*** (0.118)
Germany	-1.216*** (0.111)	-1.209*** (0.111)	-1.209*** (0.111)	-1.286*** (0.115)	-1.264*** (0.115)	-1.320*** (0.129)
Ireland	0.024 (0.096)	0.036 (0.096)	0.025 (0.097)	-0.080 (0.100)	-0.178* (0.102)	-0.197* (0.111)
Constant	-1.447*** (0.291)	-1.543*** (0.290)	-1.565*** (0.291)	-2.757*** (0.396)	-2.897*** (0.401)	-3.613*** (0.539)
Observations	11,612	11,576	11,576	11,517	11,447	9,700

Pseudo R2	0.0348	0.0393	0.0395	0.0777	0.0835	0.0825
Log pseudolikelihood	-5297.9159	-5253.1243	-5252.0069	-5016.8903	-4953.1377	-4042.4762

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Model 7

In the last four steps all perceptual variables will be added to the regression starting with knowing other self-employed. In this model, all the effects of different educational attainment levels are significant and the effect of experience remains significant. Compared to the previous model, the significance levels are lower. In the previous model all the effects were significant at a one percent level except lower and upper secondary education. After including the variable knowing other self-employed, the effect of having first stage tertiary education is only significant at a five percent level compared to a one percent level in the previous model. Including a perceptual variable, knowing other self-employed, gives less evidence for the relationship between education and self-employment. Nothing changes regarding experience, age, age squared, household size, household size squared and high income. Being females increase the probability of becoming self-employed at a five percent significance level. The added variable, knowing other self-employed, increases the likelihood of becoming self-employed at a one percent significance level. This result is similar as in the separate regression.

Model 8

Next, the variable believing in good opportunities will be included in the regression. The effects of all the variables are the same as before. Females who know other self-employed and who have higher levels of education, experience, lower incomes and a larger household size are more likely to become self-employed. Individuals who believe good opportunities for self-employment will exist in the next six months have greater probabilities of becoming self-employed compared to individuals who do not believe in these good opportunities. This effect is significant at a one percent significance level.

Model 9

In the ninth step self-confidence will be taken into account. Effects of education and experience remain positive but the effects are less significant except the effect of having primary education:

- The effects of having lower and upper secondary education are positively significant at a ten percent level (compared to the previous five percent level)
- The effect of post-secondary non-tertiary education changes to be positively significant at a one percent level in the previous five models to a five percent significance level (which is similar to model 1-3)
- The effect of having first stage tertiary education is not significant anymore, just as it wasn't in the first three models
- The effect of having second stage of tertiary education becomes less significant. Their significance level decreases from a one percent level to ten percent. This is the lowest significance level for this educational attainment in all the models.

- Experience has been positively related to the probability of becoming self-employed at a one percent level. In this model, it is the first time the significance level changes to five percent.

In this model there is, for the first time, less evidence for a positive relationship between experience and self-employment. However, the evidence is still strong enough to conclude that individuals with experience are more likely to involve in self-employment. Being female increases the probability of becoming self-employed in this model at a one percent significance level. All the other effects remain unchanged, and having self-confidence increases the probability of becoming self-employed at a one percent significance level.

Model 10

In the last model, I add the variable fear of failure. In the separate regression fear of failure decreases the probability of becoming self-employment at a one percent significance level, this still holds in the tenth model. All the other effects and their significance levels are the same as in the previous model except education. Only the effect of primary education and post-secondary non-tertiary education are significant at a five percent significance level. Lower secondary education and second stage of tertiary education are significant at a ten percent significance level. Other levels of education are positive but not significant.

Table 13: Effect of human capital, demographic and perceptual variables on self-employment

VARIABLES	(1) Model 7	(2) Model 8	(3) Model 9	(4) Model 10
Primary education	1.533*** (0.489)	1.711*** (0.576)	1.622*** (0.593)	1.503** (0.590)
Lower secondary education	1.065** (0.446)	1.137** (0.530)	0.978* (0.542)	0.937* (0.540)
(Upper) secondary education	0.986** (0.440)	1.106** (0.524)	0.889* (0.536)	0.795 (0.534)
Post-secondary non-tertiary education	1.412*** (0.443)	1.506*** (0.527)	1.254** (0.539)	1.187** (0.537)
First stage of tertiary education	1.132** (0.444)	1.158** (0.529)	0.840 (0.542)	0.736 (0.540)
Second stage of tertiary education	1.428*** (0.477)	1.505*** (0.568)	1.149* (0.587)	1.105* (0.588)
Experience	0.784*** (0.172)	0.692*** (0.184)	0.411** (0.188)	0.393** (0.193)
Female	0.150** (0.062)	0.161** (0.068)	0.323*** (0.072)	0.385*** (0.074)

Age	-0.014 (0.016)	-0.002 (0.017)	-0.027 (0.019)	-0.018 (0.019)
Age2	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Household size	0.205*** (0.049)	0.212*** (0.051)	0.188*** (0.049)	0.207*** (0.051)
Household size2	-0.008 (0.006)	-0.009 (0.006)	-0.007 (0.005)	-0.008 (0.006)
High income	-0.233*** (0.065)	-0.261*** (0.072)	-0.335*** (0.075)	-0.330*** (0.077)
Knowing other self-employed	0.810*** (0.059)	0.771*** (0.066)	0.508*** (0.070)	0.498*** (0.072)
Good opportunities		0.463*** (0.067)	0.365*** (0.069)	0.300*** (0.071)
Self-confidence			1.452*** (0.078)	1.349*** (0.080)
Fear of failure				-0.805*** (0.076)
Belgium	-0.722*** (0.143)	-0.685*** (0.165)	-0.626*** (0.175)	-0.595*** (0.183)
France	-1.007*** (0.115)	-1.090*** (0.127)	-0.986*** (0.130)	-0.963*** (0.131)
Switzerland	-0.205* (0.115)	-0.208* (0.125)	-0.080 (0.130)	-0.159 (0.133)
Austria	-0.034 (0.092)	-0.071 (0.103)	-0.051 (0.107)	-0.013 (0.110)
United Kingdom	-0.471*** (0.119)	-0.389*** (0.128)	-0.413*** (0.131)	-0.390*** (0.135)
Germany	-1.280*** (0.130)	-1.309*** (0.137)	-1.300*** (0.139)	-1.284*** (0.140)
Ireland	-0.159 (0.112)	-0.143 (0.121)	-0.063 (0.126)	-0.064 (0.128)
Constant	-3.968*** (0.542)	-4.446*** (0.632)	-4.374*** (0.652)	-4.132*** (0.652)
Observations	9,628	7,803	7,604	7,416
Pseudo R2	0.1039	0.1160	0.1710	0.1897
Log pseudolikelihood	-3922.0707	-3212.9374	-2954.1921	-2824.3628

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

To conclude, all the signs of the effects in the hierarchical model are the same compared to the separate regressions except age, household size squared and high income. In the different steps of building the hierarchical model the significance level of multiple variables changes. Some models have more evidence for the effect of one variable compared to the others. There is most evidence for the positive effect of education on self-employment in the sixth model. Experience is best explained in all the models except the last two. The positive relationship between being female and becoming self-employed is best explained in model nine and ten, where this variable is significant at a one percent significance level. The significance level of all the other variables remain the same in all the models.

Part II

The same regressions will be performed for the probability of becoming self-employed for opportunity reasons.

Model 1

The effect of education on opportunity self-employment is not significant in all the models. Therefore, there is not enough evidence to conclude whether having experience increases or decreases the probability of becoming self-employed as an opportunity.

Model 2

Experience has a positive effect on the probability of becoming self-employed and this effect is significant in either case. Having experience does not increase the probability of involvement in opportunity self-employment. This effect is (most likely) negative, however, insignificant and therefore I cannot conclude whether this effect is completely true.

Model 3

In the third step being female will be added to the regression with opportunity self-employment. Being female increases the probability of becoming self-employment but it decreases the probability of involvement in opportunity self-employment at a ten percent significance level. The effects of education and experience remain insignificant.

Model 4

Next step is to include age and age squared in the regression. In the separate regression age (squared) decreases (increases) the probability of becoming self-employed as an opportunity. In this expanded model, this effect remains the same where neither effects are significant. All the other effects remain unchanged.

Model 5

Subsequently, household size and household size squared are added. Again, neither effects are significant and therefore there is not enough evidence in the model to conclude the relationship between the household size and opportunity self-employment. Unfortunately, almost nothing changes compared to the previous model. Therefore, no statements can be made regarding the relationships with opportunity self-employment. Nevertheless, the effects of age and age squared become significant at a ten percent level. Hence, the effect of age is negatively related to opportunity self-employment and age squared positively.

Model 6

In the previous part, higher levels of income were associated with lower probabilities of entering self-employment. Hence, individuals with higher levels of income are in general less likely to become self-employed but, might be, more likely to enter opportunity self-employment. Indeed, individuals with higher incomes are more likely to enter opportunity self-employment compared to necessity self-employment at a one percent significance level. Two changes compared to the fifth model. First, the effect of being female is not significant anymore which means I cannot say whether females or males are more likely to enter opportunity self-employment. Secondly, the effect of age squared is not significant anymore.

Table 14: Effect of human capital and demographic variables on opportunity self-employment

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Primary education	-0.460 (0.923)	-0.520 (0.919)	-0.435 (0.917)	-0.414 (0.932)	-0.540 (0.910)	-0.762 (0.845)
Lower secondary education	0.091 (0.823)	0.078 (0.816)	0.174 (0.810)	0.197 (0.823)	0.145 (0.797)	0.223 (0.717)
(Upper) secondary education	0.341 (0.790)	0.274 (0.782)	0.367 (0.778)	0.374 (0.792)	0.284 (0.765)	0.184 (0.655)
Post-secondary non-tertiary education	0.519 (0.798)	0.457 (0.793)	0.578 (0.789)	0.595 (0.803)	0.518 (0.775)	0.225 (0.678)
First-stage of tertiary education	0.766 (0.798)	0.700 (0.792)	0.812 (0.787)	0.811 (0.800)	0.765 (0.773)	0.585 (0.674)
Second stage of tertiary education	-0.196 (0.941)	-0.267 (0.936)	-0.260 (0.930)	0.244 (0.937)	-0.311 (0.914)	<i>See</i> ⁵
Experience		-0.153 (0.417)	-0.186 (0.419)	-0.214 (0.425)	-0.306 (0.429)	-0.155 (0.556)
Female			-0.297* (0.161)	-0.287* (0.162)	-0.294* (0.163)	-0.119 (0.183)
Age				-0.077 (0.050)	-0.094* (0.052)	-0.096* (0.058)
Age2				0.001 (0.001)	0.001* (0.001)	0.001 (0.001)
Household size					0.019 (0.209)	-0.067 (0.231)
Household size2					0.010 (0.029)	0.014 (0.032)
High income						0.611*** (0.187)
Belgium	-1.719*** (0.396)	-1.705*** (0.395)	-1.742*** (0.394)	-1.658*** (0.399)	-1.649*** (0.405)	-1.798*** (0.467)
France	-1.228***	-1.232***	-1.248***	-1.222***	-1.222***	-1.130***

⁵ From model six onwards, the second stage of tertiary education becomes the omitted variable. There are probably not enough observations for pre-primary education for either opportunity or necessity self-employed and therefore pre-primary education cannot be used as the omitted variable.

	(0.310)	(0.310)	(0.310)	(0.311)	(0.313)	(0.334)
Switzerland	-0.691**	-0.687**	-0.670**	-0.639*	-0.598*	-0.746**
	(0.328)	(0.328)	(0.330)	(0.332)	(0.333)	(0.355)
Austria	-0.565**	-0.542*	-0.552*	-0.514*	-0.462	-0.470
	(0.280)	(0.281)	(0.282)	(0.282)	(0.283)	(0.313)
United Kingdom	-0.997***	-1.007***	-1.031***	-1.026***	-1.021***	-0.957**
	(0.344)	(0.344)	(0.345)	(0.348)	(0.352)	(0.379)
Germany	-1.364***	-1.365***	-1.408***	-1.368***	-1.390***	-1.261***
	(0.313)	(0.313)	(0.317)	(0.319)	(0.322)	(0.345)
Ireland	-1.226***	-1.225***	-1.242***	-1.234***	-1.277***	-1.144***
	(0.295)	(0.295)	(0.296)	(0.296)	(0.297)	(0.317)
Second stage of tertiary education	-0.196	-0.267	-0.260	-0.244	-0.311	
	(0.941)	(0.936)	(0.930)	(0.937)	(0.914)	
Constant	1.529*	1.593**	1.625**	3.353**	3.608***	3.523**
	(0.802)	(0.800)	(0.794)	(1.349)	(1.364)	(1.419)
Observations	956	954	954	949	945	774
Pseudo R	0.0488	0.0487	0.0519	0.0544	0.0588	0.0679
Log pseudolikelihood	-506.06474	-504.51167	-502.80646	-500.16648	-495.69574	-405.16922

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Next, the perceptual variables will be added step by step.

Model 7

First, the variable knowing other self-employed. Knowing other self-employed was positively related to entering self-employment at a one percent significance level. Individuals who know other self-employed are also more likely to become opportunity self-employed, however, this is only significant at a ten percent level. None of the other effects are significant except high income. Therefore, in this model, I can only say that individuals with higher incomes and who know other self-employed have greater probability to involve in opportunity self-employment.

Model 8

Believing in good opportunities is added as second perceptual variable. This variable is positive related to opportunity self-employment at a ten percent significance level. In this model the effect of age, age squared and high income are significant and the other effects not. Another notable change is that being female decreases the probability of involvement in opportunity self-employment in the previous seven models, but it increases this probability in this model (and in model 9 and 10).

Model 9

Self-confidence increase the probabilities of entering opportunity self-employment at a one percent significance level. Adding this variable changes little compared to the previous model. The effect of human capital variables, i.e. education and experience, is still not significant. Age is negatively related to opportunity self-employment at a five percent significance level compared to the previous ten percent significance level.

Model 10

In the first part, the effect of fear of failure was significant at a maximum significance level of five percent. In this part, the effect is not significant at all. All the other effects are same as before, except age changes from a five percent significance level back to a ten percent significance level.

Table 15: Effect of human capital, demographic and perceptual variables on opportunity self-employment

VARIABLES	(7) Model 7	(8) Model 8	(9) Model 9	(10) Model 10
Primary education	-0.646 (0.852)	-1.073 (1.124)	-0.825 (1.084)	-0.677 (1.101)
Lower secondary education	0.297 (0.718)	-0.696 (1.001)	-0.629 (0.980)	-0.474 (1.000)
(Upper) secondary education	0.232 (0.654)	-0.847 (0.949)	-0.782 (0.928)	-0.647 (0.947)
Post-secondary non-tertiary education	0.294 (0.676)	-0.807 (0.966)	-0.824 (0.944)	-0.626 (0.964)
First stage of tertiary education	0.605 (0.670)	-0.352 (0.962)	-0.205 (0.942)	-0.107 (0.960)
Experience	-0.266 (0.561)	-0.591 (0.601)	-0.674 (0.600)	-0.345 (0.647)
Female	-0.110 (0.183)	0.005 (0.202)	0.083 (0.207)	0.106 (0.207)
Age	-0.092 (0.058)	-0.117* (0.068)	-0.143** (0.072)	-0.126* (0.072)
Age2	0.001 (0.001)	0.001* (0.001)	0.002* (0.001)	0.001* (0.001)
Household size	-0.057 (0.229)	-0.091 (0.238)	-0.044 (0.233)	-0.039 (0.233)
Household size2	0.013 (0.032)	0.013 (0.032)	0.006 (0.031)	0.006 (0.031)
High income	0.589***	0.526**	0.533**	0.516**

	(0.187)	(0.207)	(0.212)	(0.213)
Knowing other	0.326*	0.326	0.230	0.249
self-employed	(0.181)	(0.202)	(0.207)	(0.209)
Good opportunities		0.392*	0.377*	0.398*
		(0.203)	(0.207)	(0.211)
Self-confidence			0.811***	0.775***
			(0.259)	(0.262)
Fear of failure				-0.110
				(0.257)
Belgium	-1.659***	-1.688***	-1.659***	-1.618***
	(0.474)	(0.536)	(0.568)	(0.574)
France	-1.157***	-1.332***	-1.124***	-1.120***
	(0.336)	(0.379)	(0.389)	(0.388)
Switzerland	-0.711**	-0.915**	-0.783*	-0.772*
	(0.357)	(0.399)	(0.408)	(0.408)
Austria	-0.463	-0.590*	-0.628*	-0.593
	(0.313)	(0.348)	(0.358)	(0.363)
United Kingdom	-0.961**	-1.195***	-1.229***	-1.202***
	(0.380)	(0.410)	(0.417)	(0.415)
Germany	-1.273***	-1.403***	-1.420***	-1.417***
	(0.345)	(0.367)	(0.371)	(0.371)
Ireland	-1.120***	-1.261***	-1.146***	-1.101***
	(0.318)	(0.350)	(0.358)	(0.357)
Constant	3.146**	4.911***	4.692***	4.163**
	(1.434)	(1.760)	(1.810)	(1.846)
Observations	772	662	654	642
Pseudo R2	0.0713	0.0844	0.0993	0.0975
Log pseudolikelihood	-403.15155	-337.26565	-326.71583	-323.31445

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In short, I cannot conclude much about the differences in human capital, demographic and perceptual variables between opportunity and necessity entrepreneurs. Notable are the differences between being females and having a high income. Being female increase the probability of becoming self-employed whereas it decreases the probability of involvement in opportunity self-employment in the first seven models. Moreover, individuals with higher incomes were less likely to involve in self-employment in general but if they become self-employed this is more likely to be due to opportunity reasons than necessity reasons.

Conclusion and limitations

Conclusion

In this thesis I looked at different characteristics and determinants of self-employment. It is important to investigate self-employment because it has been shown to be an important contributor to the economy since it drives innovation, competition and economic growth (Wennekers & Thurik, 1999). I was interested in human capital, demographic and perceptual variables and especially in education. A lot of attention has been paid to the role of education in the self-employment process, especially since Kuratko (2005) showed that entrepreneurship can be taught. Nevertheless, opinions differ regarding this relationship. Some scholars have mentioned a negative relationship between education and the probability of becoming self-employed (Riley, 1979; Carroll & Mosakowski, 1987; Iyigun & Owen, 1998; Thomas, 2009). Most argued reasons are better opportunities in wage employment (Block & Sandner, 2009) and the dedication of real entrepreneurs (Riley, 1979). However, other scholars disagree and believe that individuals with higher levels of education are more likely to become self-employed. Human capital theory is the foremost used theory to explain the relationship between education and self-employment. It says that knowledge provides individuals with increases in their cognitive abilities leading to more productive and efficient potential activity (Schultz, 1959; Block & Sandner, 2009). Therefore, individuals with more or higher quality human capital are better at perceiving and exploiting profitable opportunities for new economic activity (Davidsson & Honig, 2003). This indicates that individuals with higher levels of education are more likely to become self-employed. It is important to provide evidence for this positive relationship between education and self-employment since governments and universities are spending more and more on entrepreneurship education and training (Katz, 2003; Kuratko, 2005). To test this, I performed a study focusing on Western Europe because education plays a more significant role in the high-wage sector (Honig, 1996). In my study I included Austria, Belgium, France, Germany, Ireland, the Netherlands, Switzerland and the United Kingdom. Other characteristics and determinants of self-employment that are included are: experience, gender, age, family background, income, knowing other self-employed, believing in good opportunities, self-confidence and fear of failure. Worldwide males are the dominant gender when investigating self-employment. The relationship between age and self-employment seems both positive and negative and follows, most likely, a U-shaped curve. Individuals with a larger household size and a higher income are supposed to be more likely to become self-employed. Knowing other self-employed, believing in good opportunities, having self-confidence and fear of failure are so-called perceptual variables. The first three are positively linked to self-employment and the last, fear of failure, negatively.

In the first part, I compared self-employed individuals to wage workers using a GEM based dataset for the year 2012. This dataset was narrowed down to the countries mentioned above. From this sample, the U.K. spends, compared to the other Western European countries, most of its GDP on education (4.4 percent). Austria and Germany are spending least of their GDP on education (3.1 percent). The population with tertiary education in these countries are shown in Table 1. Only including self-employed and wage workers in these countries narrowed the dataset down to 12,602 observations. A dummy variable was constructed to see whether an individual was either self-employed or a wage worker. In the

second part I ought to find differences between opportunity and necessity self-employment. Hence, a new dummy variable was constructed in order to see whether the individual became self-employed for opportunity or necessity reasons. An individual was defined to be opportunity self-employed when the reason for involvement in the start-up was either 1) taking advantage of a business opportunity or 2) having a job but seeking better opportunities. The reason having no better choices for work was labelled as necessity self-employment. The dataset in the first and second part contain 12,602 and 1,038 observations respectively. All regressions were performed in STATA and include country effects.

First of all, all the hypotheses were tested separately. I can only draw conclusions about effects that are significant. Moreover, I was only able to interpret the signs of the variables since I performed logit regressions. First, individuals with an educational attainment higher than pre-primary education are more likely to involve in self-employment. Also, individuals with experience in self-employment are more likely to become self-employed (again). Females are more likely to involve in self-employed compared to males but they are less likely to become self-employed as an opportunity. Older individuals are more likely to become self-employed. Individuals with a higher income are apparently more likely to become self-employed as an opportunity. The perceptual variables affect the probability of (opportunity) self-employment as predicted. Knowing other self-employed, believing in good opportunities and having self-confidence increases both the probability of becoming self-employed as well as the probability of becoming so for opportunity reasons. Fear of failure decreases this probability in both cases.

Secondly, a hierarchical model was built including all the different variables step by step. There is most evidence for a positive relationship between education and self-employment in the sixth model. This model includes all human capital variables as well as all the demographic variables. In this model, all the different levels of educational attainment have a positive and significant effect on the probability of becoming self-employed. The effect of experience is positive and significant in all models. After including the perceptual variables, the effect of education becomes less significant. The effects of the perceptual variables are still as predicted and significant at a one percent level. One remark in this model is the effect of having high income. According to the hierarchical model, individuals with a higher income are less likely to become self-employed which contrasts with our expectations.

In the hierarchical model of part two, opportunity versus necessity self-employment, the effect of education and experience are not significant in all the ten models. Therefore, I cannot make conclusions about their relationship. However, I want to stress that the relationship seems to be positive. From the sixth model on, having second stage of tertiary education becomes the omitted variable. The signs of the other levels of educational attainment are negative. This indicates that individuals with lower levels of education than second stage of tertiary education are less likely to involve in opportunity self-employed. Be that as it may, the model provides not enough evidence to conclude this positive relationship between education and opportunity self-employment. Secondly, I cannot conclude anything about the effect of experience on opportunity self-employment with certain. Nevertheless, I want to mention that the relationship seems to be negative, which is the opposite from the conclusion in the first part. The relationship between gender and opportunity self-employment seems inconclusive. Being female decreases the probability of

involving opportunity self-employment significantly in model three, four and five. But, a positive relationship is sketched in the last three models, after the inclusion of perceptual variables. This effect is not significant hence nothing is sure. Scholars mentioned that necessity entrepreneurs are significantly older than opportunity entrepreneurs (Block & Sandner, 2009; Wagner, 2005). I can partly agree with this result. Namely, age has a negative effect on opportunity self-employment but this is not significant in all the ten models. Moreover, age squared is positively related with opportunity self-employment but only significant in three out of the seven models. Individuals with higher incomes are more likely to become self-employed as an opportunity. The effects of the perceptual variables are also less significant than in the first part. In the first part all their effects are significant at a one percent level. In the second part, only the effect of having self-confidence is positive and significant at a one percent significance levels.

I expected to find my results to show a positive relationship between human capital and opportunity self-employment. Less is true, I cannot conclude the effect of education on opportunity self-employment although it seems that the opportunity self-employed have indeed higher levels of education. Surprisingly, the effect of experience seems to be negatively related with opportunity self-employed. Since neither effects are significant I cannot conclude whether opportunity or necessity self-employed individuals have higher levels of human capital. Perceptual variables are less important for the distinction between opportunity and necessity self-employment than between wage workers and self-employment. Results indicate that having self-confidence is the most important perceptual variable in the probability of becoming opportunity self-employed. Hence, there is less evidence to conclude the relations between the variables and opportunity self-employment compared to self-employment in general.

In summary, individuals who have experience in self-employment and educational levels higher than pre-primary education are more likely to become self-employed. Females are more likely to become self-employed but mostly for necessity reasons. Individuals with higher incomes are less likely to become self-employed, but if they do, it is mostly for opportunity reasons. The effects of the perceptual variables are all as predicted although the evidence for their relationship with opportunity self-employment is less compared to self-employment in general. Hence, having educations seems to be positively related with (opportunity) self-employment. It is also shown by other scholars that individuals with higher levels of education are more successful in starting a new business. Given this positive relationship, governments should support the investments in education since it will result in more successful new business and this might lead to a decrease in unemployment rates.

Limitations

Every research knows multiple limitations. In the first place, this thesis has some limitations regarding variables. First of all, there is no variable in the dataset providing information about the individual's marital status. However, marriage seems to be an important demographic variable in the relation with self-employment. Self-employed individuals are mostly married since marriage provides stability which is a suitable background for risky self-employment (Le, 1999). Moreover, the spouse can work for the business as well, which reduces the risk of employees shirking on jobs (Borjas, 1986). Waldinger argued that family

members can serve as a source of cheap labour (as cited in Bates, 1995, p.145). Therefore, married individuals are more likely to be self-employed. Secondly, the family background in this thesis is measured only by one's household size. There was no valid information regarding the occupation of the parents. But this information is important to consider when looking at one's choice to become self-employed. As mentioned before, individuals with a family with an entrepreneurial background increases the likelihood of becoming an entrepreneur (Lerner & Haber, 2001). Besides, this background makes the individual aware of the challenges they will have to face and the individual will, therefore, be more prepared to this career option. The variable experience is a third limitation. Experience can be measured in either total work experience or experience required from working in an entrepreneurial venture. In this thesis, the variable experience measures if the individual had experience in starting a business. Hence, the total effect of working experience is not taken into account. Moreover, education is measured using different levels of educational attainment. Entrepreneurship education is getting more attention and the availability of entrepreneurship courses grew rapidly. There is no variable available to measure if someone has received specific entrepreneurship education. This type of education might strengthen the relationship between education and self-employment. Therefore, it would be interesting to create a variable that indicated whether someone has received education only or entrepreneurship education. This variable should be added to the hierarchical model to see the effect.

Moreover, the model itself knows some limitations. First of all, the model is made using logit regressions. The disadvantage of a logit model is that only the sign of the output can be interpreted. Nothing can be said regarding the magnitude. This is mostly a limitation for the education variable since it has multiple values. I am not able to conclude whether individuals with second stage of tertiary education are more likely to involve in (opportunity) self-employed compared to individuals with the lower levels of education. The signs can only be interpreted with respect to the omitted variable, pre-primary education. Secondly, the observations differ in the multiple steps of the hierarchical model. The number of observations in the most extensive model, model ten, only account for two-third of the number of observations in the smallest model, model one.

Appendix 1

```
. corr UNEDUC experience female age age2 hhsiz2 highinc knowent opport s
> uskill fearfail country
(obs=7,416)
```

	UNEDUC	experience	female	age	age2	hhsiz2	hhsiz2
UNEDUC	1.0000						
experience	0.0127	1.0000					
female	0.0836	-0.0386	1.0000				
age	-0.0458	0.0134	-0.0048	1.0000			
age2	-0.0490	0.0170	-0.0052	0.9882	1.0000		
hhsiz2	0.0447	0.0129	-0.0473	-0.0580	-0.0818	1.0000	
hhsiz2	0.0433	0.0175	-0.0447	-0.0448	-0.0615	0.8922	1.0000
highinc	0.3090	0.0325	-0.0510	0.0438	0.0373	0.1669	0.1098
knowent	0.1207	0.1040	-0.0628	-0.0871	-0.0892	0.0440	0.0477
opport	0.0889	0.0201	-0.0537	-0.0178	-0.0175	-0.0172	-0.0099
suskill	0.1349	0.1099	-0.1367	0.1020	0.0925	0.0454	0.0356
fearfail	-0.0238	-0.0207	0.0840	-0.0770	-0.0847	0.0137	0.0127
country	0.2048	-0.0059	0.0828	0.0658	0.0646	0.1331	0.1168

	highinc	knowent	opport	suskill	fearfail	country
highinc	1.0000					
knowent	0.0993	1.0000				
opport	0.0725	0.1815	1.0000			
suskill	0.1344	0.2575	0.1404	1.0000		
fearfail	-0.0361	-0.0885	-0.1084	-0.1770	1.0000	
country	-0.0014	0.0150	-0.0815	0.0195	-0.0182	1.0000

References

- Alvarez, C., Urbano, D., Coduras, A., & Ruiz-Navarro, J. (2011). Environmental conditions and entrepreneurial activity: a regional comparison in Spain. *Journal of Small Business and Enterprise Development*, 18(1), pp. 120-140. DOI: 10.1108/14626001111106460
- Arenius, P., & Minniti, M. (2005). Perceptual variables and nascent entrepreneurship. *Small Business Economics*, 24, pp. 233-247. DOI: 10.1007/s11187-005-1984-x
- Arnold, J., Schalk, R., Bosley, S., & van Overbeek, S. (2000). Graduates' experience of work in small organizations in the UK and the Netherlands. *International Small Business Journal*, 20(4), pp. 477-497. DOI: 10.1177/0266242602204005
- Audretsch, D.B., Carree, M.A., Van Stel, A.J., & Thurik, A.R. (2002). Impeded industrial restructuring: the growth penalty. *Kyklos*, 55(1), pp. 81-98. DOI: 10.1111/1467-6435.00178
- Bates, T. (1995). Self-employment entry across industry groups. *Journal of Business Venturing*, 10(2), pp. 143-156. DOI: 10.1016/0883-9026(94)00018-P
- Becker, G.S. (1962). Investment in human capital: a theoretical analysis. *Journal of Political Economy*, 70(5), pp. 9-49. Retrieved from <http://www.jstor.org/stable/1829103>
- Begley, T.M., & Boyd, D.P. (1987). Psychological characteristics associated with performance in entrepreneurial firms and smaller businesses. *Journal of Business Venturing*, 2(1), pp. 79-92. DOI: 10.1016/0883-9026(87)90020-6
- Blanchflower, D.G., & Meyer, B.D. (1994). A longitudinal analysis of the young self-employed in Australia and the United States. *Small Business Economics*, 6(1), pp. 1-19. DOI:10.1007/BF01066108
- Blanchflower, D.G. (2000). Self-employment in OECD countries. *Labour Economics*, 7(5), pp. 471-505. DOI: 10.1016/S0927-5371(00)00011-7
- Block, J., & Sandner, P. (2009). Necessity and opportunity entrepreneurs and their duration in self-employment: evidence from German micro data. *Journal of Industry, Competition and Trade*, 9(2), pp. 117-137. DOI: 10.1007/s10842-007-0029-3
- Block, J., & Wagner, M. (2006). Necessity and opportunity entrepreneurs in Germany: characteristics and earnings differentials. *Working paper Series, Munich University of Technology*, Munich. Retrieved from <http://ssrn.com/abstract=1604117>
- Bonnett, C., & Furnham, A. (1991). Who wants to be an entrepreneur? A study of adolescents interested in a young enterprise scheme. *Journal of Economic Psychology*, 12(3), pp. 465-478. DOI: [10.1016/0167-4870\(91\)90027-Q](https://doi.org/10.1016/0167-4870(91)90027-Q)
- Borjas, G.J. (1986). The self-employment experience of immigrants. *The Journal of Human Resources*, 21(4), pp. 485-506. Retrieved from <http://www.nber.org/papers/w1942>

Carr, D. (1996). Two paths to self-employment? Women's and men's self-employment in the United States, 1980. *Work and Occupations*, 23(1), pp. 26-53. DOI: 10.1177/0730888496023001003

Carroll, G.R., & Mosakowski, E. (1987). The career dynamics of self-employment. *Administrative Science Quarterly*, 32(4), pp. 570-589. DOI: 10.2307/2392884

Child, J. (1972). Organizational structure, environment and performance: the role of strategic choice. *Sociology*, 6(1), pp. 1-22. DOI: 10.1177/003803857200600101

Churchill, B.C. (1955). Age and life expectancy of business firms. *Survey of Current Business*, 35(12), pp. 15-19. Retrieved from http://www.thebrokenwindow.net/papers/5/5143_1955-1959.pdf

Coduras, A., Urbano, D., Rojas, A., & Martinez, S. (2008). The relationship between university support to entrepreneurship with entrepreneurial activity in Spain: A GEM data based analysis. *International Advances in Economic Research*, 14(4), pp. 395-406. DOI: 10.1007/s11294-008-9173-8

Commission of the European Communities (2006). Implementing the Community Lisbon Programme: Fostering entrepreneurial mindsets through education and learning. Communication from the commission to the council, the European parliament, the European economic and social Committee and the committee of the regions

Congregado, E., Golpe, A.A., & Carmona, M. (2010). Is it a good policy to promote self-employment for job creation? *Journal of Policy Modeling*, 32(6), pp. 828-842. DOI: [10.1016/j.jpolmod.2010.09.001](https://doi.org/10.1016/j.jpolmod.2010.09.001)

Cooper, A.C., Woo, C.Y., & Dunkelberg, W.C. (1988). Entrepreneurs' perceived chances for success. *Journal of Business Venturing*, 3(2), pp. 97-108. DOI: 10.1016/0883-9026(88)90020-1

Cowling, M. (2000). Are entrepreneurs different across countries? *Applied Economics Letters*, 7(12), pp. 785-789. DOI: 10.1080/135048500444804

Davidsson, P. (1995). Culture, structure and regional levels of entrepreneurship. *Entrepreneurship & Regional Development: An International Journal*, 7(1), pp. 41-62. DOI:10.1080/08985629500000003

Davidsson, P., & Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. *Journal of Business Venturing*, 18, pp. 301-331. DOI: 10.1016/S0883-9026(02)00097-6

DeTienne, D.R., & Chandler, G.N. (2004). Opportunity identification and its role in the entrepreneurial classroom: a pedagogical approach and empirical test. *The Academy of Management Learning and Education*, 3(3), pp. 242-257. DOI:10.5465/AMLE.2004.14242103

- Dollinger, M.J. (1985). Environmental contacts and financial performance of the small firm. *Journal of Small Business Management*, 23(1), pp. 24-30. Retrieved from <http://search.proquest.com/docview/210754835?pq-origsite=gscholar>
- Dun and Bradstreet. (1967). Patterns of success in managing a business. New York: Dun and Bradstreet
- Entrialgo, M., Fernandez, E., & Vazquez, C.J. (2000). Psychological characteristics and process: the role of entrepreneurship in Spanish SMEs. *European Journal of Innovation Management*, 3(1), pp. 137-149. <http://dx.doi.org/10.1108/14601060010334894>
- Evans, D.S., & Jovanovic, B. (1989). An estimated model of entrepreneurial choice under liquidity constraints. *Journal of Political Economy*, 97(4), pp. 808-827. Retrieved from <http://www.jstor.org/stable/1832192>
- Evans, D.S., & Leighton, L.S. (1989). The determinants of changes in U.S. self-employment, 1968-1987. *Small Business Economics*, 1(2), pp. 111-119. DOI: 10.1007/BF00398629
- Evans, D.S., & Leighton, L.S. (1990). Small business formation by unemployed and employed workers. *Small Business Economics*, 2(4), pp. 319-330. DOI:10.1007/BF00401628
- Fritsch, M., Brixy, U., & Falck, O. (2006). The effect of industry, region and time on new business survival – a multi-dimensional analysis. *Review of Industrial Organization*, 28(3), pp. 285-306. DOI: 10.1007/s11151-006-0018-4
- Fukugawa, N. (2005). Characteristics of knowledge interactions between universities and small firms in Japan. *International Small business journal*, 23(4), pp.379-401. DOI: 10.1177/0266242605054052
- Galloway, L., & Brown, W. (2002). Entrepreneurship education at university: a driver in the creation of high growth firms? *Education and Training*, 44(8/9), pp. 398-405. <http://dx.doi.org/10.1108/00400910210449231>
- Gartner, W.B. (1985). A conceptual framework for describing the phenomenon of new venture creation. *Academy of Management Review*, 10(4), pp. 696-706. DOI: 10.5465/AMR.1985.4279094
- Hayton, J.C. & George, G. & Zahra, S.A. (2002). National culture and entrepreneurship: a review of behavioral research. *Entrepreneurship Theory and Practice*, 26(4), pp. 33-52. Retrieved from http://ink.library.smu.edu.sg/lkcsb_research/4642
- Honig, B. (1996). Education and self-employment in Jamaica. *Comparative Education Review*, 40(2), pp. 177-193. Retrieved from <http://www.jstor.org/stable/1189050>
- Honig, B., & Karlsson, T. (2004). Institutional forces and the written business plan. *Journal of Management*, 30(1), pp. 29-48. DOI: 10.1016/j.jm.2002.11.002

- Iyigun, M.F., & Owen, A.L (1998). Risk, entrepreneurship and human-capital accumulation. *The American Economic Review*, 88(2), *Papers and proceedings of the hundred and tenth annual meeting of the American economic association (May, 1998)*, pp. 454-457. Retrieved from <http://www.jstor.org/stable/116966>
- Kangasharju, A., & Pekkala, S. (2002). The role of education in self-employment success in Finland. *Growth and Change*, 33(2), pp. 216-237. DOI: 10.1111/0017-4815.00188
- Katz, J.A. (2003). The chronology and intellectual trajectory of American entrepreneurship education: 1876-1999. *Journal of Business Venturing*, 18(2), pp. 283-300. DOI: 10.1016/S0883-9026(02)00098-8
- Kihlstrom, R.E., & Laffont, J. (1979). A general equilibrium entrepreneurial theory of firm formation based on risk aversion. *Journal of Political Economy*, 87(4), pp. 719-748. Retrieved from <http://www.jstor.org/stable/1831005>
- Kuratko, D.F. (2005). The emergence of entrepreneurship education: development, trends and challenges. *Entrepreneurship Theory and Practice*, 29(5), pp. 577-598. DOI: 10.1111/j.1540-6520.2005.00099.x
- Le, A.T. (1999). Empirical studies on self-employment. *Journal of Economic Surveys*, 13(4), pp. 381-416. DOI: 10.1111/1467-6419.00088
- Lent, R.W., Brown, S.D., & Hackett, G. (1994). Toward a unifying cognitive theory of career and academic interest, choice and performance. *Journal of Vocational Behavior*, 45(1), pp. 79-122. DOI: 10.1006/jvbe.1994.1027
- Lerner, M., & Haber, S. (2001). Performance factors of small tourism ventures: the interface of tourism, entrepreneurship and the environment. *Journal of Business Venturing*, 16(1), pp. 77-100. DOI: [10.1016/S0883-9026\(99\)00038-5](http://dx.doi.org/10.1016/S0883-9026(99)00038-5)
- Lucas, R.E. Jr. (1978). On the size distribution of business firms. *Bell Journal of Economics*, 9(2), pp. 508-523. DOI: 10.2307/3003596
- Mentoor, E., & Friedrich, C. (2007). Is entrepreneurial education at South African universities successful? An empirical example. *Industry and Higher Education*, 21(3), pp. 231-232. DOI: 10.5367/000000007781236862
- Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science*, 29(7), pp. 770-791. <http://dx.doi.org/10.1287/mnsc.29.7.770>
- Minniti, M. (2004). Entrepreneurial alertness and asymmetric information in a spin-glass model. *Journal of Business Venturing*, 19(5), pp. 637-658. DOI: 10.1016/j.jbusvent.2003.09.003

Moutray, C. (2007). Educational attainment and other characteristics of the self-employed: an examination using data from the panel study of income dynamics. *U.S. Small Business Administration, A Working Paper no. 313*, pp. 1-31. <http://dx.doi.org/10.2139/ssrn.1070835>

North, D.C. (1990). *Institutions, change and economic performance*. Cambridge University Press. Retrieved from [https://books.google.nl/books?hl=nl&lr=&id=oFnWbTqgNPYC&oi=fnd&pg=PR6&dq=North,+D.C.+\(1990\).+Institutions,+Institutional+change+and+economic+performance.+Cambridge+University+Press,+Cambridge&ots=sYnxUdJnX4&sig=mr5gfgAbtuY6YRhoynaXkQu6HLo#v=onepage&q&f=false](https://books.google.nl/books?hl=nl&lr=&id=oFnWbTqgNPYC&oi=fnd&pg=PR6&dq=North,+D.C.+(1990).+Institutions,+Institutional+change+and+economic+performance.+Cambridge+University+Press,+Cambridge&ots=sYnxUdJnX4&sig=mr5gfgAbtuY6YRhoynaXkQu6HLo#v=onepage&q&f=false)

OECD. (1998). *Fostering entrepreneurship, the OECD Jobs Strategy*, Paris: OECD.

Oosterbeek, H., van Praag, M., & Ysselstein, A. (2010). The impact of entrepreneurship education on entrepreneurship skills and motivation. *European Economic Review*, 54(3), pp. 442-454. DOI: [10.1016/j.euroecorev.2009.08.002](https://doi.org/10.1016/j.euroecorev.2009.08.002)

Peña, I. (2002). Intellectual capital and business start-up success. *Journal of Intellectual Capital*, 3(2), pp. 180-198. DOI: 10.1108/14691930210424761

Ployhart, R.E., & Moliterno, T.P. (2011). Emergence of the human capital resource: a multilevel model. *Academy of Management Review*, 36(1), pp. 127-150. DOI: 10.5465/amr.2009.0318

Raposo, M., & do Paço, A. (2011). Entrepreneurship education: Relationship between education and entrepreneurial activity. *Psicothema*, 23(3), pp. 453-457. Retrieved from <http://www.uniovi.es/reunido/index.php/PST/article/view/9086/8950>

Riley, J.G. (1979). Testing the educational screening hypothesis. *Journal of Political Economy*, 87(5), pp. S227-S252. Retrieved from <http://www.jstor.org/stable/1829916>

Robinson, P.B., & Sexton, E.A. (1994). The effect of education and experience on self-employment success. *Journal of Business Venturing*, 9(2), pp. 141-156. DOI: 10.1016/0883-9026(94)90006-X

Rueda-Armengot, C., Escamilla-Solano, S., & Plaza-Casado, P. (2014). Profile of young entrepreneurs in Spain in times of recession. In K. Rudiger et al. (eds), *Entrepreneurship, innovation and economic crisis: lessons for research, policy and practice*. Springer International publishing Switzerland. DOI: 10.1007/978-3-319-02384-7_16

Schultz, T.W. (1959). Investment in man: an economist's view. *Social Service Review*, 33(2), pp. 109-117. Retrieved from <http://www.jstor.org/stable/30016430>

Schultz, T.W. (1961). Investment in human capital. *American Economic Review*, 51(1), pp. 1-17. Retrieved from <http://www.jstor.org/stable/1818907>

- Schutjens, V.A.J.M., & Wever, E. (2000). Determinants of new firm success. *Papers in Regional Science*, 79(2), pp. 135-159. DOI: [10.1111/j.1435-5597.2000.tb00765.x](https://doi.org/10.1111/j.1435-5597.2000.tb00765.x)
- Shane, S.A. (1992). Why do some societies invent more than others? *Journal of Business Venturing*, 7(1), pp. 29-46. DOI: [10.1016/0883-9026\(92\)90033-N](https://doi.org/10.1016/0883-9026(92)90033-N)
- Shane, S. (1993). Cultural influences on national rates of innovation. *Journal of Business Venturing*, 8(1), pp. 59-73. DOI: [10.1016/0883-9026\(93\)90011-S](https://doi.org/10.1016/0883-9026(93)90011-S)
- Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science*, 11, pp. 448-469. DOI: [10.1287/orsc.11.4.448.14602](https://doi.org/10.1287/orsc.11.4.448.14602)
- Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25(1), pp. 217-226. DOI: [10.5465/AMR.2000.2791611](https://doi.org/10.5465/AMR.2000.2791611)
- Shapiro, A., & Sokol, L. (1982). The social dimensions of entrepreneurship. *Encyclopedia of Entrepreneurship*, pp. 72-90. Retrieved from <http://ssrn.com/abstract=1497759>
- Skuras, D., Meccheri, N., Moreira, M.B., Rosell, J., & Stathopoulou, S. (2005). Entrepreneurial human capital accumulation and the growth of rural businesses: a four-country survey in mountainous and lagging areas of the European Union. *Journal of Rural Studies*, 21, pp. 67-79. DOI: [10.1016/j.jrurstud.2004.05.001](https://doi.org/10.1016/j.jrurstud.2004.05.001)
- Solomon, G.T., & Winslow, E.K. (1988). Toward a descriptive profile of the entrepreneur. *The Journal of Creative Behavior*, 22(3), pp. 162-171. DOI: [10.1002/j.2162-6057.1988.tb00493.x](https://doi.org/10.1002/j.2162-6057.1988.tb00493.x)
- Steinmetz, G., & Wright, E.O. (1989). The fall and rise of the petty bourgeoisie: changing patterns of self-employment in the postwar United States. *American Journal of Sociology*, 94(5), pp. 973-1018. Retrieved from <http://www.jstor.org/stable/2780465>
- Storey, D.J. (1994). *Understanding the small business sector*. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial leadership historical research reference in Entrepreneurship. Retrieved from <https://ssrn.com/abstract=1496214>
- Taylor, M.P. (1999). Survival of the fittest? An analysis of self-employment duration in Britain. *The Economic Journal*, 109(454), pp. C140-C155. DOI: [10.1111/1468-0297.00422](https://doi.org/10.1111/1468-0297.00422)
- Thomas, M.K. (2009). The impact of education histories on the decision to become self-employed: a study of young, aspiring, minority business owners. *Small Business Economics*, 33:455, pp. 455-466. DOI: [10.1007/s11187-009-9201-y](https://doi.org/10.1007/s11187-009-9201-y)
- Van Gelderen, M., Thurik, R., & Bosma, N. (2005). Success and risk factors in the pre-startup phase. *Small Business Economics*, 24, pp. 365-380. DOI [10.1007/s11187-004-6994-6](https://doi.org/10.1007/s11187-004-6994-6)

Van de Ven, A.H., Hudson, R., & Schroeder, D.M. (1984). Designing new business start-ups: entrepreneurial, organizational, and ecological considerations. *Journal of Management*, 10(1), pp. 87-108. DOI: 10.1177/014920638401000108

Wagner, J. (2005). Nascent necessity and opportunity entrepreneurs in Germany evidence from the regional entrepreneurship monitor (REM). University of Lone burg working paper series in economics, 10. Retrieved from <http://repec.iza.org/dp1608.pdf>

Watson, K., Hogarth-Scott, S., & Wilson, N. (1998). Small business start-ups: success factors and support implications. *International Journal of Entrepreneurial Behavior & Research*, 4(3), pp. 217-238. DOI: [10.1108/13552559810235510](https://doi.org/10.1108/13552559810235510)

Weber, E.U., & Milliman, R.A. (1997). Perceived risk attitudes: relating risk perception to risky choice. *Management Science*, 43(2), pp. 123-144. DOI: 10.1287/mnsc.43.2.123

Wennekers, S., & Thurik, R. (1999). Linking entrepreneurship and economic growth. *Small Business Economics*, 13(1), pp. 27-56. DOI: 10.1023/A:1008063200484