

STOCKHOLM SCHOOL OF ECONOMICS

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41448 Master's thesis in economics

Academic year 2019–2020

**How age and environmental factors influence entrepreneurship and growth:
a panel-data analysis of an entrepreneurial intention framework**

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Abstract

The economic literature has established many determinants of entrepreneurship. However, most research lacks the presence of a suitable theoretical framework. This study aims to fill this gap in the literature by utilizing an intention model derived from the psychology research. According to this model, the environment affects entrepreneurship through the mediating factors of perceptions and intentions. Country-level data from the Global Entrepreneurship Monitor are employed to successfully test the model and reveal the moderating role of age. Particularly, youth entrepreneurship is shown superior to general entrepreneurship in terms of growth impact but at the same time intentions are found to more easily translate to entrepreneurial actions among older individuals. Meanwhile, perceived opportunities and capabilities are displayed to be the main predictors of entrepreneurial intentions in developing and developed countries respectively. Lastly, various environmental factors, most important among them the entrepreneurial role models and their media representation, are shown to significantly improve entrepreneurial perceptions.

Keywords: Entrepreneurship, Intentions, Perceptions, Age, Panel data, Economic Development

JEL: C23, J13, L26, O11

Supervisor:	Pamela Campa
Date submitted:	December 1, 2019
Date examined:	...
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1. Introduction

The question on the causes of growth has been central throughout the history of economics. This dates to Aristotle first using the word “economics” referring to the management of household with the aim of increasing its members’ wellbeing. According to Heilbroner (2011), in his book “Worldly Philosophers”, the feudal system, representing tradition, or the monarchs, representing authoritarian rule, have been responsible for the creation of wealth in societies until the seventeenth century. Later, with the industrial revolution, entrepreneurs emerge as the engine of economic growth (Varoufakis, 2017). Already from 1934, Schumpeter argues that entrepreneurs create new ideas or produce more efficient combinations of existing resources and thus constitute the central motivation behind economic growth. Van Praag and Versloot (2007), in a meta-analysis of 57 relevant studies, further explain this argument by establishing three positive contributions of entrepreneurs in the form of employment creation, increased innovation and higher productivity.

Given the significance of entrepreneurship on growth, this paper looks at the determinants of entrepreneurship. Djankov, Miguel, Qian, Roland and Zhuravskaya (2005) assert that social science has established institutional environment, sociological variables and psychological characteristics as drivers of entrepreneurship. Although there has been substantial research on entrepreneurial antecedents, economists have failed to agree and use a certain theoretical framework on the conception of entrepreneurship. The psychology literature, on the other hand, has provided with a plethora of relevant models, some of which more prevalent than the others. In the core of all models lies the argument that entrepreneurial behavior only occurs after the individual intends to become an entrepreneur. This paper utilizes such a psychology model. After all, several researchers raise the need of a multi-disciplinary approach in explaining entrepreneurship (Chandler & Lyon, 2001; Wennekers, 2006; Crecente-Romero, Giménez-Baldazo, & Rivera-Galicia, 2016).

The unwillingness of many economic researchers to integrate such intention models in their analysis may be explained by lack of relevant data, especially data on intentions. However, a relatively new project has emerged to fill this gap in the dataset. Global Entrepreneurship Monitor (GEM) has been providing entrepreneurship data, including entrepreneurial intent, on an abundance of countries globally since 1999. It aims to explore the complex relationships between economic development, entrepreneurship and its determinants (Carree & Thurik, 2010). It has been widely recognized as the most informative and authoritative longitudinal study on entrepreneurs all over the world (Ferreira, Fayolle, Fernandes, & Raposo, 2017). Approximately 2,000 interviews are carried out in each country yearly in survey form (Reynolds et al., 2005). GEM questionnaires include cognitive items that allow analysis of entrepreneurial intentions (Reynolds et al., 2005). However, Bosma (2013), in examining the impact of GEM on entrepreneurship research, illustrates the limited attention on intention variables. This paper makes use of such variables from the GEM dataset.

Therefore, the pieces for a complete analysis of environmental drivers of entrepreneurship are at place. First, current research confirms the importance of entrepreneurship in economic growth. Second, psychologists provide for a theoretical framework on the conception of entrepreneurships. The presence of such a model provides for some theoretical foundation that is absent in most of

the relevant literature. Third, the GEM dataset, with its broad geographic and time coverage, allows for an in-depth statistical analysis of the above model. Once this paper establishes the effect of different environmental variables on entrepreneurship, it can be a useful guide in the hands of government officials or other policy makers in their effort to boost entrepreneurship and hence economic growth.

This paper follows certain steps to arrive at a set of policy recommendations. First, it establishes the theoretical framework that guides this research. In particular, section 2 examines different intention models and decides on the most relevant one. Then, the literature review (section 3) presents evidence in favor of the selected model and scans the existing research to establish environmental predictors of entrepreneurship that can fit the model. Following, research hypotheses are motivated and presented while the contribution of this paper to the current state of knowledge is discussed (section 4). The data and methodology used to attempt to validate or reject the established hypotheses are introduced in section 5, followed by the data analysis (section 6). Then, the discussion of the findings takes place in order to motivate policy actions that aim to boost entrepreneurship and thus, economic growth in general (section 7). Before the conclusive remark, limitations of this research are presented, next to suggestions of future research.

Definitions of major terms used throughout the rest of the paper are displayed in Table 1.

Table 1: Definitions of important notions

Intention(s)	the cognitive state temporally and causally prior to entrepreneurial action (Dennett, 1989)
Perceptions	subjective interpretation toward entrepreneurship; captured through senses and consciousness (Krueger, 2003; Arenius & Minniti, 2005)
Attitudes	favorable or unfavorable evaluation of entrepreneurship (Ajzen, 1991)
Fear of failure	perceived fear of bankrupting or not succeeding if the individual decides to become an entrepreneur
Subjective norm	the perceived social pressure to be or not to be an entrepreneur; it measures perceived social disposition toward entrepreneurship
Perceived opportunity	the conception of an entrepreneurial opportunity
Self-efficacy (Perceived capability)	the belief in one's capabilities to perform an entrepreneurial act (Bandura, 1977)

2. Theoretical framework: the intent model

The psychology literature has been used as an important source to extract and utilize different theoretical frameworks on the birth of entrepreneurship. These models agree that entrepreneurship cannot occur without intentions. In particular, they view entrepreneurial decisions as cognitive processes, which mean that decisions are influenced by knowledge structures and mental processes such as motivation and perception (Shaver & Scott 1991; Krueger 2000; Mitchell et al. 2002; Krueger 2003; Baron, 2004). This means that entrepreneurship, as any form of planned behavior, is also intentional (Krueger, 2017). Therefore, it is assumed that having entrepreneurial intentions is a necessary condition for becoming an entrepreneur.

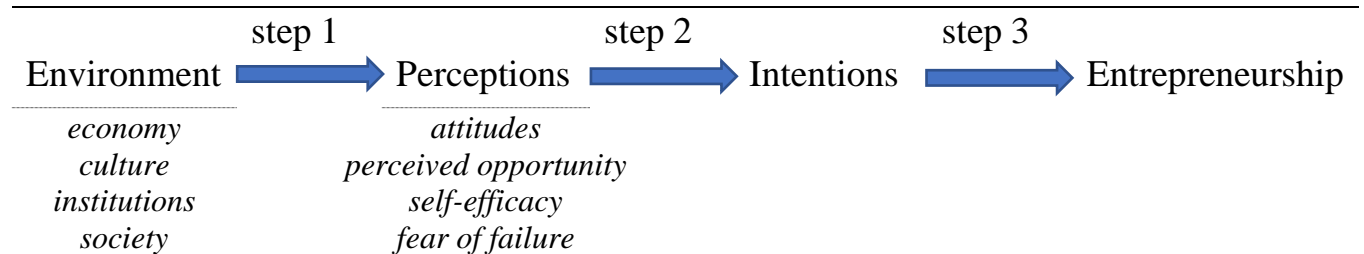
The most used theoretical contribution to the entrepreneurial intent literature comes from Ajzen in 1991. Ajzen's theory of planned behavior states that perceived behavioral control, attitudes toward the behavior and subjective norms predict intentions which in turn translates to actual behavior. Subjunctive norm refers to perception of social disposition against entrepreneurship whereas perceived behavioral control measures the perceived ability to perform the behavior (Linan, 2008). Another intention model comes from Shapero and Sokol (1982) who argue that individuals decide to create a firm when the entrepreneurial activity is perceived to be more desirable and more feasible than other alternatives. They also add to their model the propensity to act on one's decision, reflecting volitional aspects of intention (Krueger & Day, 2010). This model recognizes the existence of moderators between incentive and behavior whereas Ajzen's theory assumes full volitional control (Linan, 2008). Apart from that, the two models are very close since perceived desirability can relate with attitudes and subjective norm, whereas perceived feasibility and behavioral control are substitute notions.

Both models have been found to significantly explain entrepreneurial intentions. However, Ajzen's theory of planned behavior has received the best response (Kolvereid, 1996; Tkachev & Kolvereid, 1999; Krueger, Reilly, & Carsrud, 2000; Liñán, 2004; Fayolle & Gailly, 2005; Veciana, Aponte, & Urbano, 2005; Díaz-García & Jiménez-Moreno, 2010; Kautonen, Van Gelderen & Tornikoski, 2013; Kautonen, van Gelderen & Fink, 2015). In comparing the two models, Matlay, Rae, Solesvik, Westhead and Kolvereid (2012) find that Ajzen's and Schaper's theory explain 55% and 40% in the variance of entrepreneurial intention respectively, suggesting the superiority of Ajzen's theory of planned behavior. Estrin and Mickiewicz (2010) explain that the inclusion of informal institutions in the model, in the form of subjective norm, is an important advantage of the theory of planned behavior. Matlay et al. (2012) integrate the two models to explain 60% of intention variation. This result indicates that Schaper's theory contains variables that explain intention and are not captured by Ajzen's, hinting to the role of the propensity to act.

Krueger and Day (2010) as well as Schlaegel and Koenig (2014) proceed with integrating and extending the two models to allow for exogenous factors to affect perceptions, which in turn influence intentions. This responds well to the critic that intention models do not necessarily imply that intention formation is the very first stage in becoming self-employed (Kautonen, van Gelderen, & Fink 2015). This proposed extended model suggests that environmental, institutional, cultural, socioeconomic and other conditions shape perceptions of entrepreneurship, which is the first step in new venture creation (step 1). These perceptions forge intentions (step 2) which in turn

translate to entrepreneurship (step 3). This paper makes use of this model, hereafter called the intent model or the model, presented in a simplified version on graph (1), to guide research and structure the literature review. Pointing to its suitability, this model parallels with the entrepreneurship conception model proposed and used by the Global Entrepreneurship Monitor (Reynolds et al, 2005). Prove of it is that, except perceived desirability, all variables of the intent model can be found in the GEM dataset.

Graph 1: The (intent) model



The next section analyzes the relevance and applicability of the intent model. It specifically examines the prevalence and viability of the three steps of the intent model, starting from step 3 and finishing with step 1. In other words, it in turn shows that intentions predict entrepreneurship, perceptions influence intentions and environment shapes perceptions. It also establishes the relevance of attitude towards entrepreneurship, perceived opportunity, self-efficacy and fear of failure as the major perceptual variables of the intent model.

3. Literature review

3.1 Intention before entrepreneurship

Although the majority of entrepreneurial literature investigates direct influences of environmental conditions on entrepreneurship, there are important findings on the role of intentions to explain venture creation. Intentions are classically defined as the cognitive state temporally and causally prior to action (Dennett, 1989). In establishing their relevance to business creation, Krueger, Reilly and Carsrud (2000) present entrepreneurship as a way of thinking that prioritizes opportunity identification which is an intentional process. Further contributions reaffirm that entrepreneurial incentives predict venture formation (Kolvereid & Isaksen, 2006; Walker, Jeger, & Kopecki, 2013; Beynon, Jones, & Pickernell, 2016). The most recent contribution comes from Mota (2019), who uses the GEM dataset and finds significant effects of intention on new entrepreneurship for each year separately from 2002 to 2015. Mota also gives evidence in favor of the influence of intention on motivation driven venture creation.

A more detailed discussion of the relevant literature is presented in Appendix A, where special emphasis is placed on the discrepancy between intentions and entrepreneurship.

3.2 Perceptions before intention

The importance of perceptions in entrepreneurship has been apparent among entrepreneurial studies (Liñán, Santos, & Fernández, 2011; Ebrahim & Schøtt, 2014). The cognitive science and neurobiology assert that people apprehend reality through multiple perceptual lenses (Krueger & Day, 2010). Entrepreneurial research defines perceptions as subjective interpretation of reality which is captured through senses and consciousness (Krueger, 2003; Arenius & Minniti, 2005). These interpretations may differ between individuals due to cognitive biases which induce judgement errors (Liñán, Santos, & Fernández, 2011). The prevalence of such distorted perceptions is evident also among entrepreneurs (Cooper, Woo, & Dunkelberg, 1988; Busenitz & Barney, 1997). Therefore, perceptions need not be realistic to play a role in intention formation and generally in economy (Varoufakis, 2017).

The literature review has already established that perceptions determine entrepreneurial intentions. The most cited perceptual variables that research establishes as antecedents of incentives are perceived opportunity, self-efficacy and fear of failure (Morales-Gualdrón & Roig, 2005; Shinnar, Giacomini, & Janssen, 2012; Ebrahim & Schøtt, 2014; Dileo & Losurdo, 2016). In these variables, some authors add subjective norm as well as the role of attitudes towards entrepreneurship. (Segal, Borgia, & Schoenfeld, 2005; Walker, Jeger, & Kopecki, 2013; Hui-Chen, Kuen-Hung, & Chen-Yi, 2014; Kautonen, van Gelderen, & Fink, 2015; Kim-Soon, Ahmad, & Ibrahim, 2018; Mota, 2019). These are the five main perceptual variables which are established as main determinants of intention. A complete review of the relevant literature can be found in Appendix B, which presents evidence on the significance and relevance of perceived opportunity, attitudes, self-efficacy, subjective norm and fear of failure, on the intent model.

In addition to these variables, studies also display the role of individual, opportunity, and socio-cultural perceptions in explaining intentions (Fernández, Liñán, & Santos, 2009; Liñán, Santos, & Fernández, 2011). Additionally, Douglas and Shepherd (2002) show that attitudes towards income, independence, risk and work effort affect intentions to start a business. Finally, Liñán and Fayolle (2015) find that perceived barriers related to lack of capital and skills hinder entrepreneurial incentive formation.

3.3 Environment before perceptions

Already from 1977, Bandura's social learning theory dictates that the environment influences the way people behave and learn. Kets de Vries (1996), employing a psychoanalytic perspective, argues that all humans have critical core beliefs which trigger significant action. Next, Hofstede, Hofstede and Minkov (2005) claim that culture, seen as the social environment in which one grows, exerts considerable influence in forming our ways of feeling, thinking and acting. Entrepreneurial research utilizes this framework to demonstrate that people's views and concepts about the world drive entrepreneurial thinking and activity (Raco & Tanod, 2014). Finally, Krueger (2017), in his research of entrepreneurial intentions, explains how the brain can make choices without our volitional control and asserts that our decisions are based on deep beliefs determined by our environment. Therefore, it is safe to assume perceptions are not inherent but shaped by our surroundings (step 1 of the intent model). Therefore, this section presents the

environmental drivers of perceptions, as have been indicated by the current literature while it also aims to create a pool of variables that can be used to explain perceptions in the data analysis

To start with, the cultural and social framework are found to significantly influence attitudes and perceived opportunity (Freytag & Thurik, 2007; Liñán, & Chen, 2009). In particular, quality of institutions, economic development, consumer trust, social capital, expected benefits, favorable salient beliefs and personal background factors improve attitudes toward entrepreneurship (Kolvereid & Isaksen, 2006; Bosma & Schutjens, 2011; Goethner, Obschonka, Silbereisen, & Cantner, 2012; König, 2016). Respectively, property rights, alertness, discipline, social capital, technology diffusion, trust, entrepreneurial heuristics, social network, self-expressionism, family involvement in business, education and start-up training enhance entrepreneurial opportunity perception (Bryant, 2007; Levie & Autio, 2008; Kwon & Arenius, 2010; Wang, Ellinger, & Jim Wu, 2013; Ebrahim & Schøtt, 2014; Pathak, Laplume, & Xavier-Oliveira, 2014; George, Parida, Lahti, & Wincent, 2016; Lins & Lutz, 2017). Interestingly, the presence of immigrants and extreme events, such as tsunamis, are suggested to foster perceptions of opportunities. (Brück, Llussá, & Tavares, 2010; Peroni, Riillo, & Sarracino, 2016; Moghaddam, Tabesh, Weber, & Azarpanah, 2017). Finally, the nature of one's residential area, legislation system and population density are found to modify people's entrepreneurial attitudes and perceived opportunities (Arenius & De Clercq, 2005; Bosma & Schutjens, 2011).

Furthermore, education and cultural characteristics are hypothesized to decidedly shape perceived capabilities. Research asserts that self-efficacy increases with previous entrepreneurial experience, risk propensity, learning orientation, work passion, achievement motivation, start-up training, presence of role models and mentoring (Bandura, 1986; Zhao, Seibert, & Hills, 2005; Carr & Sequeira, 2007; Carsrud & Brännback, 2011; De Clercq, Honig, & Martin, 2013; Baluku, Matagi, Musanje, Kikooma, & Otto, 2019). The link between education and perceived capability has been extended to include moderators, such as proactive personality and locus of control, the latter of which measures the beliefs that action depend on own effort (Borchers & Park, 2010; Prabhu, McGuire, Drost, & Kwong, 2012). Additionally, country of origin and cultural characteristics are found to significantly alter people's perceptions of own capabilities (Olszewska, 2014). Specifically, Ebrahim and Schøtt (2014) display that self-expressionism and traditionality increase self-efficacy while highlighting the role of gender; men more often than women consider themselves capable as well as risk-willing and aware of opportunities.

Institutions and socioeconomic conditions have been thought to drive fear of failure next to the other main perceptual variables. For example, economic development, entrepreneurial framework conditions, population density, socialist legal origin and entrepreneurial status reduce the fear whereas number of required start-up procedures and unemployment increase scare of failing among individuals (Bosma & Schutjens, 2011; Beynon, Jones, & Pickernell, 2018). In addition, inflation, tax rates, social security, layoff and duration of unemployment are found to influence fear of failure (Hessels, Van Gelderen, & Thurik, 2008; Wood, McKinley, & Engstrom, 2013; Roman & Rusu, 2016). Age, personality, education and family income have also been considered to determine scare of failing (Mota, Braga, & Ratten, 2019). Specifically, locus of control, self-esteem and presence of entrepreneurial examples lower fear of failure, whereas this fear is shown

to intensify in the proximity of family pressures and neuroticism characteristics (Ekore & Okekeocha, 2012; Vale, Corrêa, & Reis, 2014; Ferreto, Lafuente González, & Leiva Bonilla, 2018).

Table 2: Environmental factors that can shape entrepreneurial perceptions

Economy	Culture	Education	Labor framework	Networking	Rule of law	Governance
<i>economic development</i>	<i>social capital and norms</i>	<i>formal education</i>	<i>population density</i>	<i>technology diffusion</i>	<i>property rights</i>	<i>inflation</i>
<i>entrepreneurial framework conditions</i>	<i>self-expressionism, individuality</i>	<i>startup training</i>	<i>unemployment</i>	<i>social network</i>	<i>legislation system</i>	<i>tax</i>
<i>inequality</i>	<i>entrepreneurial heuristics and evaluation</i>	<i>learning orientation</i>	<i>layoff</i>	<i>presence of immigrants</i>	<i>social security</i>	<u><i>administration quality</i></u>
<u><i>structural support to entrepreneurs</i></u>	<i>cultural values: trust, uncertainty avoidance, generosity</i>	<i>work passion</i>	<i>duration of unemployment</i>	<i>presence of role models/ entrepreneurial examples</i>	<i>number of required start-up procedures,</i>	<u><i>government size</i></u>
<u><i>innovativeness</i></u>	<i>role of gender</i>		<u><i>FDI</i></u>	<i>mentoring</i>	<u><i>liberalization</i></u>	<u><i>corruption</i></u>
<u><i>economic freedom</i></u>	<i>Traditionality, post-materialism</i>		<u><i>access to capital</i></u>	<u><i>media representation of entrepreneurship</i></u>	<u><i>social security</i></u>	<u><i>monetary policy consistency</i></u>
<u><i>level of competition</i></u>	<i>family pressure</i>		<u><i>investments</i></u>		<u><i>progressivism</i></u>	<u><i>sustainability orientation</i></u>

Note: The variables, that are not underlined, are taken from past research that agrees with the intent model in that perceptions are directly influenced by the environment. The underlined variables refer to environmental factors found by past research to directly influence either intentions or entrepreneurship, in contradiction with the line of causality established in the intent model.

Next to the previous literature, where each research focus on a particular variable, there are two papers that look at all perceptual variables at once and illustrate the direct effect of environment on entrepreneurial perceptions. Ebrahim and Schott (2014) reveal that formal education, entrepreneurial training and cultural values affect perceived opportunity, self-efficacy and fear of

failure. At the same time, gender institutions, such as the extent of inequality, is shown to also mold perceptions regarding entrepreneurship (Estrin & Mickiewicz, 2011). Considering the above discussion in this section, a Table is created with summarized findings for environmental determinants that can fit the intent model (Table 2). This Table is used in the data analysis in order to motivate the selection of certain environmental variables which are tested as predictors of perceptions (step 1 of the intent model).

Next to the literature already reviewed here, there is substantial research that does not follow any intention model, and thus examines the direct effect of environment on intentions and entrepreneurship. According to the model, these authors may have ignored the mediating effects of perception or intention but can still provide with potential variables that can fit the model. Therefore, these variables are also considered and included in the group of potential determinants of perceptual variables that this paper aims to test (Table 2). A complete literature review on the environmental determinants of intentions and entrepreneurship can be found in Appendix C. Some of the environmental factors discussed in Appendix C are already introduced in the literature review above. However, there are variables that are not displayed above but can potentially be important determinants of perceptions. These variables are underlined in Table 2.

4. Research hypotheses and contribution

The discussion above reveals that researchers have failed to agree on a model or framework that explains entrepreneurship formation. On one hand, some papers follow the intent model logic and locate environmental variables that affect perceptions (Table 2). At the same time, others find that the same variables directly influence entrepreneurship. As a result, there is a mismatch on the factors that determine entrepreneurship between the two line of thoughts. In other words, there are environmental factors that appear to directly affect entrepreneurship but not perceptions, according to present literature. This piece of study intends to fill this gap. In particular, it examines whether the relevant environmental variables, as established in Table 2, are determinants of perceptions.

This paper aims to test all three steps of the intent model and thus locate determinants of entrepreneurship that fit this theoretical framework. It follows the intent model steps backwards. First, intentions are established as important predictors of entrepreneurship (step 3 of the intent model). This is in support of all intention models that view entrepreneurial intentions as a necessary-although not sufficient- condition for becoming entrepreneur. Second, the paper examines which perceptions affect intentions. According to the literature review, the relevant perceptual variables constitute attitudes, subjective norm, perceived opportunities, self-efficacy and fear of failure. It is hypothesized that the first four positively influence intentions, whereas fear hinders intention formation. Once the importance of certain perceptions is established, the paper continues to locate environmental determinants of these perceptions (step 1 of the intent model). Lastly, the role of age is introduced into the model as a moderating factor between perceptions, intentions, entrepreneurship and, finally, economic growth. The two main contributions of this paper concern the role of relevant environmental factors and age.

The stage of economic development is hypothesized to shape both how different environmental variables affect perceptions (step 1) and how the latter influence entrepreneurial intentions (step 2). This comes from the different main drives or motives of entrepreneurship. In developed countries, motivation-driven entrepreneurship prevails whereas necessity-motivated entrepreneurs are the norm in developing countries (Wong, Ho, & Autio, 2005). In other words, the prevalence of either group of entrepreneurs drive the quality and degree of the relevant effects in all three steps of the intent model. For example, it is expected that different perceptual variables are the main determinants of entrepreneurial intentions in developed than in developing countries. As a result, this paper utilizes a distinction among countries, based on their economic and development status, to examine the relationship between environment and entrepreneurship. Additionally, a period of crisis may also be considered as a temporarily lower stage of economic development and thus, this paper also examines the role of the 2009 crisis on the intent model.

This paper largely constitutes a contribution to the existing literature in the form of theory testing. No previous study has tested all three steps of the intent model simultaneously. The present literature has mostly covered step 2 and 3 of the intent model, meaning the interactions between perceptions, intentions and entrepreneurship. Walker, Jeger and Kopecki (2013) examine 43 countries in 2010 to establish the link between attitudes, subjective norms and intentions, which are also shown to boost entrepreneurial activity. The most recent contribution to the literature utilizes a series of cross-country datasets to show that perceived opportunities, self-efficacy and fear of failure shape entrepreneurial intentions (Mota, 2019). Liñan and Santos (2011) also find that individual perceptions, perceptions on economic opportunities and socio-cultural perceptions significantly explain intention formation. However, they only examine 13 developed countries in 2011. This paper looks at both developing and developed countries for a period between 2001 and 2015 while revealing the effect of the 2008 crisis on the intent model, which has not been explicitly and empirically tested by previous works.

While research focus on the interplay between perceptions, intentions and entrepreneurship, it limitedly regards the effects of environmental variables on perceptions (step 1 of the intent model). Only few articles examine the effect of environment on many perceptual variables simultaneously (Elam, & Terjesen, 2007). Ebrahim and Schøtt (2014) are one of those articles that utilize the Global Entrepreneurship Monitor dataset in micro level to display the role of cultural and demographic characteristics in perceived opportunity, self-efficacy and fear of failure. The present paper aims to enrich this under-researched field. Another contribution of this paper lies on its use of panel data in macro level. Past research has merged different cross country micro datasets into panel to address the influence of perceptions on intention between 2005 and 2012 (Dileo & Losurdo, 2016). However, panel datasets have not been utilized at the macro level (Mota, 2019). This paper aims to fill this gap in the literature, while also utilizing more elaborate statistical specification, such as the inclusion of fixed effects, now allowed due to increased sample size. Most importantly, the panel dataset allows for directly testing step 3, the link from intentions to entrepreneurship, as it is now feasible to test for lagged entrepreneurial intention effects.

This research concludes with an examination on the moderating role of age in the intent model. It aims to contribute to existing literature by theory building, as an extension or modification of the

intent model. This is done by testing how the links and relationships in the intent model change when age is included as moderator in the variables of interest. In particular, this is examined for steps 2 and 3 of the intent model. Testing the importance of such variables in intention model is also motivated by Bosma (2013) who suggests modeling relevant mediating and moderating effects. To fully understand the mechanics of the role of age on the intent model, its moderating role between entrepreneurship and growth is also illustrated in what could be considered as step 4 of the intent model. On one hand, it is hypothesized that younger entrepreneurs, as creators and carriers of ideas and innovation, exert a bigger influence on GDP growth than their older counterparts. On the other hand, it is expected that intentions more easily convert to entrepreneurial activity when in relatively older age, since individuals would now have accumulated the necessary physical resources and capital. Similarly, it is hypothesized that older individuals more easily transform perceptions such as self-efficacy into entrepreneurial intentions.

All hypotheses and propositions established in this section are summarized in Table 3 below. Although the expected direction of each effect is presented in the Table, this paper tests the null hypotheses of zero correlation of the corresponding variables. For example, the hypothesis 1 assumes that entrepreneurial intentions and entrepreneurship variables have zero correlation. Similarly for the rest hypotheses. The next section presents the data and methodology that are used to test these hypotheses.

Table 3: Hypotheses

Null hypothesis	Propositions	Contribution
#1	Entrepreneurial intentions increase entrepreneurship	theory testing, step 3 of intent model
#2	Favorable attitudes toward entrepreneurship increases entrepreneurial intentions	theory testing, step 2 of intent model
#3	Favorable subjective norm increases entrepreneurial intentions	theory testing, step 2 of intent model
#4	Perceived opportunities increase entrepreneurial intentions	theory testing, step 2 of intent model
#5	Self-efficacy increases entrepreneurial intentions	theory testing, step 2 of intent model
#6	Fear of failure decreases entrepreneurial intentions	theory testing, step 2 of intent model
#7	Environmental factors (Economy, Culture, Education, Labor framework, Networking, Rule of law, Governance) shape perceptions	theory testing and building, step 1 of intent model
#8	The younger the entrepreneur, the larger their positive contribution to growth	theory building, the next step from the intent model
#9	The older the entrepreneur, the easier to turn intentions to action (entrepreneurship)	theory building, moderating step 3 of intent model
#10	The older the entrepreneur, the larger the effect of perceptions on entrepreneurial intentions	theory building, moderating step 2 of intent model

5. Data and methodology

An unbalanced panel data analysis is conducted between 2001 and 2015 to give answers to the previous questions and hypotheses. The unit of observation is country per year. In particular, the number of countries varies with an average of 52 countries per year allowing for around 900 observations. The main source of data comes from the Global Entrepreneurship Monitor project. Its adult population surveys from 2001 to 2015 are combined to give data on perceptions, intentions and entrepreneurship. These variables are first collected at the micro level in the form of dummies for each individual surveyed in the various countries during the examined years. Then, they are converted at the macro level in the form of percentages to turn the unit of observation from the individual to country per year. This permits the examination of lagged effects in the intent model since countries and not specific individuals are followed over years. The estimation of the lagged impact of intentions on entrepreneurship, on the macro level, allows for disentangling possible reverse causality biases in the coefficient of interest (Bergmann, Mueller, & Schrettle, 2014)

Further, the Global Entrepreneurship Monitor (GEM) equips this research with the following main variables of interest. The percentage of working age (18-64 years old) population about to set up or own a new (less than 42 months) firm constitute the main variable on entrepreneurship, along with the percentage of those owning a firm (established business) older than 42 months. GEM also provides longitudinal data on intentions and perceptions on the level of countries. In particular, it measures entrepreneurial intentions as the percentage of working age population who are latent entrepreneurs and intend to start a business within three years following the year of the survey (Bosma, 2013). In addition, various perceptual variables are measured allowing to test the intent model. Specifically, attitude toward entrepreneurship is measured as the percentage of working age population who agree that, in their country, successful entrepreneurs receive high status. Subjective norm is measured as the percentage of working age population who agree that most people consider starting a new business a desirable career choice (Reynolds et al., 2005). Similarly, perceived opportunity, self-efficacy and fear of failure are also measured and utilized. The definitions of all main variables are displayed in Table 4.

The contribution of the Global Entrepreneurship Monitor does not stop in measuring the main variables of interest on the intent model. It also provides with a pool of environmental factors. Next to the general adult population surveys, GEM also yearly surveys selected experts on the local economy of each country. This is part of the National Expert Surveys which quantifies the entrepreneurial framework conditions (indexes from 1 to 10) that determine the quality of an entrepreneurial ecosystem (Bosma, Coduras, Litovsky, & Seaman, 2012). Such rates constitute entrepreneurial training, bureaucracy index, favorable social norms among others. The full list of these variables can be found in Appendix F Table 16. The pool of environmental factors available in this research is further enhanced from the World Development Indicators database of the World Bank. Finally, economic and political freedom data from the Canadian Fraser institute, the Heritage Foundation index of Economic Freedom and Polity IV also complement the available dataset. All environmental variables selected and tested in this research are motivated and drawn from the literature review and Table 2. More on their selection and specific definitions are found in the corresponding part of the statistical analysis.

Table 4: Definitions and description of main variables (and data used)

Variable	Description	Source
Nascent entrepreneurship	%18-64 age population who are either a nascent entrepreneur or owner-manager of a new business (less than 42 months)	GEM
Established entrepreneurship	%18-64 age population who are currently an owner-manager of an established business (more than 42 months)	GEM
Entrepreneurship	The sum of Nascent and Established entrepreneurship	GEM
Intentions	%18-64 age population who are latent entrepreneurs and who intend to start a business within 3 years	GEM
High status	%18-64 age population who agree that in their country, successful entrepreneurs receive high status	GEM
Career choice	%18-64 age population who agree that, in their country, most people consider starting a new business a desirable career choice	GEM
Perceived opportunities	%18-64 age population who see good opportunities to start a firm in area where they live	GEM
Self-efficacy	%18-64 age population who believe they have the required skills and knowledge to start a business	GEM
Fear of failure	%18-64 age population who indicate fear of failure would prevent them from setting up a business	GEM
GDP growth	Annual percentage growth of Gross Domestic product	World Bank

Merging the above data gives an unbalanced panel data from 2001 to 2015 with a different number of countries per year (for 2001:28 countries-observations, 2002:36, 2003:32, 2004:35, 2005:37, 2006:42, 2007:42, 2008:43, 2009:52, 2010:57, 2011:54, 2012:67, 2013:69, 2014:72, 2015:61). Ordinary least squares with fixed effects are used to analyze the data. The inclusion of fixed effects allows controlling for time-invariant differences between the countries and years examined. In all regressions that test the intent model, two statistical methods are examined. First, both time and country fixed effects are considered in order to examine the variation within countries over years. However, due to limited variability coming from the small number of observations, all estimations are repeated using only time fixed effects to also account for variation between countries and hence increase the precision of the model at the cost of higher chance of omitted variable bias. In most cases, the fixed-effect specification delivers coefficients smaller than the cross-sectional specification suggesting the removal of sources of bias. Although the inclusion of country fixed effects allows for the removal of unobserved heterogeneity between countries, there might still be dependence of observations within the same countries over years in the form of serial correlation. This issue is addressed with the inclusion of clustered standard errors at the level of countries.

This paper centers around the intent model, of which all three steps are tested. In particular, the statistical analysis has followed the three steps backwards. In other words, first, the effect of intention on entrepreneurship (step 3) is verified. Due to their nature, intentions are not hypothesized to translate to entrepreneurship directly. Rather, there is a period of time between

intention formation and entrepreneurship composition. This is taken into consideration with the inclusion of lagged effects of entrepreneurial intentions. Following, step 2 aims to locate the relevant perceptual variables in the intent model, looking at their effect on entrepreneurial intentions in both developed and developing countries. The complete list of all developed and developing countries can be found on Appendix E Table 14. Once the impact of some perceptions is verified, this paper next examines (step 1) whether various environmental variables, shown in the Table 2, can be considered as causes of those perceptions of interest. It is important to note that the choice of the environmental variables as predictors of perceptions lies on maximizing statistical power while also trying to represent all categories established in Table 2.

Once the applicability of the intent model is examined along with relevant environmental variables, this paper continues with an effort to motivate the inclusion or importance of age in the intent model. First, since economists and policy makers are interested in economic development rather than entrepreneurship per se, the role of age in the relationship between entrepreneurship and GDP growth is examined. This link can be considered as step four of the intent model, from entrepreneurship to economic development. Here, the main variable of interest is the percentage of working age population that are nascent or established entrepreneurs below 35 year of age versus those above 35. Similarly, when the role of age is considered on the link between perceptions, intention and entrepreneurship, the paper considers the percent of individuals that have certain perceptions or intentions and at the same time are below 35 years of age versus the corresponding percent of those above 35.

All regressions used in the data analysis are summarized and listed in Table 5 below.

Table 5: Equations

	Dependent variable	Independent variable(s) of interest	Control variables
step3	Nascent entrepreneurship	Intentions	GDP growth, unemployment, population growth
step2	Intentions	High status, Career choice, Perceived opportunities, Self-efficacy, Fear of failure	Services (% of nascent entrepreneurship), Motivation index, Equality index, Media representation of entrepreneurship, Unemployment, GDP growth
step1	Perception(s)	Environment (categories: economy, culture, education, labor framework, networking, rule of law, governance)	
step4 (age)	GDP growth	Entrepreneurship (age)	GNI, GDP growth, unemployment, tertiary education
step3 (age)	Nascent entrepreneurship	Intentions (age)	GDP growth, unemployment, population growth
step2 (age)	Intentions	High status, Career choice, Perceived opportunities, Self-efficacy, Fear of failure (age)	Services (% of nascent entrepreneurship), Motivation index, Equality index, Media representation of entrepreneurship, Unemployment, GDP growth

6. Data analysis and results

This paper confirms both that intentions predict entrepreneurship (step 3) and that perceptions determine intentions (step 2). In particular, entrepreneurial intentions are found to predict and cause entrepreneurship with either one or two years lag. The complete analysis can be found on Appendix D. However, not all perceptual variables are shown to increase entrepreneurial intentions. Specifically, perceived opportunities raise intentions in developing countries whereas self-efficacy increases intentions in developed countries. The distinction between the two set of countries is made to capture the role of different stages of economic development on the intent model. Regarding the effects of attitudes, subjective norm and fear of failure on intention, the data is inconclusive. The relevant analysis is presented in Appendix E. The following section concerns the main contributions of this paper. To test step 1 of the intent model, environmental variables established in the literature review are tested as determinants of the relevant perceptions. The section then examines the mediating role of age in all steps of the intent model.

6.1 The effect of environment on perceptions; testing step 1 of the intent model

An important contribution of this paper lies on demonstrating the effect of environment on perceptions, namely step 1 of the intent model. In this, several variables are collected and tested as predictors of perceptions. The choice of those has been made in order to agree with the variables in Table 2, as established in the literature review. In other words, only variables that have been shown by past research to influence entrepreneurship, intention or perceptions are selected to test step 1 of the intent model. The complete list of these environmental variables, along with their definitions and data sources, can be viewed in Table 6 in Appendix F. Among them, 17 variables have been chosen and used in this specification. They are displayed in Table 6 below. Their choice has been made according to their statistical significance, but care has been taken so that each specification includes at least one variable from each category in Table 2, wherever possible. This section tests the null hypothesis of zero correlation between perceptions and each environmental variable collected, namely hypothesis 7 in Table 3.

To test the relationship between the environmental variables and perceptions, a decision on which perceptual variables to use must be reached. Statistical analysis shown in Appendix E indicates that self-efficacy and perceived opportunity are the two main perceptual variables that are found to influence entrepreneurial intentions. The remaining variables do not display the same statistical significance. Thus, this section examines the impact of environment on perceived opportunities and self-efficacy. Further, since perceived opportunities are found to significantly predict intentions only in developing countries, the specification with perceived opportunities as dependent variable only includes developing countries. Similarly, the effect of environment on self-efficacy is examined only for developed countries. In addition to these two perceptual variables, career choice is also found to affect intentions in developed countries, although at a lesser extent. Hence, this section also looks at the effect of environment on career choice.

Table 6: Definitions and description of environmental variables used

Category	Reference to Table 2	Variable	Description	Source
Economy	<i>economic development</i>	GDP growth	GDP growth (annual %)	World Bank
	<i>entrepreneurial framework conditions</i>	Market dynamics	The level of change in markets from year to year (index)	GEM, NES
	<i>inequality</i>	GINI index	GINI index (World Bank estimate)	World Bank
Culture	<i>social capital and norms</i>	Favorable cultural norms toward entrepreneurship	The extent social and cultural norms encourage new business methods or activities (index)	GEM, NES
Education	<i>formal education</i>	Tertiary education	Percentage of population with tertiary education	GEM, APS
Labor framework	<i>Population density</i>	Population density	Population density (people per sq. km of land area)	World Bank
	<i>Unemployment</i>	Unemployment	Unemployment, total (% of total labor force)	World Bank
	<i>FDI</i>	FDI	Foreign direct investment, net inflows (% of GDP)	World Bank
Networking	<i>presence of role models/entrepreneurial examples</i>	Entrepreneurial role model	Percentage of working age population who personally know someone who started a firm in the past two years	GEM, APS
	<i>media representation of entrepreneurship</i>	Media representation of entrepreneurship	Percentage of working age population who often see stories in their national public media about successful new businesses	GEM, APS
Rule of law	<i>legislation system</i>	Bureaucracy	The extent public policies support entrepreneurship in the form of tax/regulation (index)	GEM, NES
	<i>property rights</i>	Labor freedom	Component of index of economic freedom (index)	Heritage foundation
	<i>Liberalization, progressivism</i>	Business freedom	Component of index of economic freedom (index)	Heritage foundation
	<i>monetary policy consistency</i>	Sound money	Consistency of monetary policy on rate & variability of inflation & monetary control (index)	Fraser institute
Governance	<i>corruption</i>	Democracy index	Presence of democratic values in the government (index)	Polity IV
	<i>tax</i>	Labor tax	Amount of taxes/mandatory contributions on labor paid by the business (% profits)	World Bank
	<i>administration quality</i>	Programs	Presence/quality of programs directly assisting SMEs at all levels of government (index)	GEM, NES

Table 7 includes the specifications for perceived opportunities and self-efficacy. As already mentioned, there has been an attempt to use at least one variable from each category in Table 2. However, the main concern relates to maximizing statistical power and economic significance. That is why there have been included no variables for the category of education in the perceived opportunity specification and for the category of culture in the self-efficacy specification. In support of the chosen specifications, the adjusted R squared in all equations ranges from 41% to 56% meaning that around half of the variation of perceived opportunities and self-efficacy can be explained by the chosen models. Although there are more developing countries (49) than developed (34), the number of observations is almost the same for either specification (213 and 210). This is because only a few years are observed for some developing countries, meaning that there is less variation within countries in perceived opportunities specification than in that of self-efficacy.

Regarding the perceived opportunities specification, the inclusion of country fixed effects displays a lower adjusted R-squared (43%) than the inclusion of only year fixed effects, due to limited variation within developing countries. Despite, five environmental variables remain statistically significant. They concern the categories of culture, networking, rule of law and governance. Networking appears to be the most influential. In particular, the presence of entrepreneurial role models, and media representation of entrepreneurship, measured as population percentages (see Table 6 for exact definitions), are found to boost perceived opportunities at 1% and 5% significance level respectively. Next, the democracy index, at 5% significance, is shown to reinforce perceived opportunities. At 10% significance level, favorable cultural norms toward entrepreneurship similarly reinforce perceived opportunities. Finally, also at 10% significance, the bureaucracy index hinders perceptions of opportunities.

Turning to the self-efficacy estimation for developed countries, the presence of multiple year-observation points in the dataset allows for more variation within countries. This is displayed in the relatively large adjusted R squared (56%) with the inclusion of country fixed effects compared with the R squared (41%) when only year fixed effects are present. In addition, this can also explain why all 10 environmental variables appear to significantly influence self-efficacy. Entrepreneurial role models and media representation of entrepreneurship are again shown to improve self-efficacy in developed countries, also at 1% and 5% significance levels, just like in the perceived opportunities specification. Next to them, at 1% significance level, unemployment, consistency of monetary policy and governance support to entrepreneurship in the form of programs increase self-efficacy, whereas labor tax and population density reduce it. Labor freedom and tertiary education also appear to enhance self-efficacy at 5% significance. Finally, at 10%, the GINI index impedes self-efficacy pointing to the negative relationship between inequality and perceived capabilities.

Table 7: Environment to perceptions

Category	VARIABLES	Developing countries		VARIABLES	Developed countries	
		(1) Perceived opportunities	(2) Perceived opportunities		(3) Self-efficacy	(4) Self-efficacy
Economy	GDP growth	0.0725 (0.182)	0.260 (0.161)	Gini	-0.725* (0.414)	0.357 (0.248)
	Market dynamics	1.530 (1.586)	0.179 (1.451)			
Education				Tertiary education	0.0992** (0.0418)	0.0403 (0.0556)
Culture	Norms	2.831* (1.494)	4.391*** (1.555)			
Labor framework	FDI	0.505 (0.444)	0.0135 (0.401)	Unemployment	0.278*** (0.101)	0.0865 (0.104)
				Population density	-0.206*** (0.0571)	-0.0231** (0.0115)
Networking	Role model	0.399*** (0.0952)	0.474*** (0.0803)	Role model	0.191*** (0.0503)	0.182** (0.0726)
	Media	0.179** (0.0761)	0.162** (0.0650)	Media	0.106** (0.0512)	0.0847* (0.0451)
Rule of law	Bureaucracy	-4.857* (2.814)	-5.640** (2.432)	Labor freedom	0.117** (0.0571)	0.0730 (0.0749)
	Business freedom	0.0389 (0.111)	-0.0110 (0.103)	Sound money	1.762*** (0.608)	0.311 (0.689)
Governance	Democracy index	0.644** (0.256)	0.503** (0.200)	Labor tax	-0.729*** (0.255)	-0.0878 (0.107)
				Programs	6.867*** (1.616)	4.430*** (1.507)
	Constant	3.001 (11.27)	8.402 (9.974)	Constant	51.66*** (16.67)	3.239 (11.70)
	Time fixed effects	YES	YES	Time fixed effects	YES	YES
	Country fixed effects	YES	NO	Country fixed effects	YES	NO
	Observations	213	213	Observations	210	210
	Adjusted R-squared	0.4283	0.4835	Adjusted R-squared	0.5574	0.4136
	Number of countries	49	49	Number of countries	34	34

Country-level clustered standard errors in parentheses

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

The estimations for the effect of environment on career choice is shown in Table 17 in Appendix F. The adjusted R squared is 40% with 42 developed countries and 245 observations. Three variables are shown to significantly influence career choice. Media representation of entrepreneurship and monetary policy consistency improve subjunctive norm at 1% and 5% significance level respectively. Labor tax appears to restrain, at 1% significance, the percentage of population who agree that society views entrepreneurship as desirable career choice. Finally, it is important to note that after testing all environmental variables (Table 16, Appendix F), this research finds that most of them are statistically insignificant in explaining variations in selected perceptions. This however does not mean that these variables do not matter; there is just not enough variation in the data to support any potential impact. Only for the variables mentioned in this section, of which significance levels are at most 10%, there is evidence to reject the null hypothesis of zero correlation.

6.2 Extending the intent model: the role of age

The second main contribution of this paper lies on testing the significance of age as a moderator in the steps two and three of the intent model, namely from perceptions to intentions to entrepreneurship. However, before proceeding to the corresponding estimations, the role of age in the relationship between entrepreneurship and economic development is explored in order to better understand the importance of age. After all, the main motivation of this research concerns the examination and location of entrepreneurship determinants in order to guide policy making in the direction of promoting economic development. Because entrepreneurship per se is well established to bring economic growth, the causality from entrepreneurship to GDP growth has not been examined in the previous data analysis sections (Section 6.1, Appendix D, Appendix E). However, the role of age in this relationship is not presumed. Hence, before proceeding with the role of age in the intent model, its impact on the entrepreneurship-growth relationship is investigated.

The causality from entrepreneurship to economic development can theoretically be considered as step 4 of the intent model, although the scope of the model focus around entrepreneurial intentions. Despite, this paper reveals the statistically significant effect of entrepreneurship on GDP growth (equation 5 in Table 8). Here, the selected estimation and independent variables follow the work of Carree, van Stel, Thurik and Wennekers (2007) who also establish the positive role of entrepreneurship in country development. In particular, the variable of interest (entrepreneurship) is lagged by one year in a specification which includes both year and country fixed effects. Standard errors are again clustered at the level of countries. The control variables of population growth and tertiary education are included to increase the probability that the real effect of entrepreneurship on growth is captured. In addition, the term with the Gross National Income captures the conditional convergence effect among countries whereas the 1-year lagged GDP growth limits the reverse causality effects. Finally, it is important to note that only developed countries are examined. This is to agree with Crnogai, Rebernik and Bradac (2015) who show that only motivation-driven entrepreneurs, prevalent in developed countries, and not necessity-driven entrepreneurs, prevalent in developing countries, improve economic development.

Table 8: The role of age in the relationship between entrepreneurship and GDP growth in developed countries

VARIABLES	Developed countries					
	(5) GDP growth	(6) GDP growth	(7) GDP growth	(8) GDP growth	(9) GDP growth	(10) GDP growth
Entrepreneurship [1-year lag]	0.102** (0.0411)					
Youth entrepreneurship (age 18-34) [1-year lag]		0.227** (0.101)				
Old entrepreneurship (age 35-54) [1-year lag]			0.175 (0.120)			
Nascent entrepreneurship [1-year lag]				0.0986 (0.0648)		
Youth nascent entrepreneurship (age 18-34) [1-year lag]					0.203* (0.116)	
Old nascent entrepreneurship (age 35-54) [1-year lag]						0.101 (0.229)
GNI (log)	-6.360*** (1.203)	-6.803*** (1.492)	-6.948*** (1.460)	-6.464*** (1.268)	-6.886*** (1.457)	-6.938*** (1.567)
GDP growth [1-year lag]	0.340*** (0.0631)	0.351*** (0.0568)	0.347*** (0.0596)	0.340*** (0.0631)	0.351*** (0.0578)	0.348*** (0.0590)
Population growth	0.665 (0.551)	0.779 (0.589)	0.842 (0.585)	0.670 (0.538)	0.784 (0.609)	0.852 (0.559)
Tertiary education [1-year lag]	-0.0128 (0.0169)	-0.0156 (0.0253)	-0.0152 (0.0218)	-0.0130 (0.0181)	-0.0158 (0.0246)	-0.0126 (0.0253)
Constant	164.3*** (30.15)	176.5*** (37.75)	179.3*** (36.67)	167.4*** (31.97)	178.5*** (36.97)	180.0*** (39.59)
Observations	373	322	322	374	323	323
Adjusted R-squared	0.589	0.591	0.597	0.585	0.590	0.588
Number of countries	38	37	37	38	37	37

Country-level clustered standard errors in parentheses

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

Turning to the question of interest, entrepreneurship is replaced by youth entrepreneurship, namely the percentage of working age population who are nascent or established entrepreneurs and are between 18 and 34 years of age (equation 6). The impact on growth is now more than doubled while the variable of interest remains statistically significant at 5%. On the contrary, if entrepreneurship gives its place to entrepreneurship by individuals between 35 and 54 years of

age, the statistical significance is lost. Similar results can be viewed if instead of entrepreneurship in general, there is nascent entrepreneurship (equations 8 to 10). Still, the effect of nascent entrepreneurs on growth is larger if the entrepreneurs are of relatively young age (18-34 years old). Hence, there is evidence to reject the null hypotheses (number 8 in Table 3) of no moderating role of age in the relationship between entrepreneurship and growth. In other words, it can be proposed that the younger the entrepreneur, the larger their positive contribution to growth.

Table 9: The role of age in the relationship between intention and entrepreneurship

VARIABLES	(11) Nascent Entrepreneurship	(12) Nascent Entrepreneurship	(13) Nascent Entrepreneurship	(14) Nascent Entrepreneurship	(15) Nascent Entrepreneurship	(16) Nascent Entrepreneurship
Intentions [1-year lag]	0.0641 (0.0405)					
Intentions AND youth (age 18-34) [1-year lag]		0.0626 (0.0719)				
Intentions AND old (age 35-54) [1-year lag]			0.185* (0.110)			
Intentions [2-year lag]				0.0756* (0.0445)		
Intentions AND youth (age 18-34) [2-year lag]					0.0862 (0.0950)	
Intentions AND old (age 35-54) [2-year lag]						0.207** (0.0997)
GDP growth	-0.0279 (0.0601)	-0.0559 (0.0517)	-0.0567 (0.0527)	0.0429 (0.0499)	0.0317 (0.0478)	0.0337 (0.0450)
Unemployment	-0.137** (0.0552)	-0.157** (0.0704)	-0.151** (0.0657)	-0.0720 (0.0667)	-0.0599 (0.0743)	-0.0542 (0.0677)
Population growth	0.221 (0.141)	0.176 (0.279)	0.162 (0.281)	0.430* (0.237)	0.672* (0.378)	0.657* (0.353)
Constant	9.403*** (0.900)	10.17*** (0.817)	9.586*** (0.766)	8.396*** (1.013)	8.654*** (1.222)	8.158*** (0.989)
Observations	630	536	536	577	530	530
Adjusted R-squared	0.4425	0.3267	0.4519	0.5170	0.4499	0.5217
Number of countries	87	84	84	91	89	89

Country-level clustered standard errors in parentheses

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

Given the relevance and importance of age in entrepreneurship and economic development, this section continues with investigating the role of age in the core of the intent model, namely step 2 and 3. First, its moderating role on the relationship between intentions and entrepreneurship (step 3) is examined. The relevant regressions can be viewed in Table 9. The estimations utilized in Appendix D on the effect of entrepreneurial intentions on entrepreneurship are repeated. Specifically, equation 11 examines the 1-year lagged impact of intentions and equation 14 the 2-year lagged. All equations in the Table use both country and time fixed effects, with clustered standard errors at the level of countries. The specifications with only time fixed effects display similar results and are thus not shown for economy of space and clarity.

The main equations of interest here are equations 12,13 and 15,16, where intentions, with either lag, are consecutively replaced by two other variables in turn. These variables represent the percentage of working age population who intend to start a business and belong to a certain age group. The two groups are 18-34 and 35-54 years of age. This data is mined from the GEM datasets of Adult Population Surveys. When the variable of interest constitutes youth intentions (equations 12 and 15), the statistical significance of intention is greatly reduced. On the contrary, when intentions come from the older population (ages 35-54) in equations 13 and 15, the effect of intentions on nascent entrepreneurship is almost tripled, with its statistical significance also rising. Hence, there is evidence to reject the null hypotheses (number 9 in Table 3) of no moderating role of age in the relationship between entrepreneurial intentions and entrepreneurship. In other words, it can be proposed that the older the entrepreneur, the easier to turn intentions into action (entrepreneurship).

Given the importance of age on how intentions translate to entrepreneurship, it is natural to ask whether age also plays a role on how intentions are shaped. Since the intent mode, on which this research is based, asserts that entrepreneurial intentions originate from perceptions, this section continues backwards at step 2 of the intent model. The data analysis for step 2, shown in Appendix E, has asserted that at least two perceptual variables, namely perceived opportunities and self-efficacy, have been found to significantly explain intention formation. More specifically, perceived opportunities is shown to increase entrepreneurial intentions in developing countries, whereas self-efficacy improves intentions in developed countries. Hence, this section follows these directions, and attempts to understand the impact of age first, on the perceived opportunities-intentions relationship in developing countries (equations 17-19 in Table 10 below) and second, on the self-efficacy-intentions relationship in developed countries (equations 20-22). Similar with Table 9, only the specifications with both country and time fixed effects are shown.

Table 10: The role of age in the relationship between perceptions and intentions

VARIABLES	Developing countries			Developed countries		
	(17) Intentions	(18)	(19)	(20) Intentions	(21)	(22)
High status	0.0001 (0.140)	-0.0490 (0.142)	-0.00465 (0.143)	-0.120 (0.0675)	-0.110 (0.0828)	-0.136 (0.0678)
Career choice	0.0301 (0.153)	0.0342 (0.151)	0.0354 (0.164)	0.129* (0.0708)	0.133* (0.0694)	0.138** (0.0655)
Perceived opportunities	0.290*** (0.0810)			0.0325 (0.0422)	0.0515 (0.0437)	0.0439 (0.0405)
Perceived opportunities AND youth (age 18-34)		0.730*** (0.230)				
Perceived opportunities AND old (age 35-54)			0.241 (0.303)			
Self-efficacy	0.0142 (0.121)	-0.0133 (0.129)	0.104 (0.119)	0.194** (0.0835)		
Self-efficacy AND youth (age 18-34)					0.164* (0.0887)	
Self-efficacy AND old (age 35-54)						0.389*** (0.112)
Fear of failure	-0.0837 (0.103)	-0.0366 (0.0930)	-0.0413 (0.132)	-0.0216 (0.0751)	-0.0587 (0.0675)	-0.0302 (0.0672)
Services (% of nascent entrepreneurship)	0.355** (0.167)	0.335** (0.163)	0.403** (0.179)	-0.0206 (0.0463)	-0.0298 (0.0444)	-0.0221 (0.0454)
Motivation index	-0.238 (0.320)	-0.475 (0.318)	-0.165 (0.430)	0.0356 (0.0506)	0.0138 (0.0563)	0.0463 (0.0476)
Equality index	0.0473 (0.0858)	0.0512 (0.0754)	0.0251 (0.0925)	0.0416 (0.0477)	0.0521 (0.0536)	0.0371 (0.0465)
Media representation of entrepreneurship	0.258*** (0.0902)	0.282*** (0.0943)	0.298*** (0.0864)	-0.0758 (0.0577)	-0.0754 (0.0591)	-0.0630 (0.0558)
Unemployment	1.251** (0.475)	1.369*** (0.403)	1.396*** (0.516)	-0.0218 (0.150)	-0.00440 (0.159)	-0.0296 (0.141)
GDP growth	-0.110 (0.221)	-0.0496 (0.253)	0.00599 (0.223)	-0.0611 (0.121)	-0.0954 (0.129)	-0.0862 (0.118)
Constant	-15.72 (12.88)	-15.86 (11.56)	-16.16 (13.72)	4.519 (7.002)	10.05* (5.882)	5.725 (5.972)
Observations	223	219	219	333	330	330
Adjusted R-squared	0.2963	0.3461	0.2563	0.3799	0.3744	0.3105
Number of countries	52	52	52	45	45	45

Country-level clustered standard errors in parentheses

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

Equations 17 and 20 concern the effect of perceptions on intention, namely step 2 of the intent model examined in Appendix E. Starting with equation 17 and the role of age in the perceived opportunities-intentions relationship in developing countries, perceived opportunity is consecutively replaced by two other variables (equations 19 and 19). Analogous to previous work on this section, these variables represent the percentage of working age population who perceive good opportunities to start a business and simultaneously belong to a certain age group. The two groups are again 18-34 and 35-54 years of age. Similarly, self-efficacy in developed countries (equation 20), is in turn replaced by youth self-efficacy, referring to the young who perceive they have the required skills to start a business, and self-efficacy by older people (equation 21 and 22). The substitution of the main variable of interest in either set of countries does not significantly alter the scale of the adjusted R squared, supporting the choice of the alternative specifications (equations 18,19 and 21,22).

The results in Table 10 assert that age does play a role in the relationship between perceptions and entrepreneurial intentions. However, the direction of the effect is not the same for perceived opportunities and self-efficacy. On one hand, it is shown in equations 18,19 that perceived opportunities better improve intention formation when the individuals belong to the young age group (18-34). On the other hand, equations 21,22 show that self-efficacy stimulates intentions more efficiently if the individuals are old (age 35-54). In either case, the effect is more than doubled and statistical significance reaches 1%. Hence, there is evidence to reject the null hypotheses (number 10 in Table 3) of no moderating role of age in the relationship between perceived opportunities or self-efficacy on one hand and entrepreneurial intentions on the other. Also, these results are countries specific (developing countries for perceived opportunities and developed countries for self-efficacy) since only perceptual variables that have been found to matter (in Appendix E, step 2 of intent model) are examined in this section.

7. Discussion

The analysis above sheds light on the hypotheses this paper tests. For some variables, there is enough evidence to reject the null hypothesis of zero correlation. For others, the data and variation displayed do not allow for clear conclusions. The results for each step of the intent model and initial hypotheses are summarized in Table 11. All in all, there is substantial evidence in favor of the intent model and its applicability. In addition, age is found to have an important moderating role in the relationships between variables of interest in the intent model. Hence, the paper encourages the extension of the inter model to include the role of age. The current section discusses these results, starting from general comments and policy implications. Then, it presents research limitations and recommends areas of future research.

Table 11: Hypotheses revisited with results

Hypothesis		Results
#1	step 3	Entrepreneurial intentions are found to predict and cause entrepreneurship. The effect is valid with either one- or two-year lag
#2	step 2	The data is inconclusive on the effect of entrepreneurial attitudes on entrepreneurial intentions
#3	step 2	The data is inconclusive on the effect of subjective norm on entrepreneurial intentions in general. However, some evidence towards its role on explaining entrepreneurial intentions in developed countries is established.
#4	step 2	Perceived opportunities are found to significantly increase entrepreneurial intentions in developing countries
#5	step 2	Self-efficacy is found to significantly increases entrepreneurial intentions in developed countries.
#6	step 2	The data is inconclusive on the effect of fear of failure on entrepreneurial intentions
#7	step 1	Certain environmental variables (regarding categories Economy, Culture, Education, Labor framework, Networking, Rule of law, Governance) are found to influence perceived opportunities in developing countries and self-efficacy in developed countries
#8	step 4, role of age	It is found that the younger the entrepreneur, the larger their positive contribution to growth for developed countries.
#9	step 3, role of age	It is found that the older the entrepreneur, the easier to turn intentions to entrepreneurial action
#10	step 2, role of age	For developed countries, it is found that the older the entrepreneur, the larger the effect of self-efficacy on entrepreneurial intentions. For developed countries, it is shown that the younger the entrepreneur, the larger the impact of perceived opportunities on intentions.

7.1 Policy implications

The data analysis section provides clear results in favor of the intent model and its applicability. In particular, different environmental variables are found to influence perceptions of entrepreneurship. These perceptions in turn matter in intention formation, eventually leading to new entrepreneurship. Hence, the mechanics of the intent model are illustrated and supported. To further motivate the significance of the intent model, of which the final outcome is entrepreneurship, the importance of entrepreneurship per se in economic development is revisited and verified. The current subsection comments and discusses the implications of the above analysis and findings and aims to set directions of policy making toward boosting entrepreneurship. The starting point concerns the effect of entrepreneurship on GDP growth. The discussion then follows the steps of the intent model backwards to derive a set of policy recommendations for both developed and developing countries. The examination of the role of age in each phase is incorporated in the corresponding steps.

7.1.1 Policy implications from the relationship between entrepreneurship and growth

Verifying the well-established link from entrepreneurship to growth, this paper confirms this relationship for developed countries. More importantly, it complements the relevant past research with the disclosure of the role of age as a moderating factor. Particularly, younger entrepreneurs are found to bring more economic growth than older entrepreneurs. This is not meant to establish that youth is more clever or open-minded than older generations. It simply demonstrates that entrepreneurs tend to create more added value for themselves and the economy while at relatively young age. This may be explained by the urge or the need for young people to succeed and achieve a better life through higher wages. Once this is accomplished, they may find no extra incentives to further innovate and prefer to enjoy the benefits of their past achievements. Hence, it can be supported that young people are creators and carriers of ideas and innovation crucial to economic development.

The economic importance of entrepreneurship, and particularly youth entrepreneurship, brings major policy implications. In general, governments should promote and favor entrepreneurship of any type. For example, they could use subsidies to persuade and help people make their own start-up. This form of finance, however, should always include some criteria on who is eligible to be granted the subsidy. In particular, youth should be the main target of such programs. Most importantly, they should be given further incentives to start their own businesses in the form of certain privileges such as tax holidays for their start-ups. All in all, each politician should strive to attract young minds into the world of entrepreneurship for the sake of youth and society as a whole.

7.1.2 Policy implications from the relationship between intentions and entrepreneurship

The examination and support of step 3 of the intent model has verified the relevance of entrepreneurial intentions to the creation of new businesses. Intentions are seen as a necessary condition for becoming an entrepreneur. At the same time, given that not all intentions convert to actions, entrepreneurial intention is not considered a sufficient condition for entrepreneurship. Nevertheless, every current entrepreneur once had an intention to start a business. Hence, if policy makers want to increase entrepreneurship, raising entrepreneurial intentions is a fundamental requirement. Similarly, in stimulating youth entrepreneurship, action should be taken to create entrepreneurial intentions among young people. Yet, it is seen that intentions more easily turn to entrepreneurial action among older individuals. This is explained by the larger quantity of financial and human capital possessed by the older generations (Arenius & Minniti 2005; Parker 2018). Thus, policy makers who aim at boosting youth entrepreneurship should consider these limitations and increase their efforts.

While policy makers attempt to bring individuals closer to entrepreneurship by raising entrepreneurial intentions, caution must be taken regarding the quality of recipients of the relevant political campaigns. Governments do not want to spend time and resources in encouraging individuals or social groups who would never consider starting a business, either out of incapability or simple desire. Even worse, forcing such individuals to start a business can have the potential to harm the economy in the future, when the low set of skills, zeal and competence of the entrepreneur would cause the bankruptcy of the new firm. Hence, governments must make sure that promote

entrepreneurial intentions among specific groups of people. The youth is one such social group which, as already displayed and motivated, can make entrepreneurship more beneficial for the economy.

7.1.3 Policy implications from the relationship between perceptions and intentions

Policy makers can increase entrepreneurial intentions by improving people's perceptions toward entrepreneurship. This direction of causality is proposed in the intent model and supported by this research. In particular, it is found that perceived opportunities increase entrepreneurial intentions in developing countries while self-efficacy raises intentions in developed countries. Hence, developed countries should direct their resources toward raising people's perceptions of their capabilities. In achieving this, policy makers could provide general entrepreneurial training to the wider population or enhance the education system. Regarding the latter action, special attention should be placed on the training and education of the teachers, instructors and professors who would need to get equipped with the necessary knowledge and tools. On the contrary, governments in the developing world would need to shift their focus on improving people's perceptions of entrepreneurial opportunities in the economy. This can be done either by enhancing future expectations of the stage of the economy or, even better, by actually creating more economic opportunities.

Policy makers should also consider the role of age when trying to improve perceptions toward entrepreneurship. In developing countries, it is displayed that the younger the individual, the more perceived opportunities boost intentions. After all, in such countries most people become entrepreneurs out of necessity and lack of better option. If there are more opportunities available, naturally more individuals, who have no other alternative, would begin to make plans for starting their own business. Given that youth entrepreneurship is preferred and advocated, this is good news for the developing world's government officials whose actions on improving perceived opportunities can have a bigger potential on increasing intentions among the young. On the contrary, the picture is reversed for developed countries, where it is seen that the younger the individual, the less self-efficacy boosts intentions. This can again be explained by the larger prevalence of financial and human capital among the old. Hence, policy makers who aim to increase intentions through boosting self-efficacy in developed countries would need to enhance their efforts to advocate youth entrepreneurship.

7.1.4 Policy implications from the relationship between environment and perceptions

Finally, environmental variables are found to induce changes in the two perceptual variables of interest, perceived opportunities and self-efficacy. According to the intent model, this effect moves to entrepreneurship through intentions. This transition of the effect from the environment to entrepreneurship means serious policy implications that can be utilized by the corresponding governments. Specifically, in developing countries, improving the cultural disposition toward entrepreneurship, the administrative framework or the current democratic values raises perceived opportunities, possibly due to increased economic freedom and comfort among potential entrepreneurs in the society. Next to the above policy recommendations, which regard mostly the long run due to the rigid nature of cultural and political values, the data analysis also provides with variables that can more easily change in shorter periods of time. These concern the presence of

entrepreneurial models and media representation of successful entrepreneurship. Getting in touch with the entrepreneurial word, the individuals can get news and opinions of profitable areas of business, effectively increasing their perceived opportunities. Hence, by raising awareness of successful entrepreneurs, through the same outlets of communication they use to address the public, a politician can increase perceived opportunities among the general population, at relatively little cost.

Similarly, in developed countries, entrepreneurial role models and their media representation also stimulate self-efficacy. After all, the more somebody learns and hears about successful entrepreneurs, the more they perceive they have the required capabilities to do the same. Hence, policy makers in developed countries can likewise utilize these mechanisms to improve people's self-efficacy in the short run. In addition, they can decrease labor taxes or offer more and better programs that assist small and medium enterprises. Less taxes mean lower expected cost of starting a business, whereas more entrepreneurial programs boost education and skillset; both effects raise perceived capabilities at a relatively short amount of time. Turning to more rigid mediums, which cannot be easily altered in the short run, policy makers can attempt to improve equality, education, population density, labor freedom or monetary consistency. Such changes would enhance economic freedom, security or current skillset and hence naturally boost self-efficacy. Finally, a higher unemployment rate is shown to increase self-efficacy, possibly pointing to the role of crisis periods. In particular, if someone gets unemployed because they are fired, they may respond with the judgement that they can successfully start their own business and do better than their ex-boss.

7.2 Limitations and future research

Like all researches, this one suffers from a variety of limitations. An important such constraint regards the measurement of the variables used. First, the indexes drawn from GEM are based on surveys rather than count data. This means that the relevant indicators are statistical estimates whose confidence intervals decrease with sample size. Second, this paper uses the percentage of people who consider successful entrepreneurs to have high status as a measure for attitudes toward entrepreneurship in the intent model. However, these two notions are not easily interchangeably. In addition to this perceptual variable, concern has been raised on the measurement of fear of failure by GEM. Asking people whether fear of failure would prevent them from starting a new venture dictates the negative relationship between the perception of fear and the decision to start a business (Cacciotti & Hayton, 2014). These measurement issues may have been the reason why high status and fear of failure have not been shown to significantly affect entrepreneurial intentions. To address the above concerns, future research should attempt to collect more data from larger samples while making sure the variables of interest are cautiously measured and interpreted.

Another main limitation of this study concerns the effects of the variables of interest. Particularly, the *ceteris paribus* interpretation assumes that the respective effect matters only if the remaining variables in the specification remain constant. This most probably under-represents the real effect of the variable of interest due to backward and linkage linkages that affect other variables in the model once the effect takes place. This threat to the study's internal validity limits the potential of the research to provide policy recommendations with description of quantitative implications next

to qualitative motivation. The use of different datasets and hence the heterogeneity in the measurement of variables limits the significance of policy recommendations even further (Mota, 2019). Future research can fill this gap by evaluating government interventions that aim to facilitate or encourage entrepreneurship or another main component of the intent model. The utilization of pre- and post- intervention research designs (Zahra & Wright, 2011) can prove crucial for establishing solid policy recommendations.

Among research on the intent model, there are papers that disagree with the use of intentions in explaining entrepreneurship. Some claim that the intent to become an entrepreneur is not persistent but constantly changes and hence should possibly not be considered predictor of entrepreneurship (Krueger & Day, 2010). Others justify the use of intentions only parallel with the inclusion of opportunity cost in order to consider alternative behaviors (Krueger, 2017). The definition of intentions is also disputed to incorporate the view that intent without the right action is not intent (Krueger, 2017). Most important limitation, however, of the intent model, concerns the assumption of the static nature of entrepreneurial intentions, which are in nature dynamic. Future research should incorporate this quality of intentions in the model. The collection of longitudinal data on same individuals can prove critical on actualizing this recommendation. In addition, researchers are encouraged to collect data at different units of observations (individual, region, country, etc.) while also considering multilevel analyses (Bosma, 2013; Jaén & Liñán, 2013). In doing so, the external validity of the findings could be extended beyond the country level, present in this study.

A central limitation of the intent model is that it does not allow for directions of causalities other than from environment to perceptions to intention to entrepreneurship. Past research has motivated the presence of reciprocal relationships between perceptions and entrepreneurship (Bergmann, Mueller, & Schrettle, 2014), between perceptions and intention (Krueger & Kickul, 2006), between different perceptions (Tsai, Chang, & Peng, 2016) as well as between environment and perceptions (Bosma & Schutjens, 2011). As a result, Krueger (2017) has motivated the need for multidirectional modeling for intention formation frameworks such as the Ajzen's model, where dynamic modeling would allow relaxing the assumption that behavior is fully volitional. The need for multidirectional modeling also applies for the intent model in this paper. Hence, future research is advised to apply structural equation modeling in the intent model. It would be the first paper that makes this attempt for any intention model.

8. Conclusion

This paper contributes to current research by providing evidence in favor of the intent model, which explains how environment affects entrepreneurship through the links of perceptions and intentions. In addition, it motivates the inclusion of age as a moderating variable in the relationships between perceptions, intentions and entrepreneurship. To produce these results, several steps have been taken. First, past research is shown to support the structure and relevance of the intent model. At the same time, the literature review establishes various environmental variables as potential predictors of perceptions in the intent model. Then, different hypotheses are formed to both test the steps of the intent model and assess the moderating role of age. To examine

these hypotheses, data are collected mainly from Global Entrepreneurship Monitor and World Bank while the appropriate methodology is motivated. Finally, the data are analyzed to validate or contradict the formed hypotheses.

The results of this paper are relevant on many levels. First, the confirmation of the causality from intentions to entrepreneurship sends a clear message on policy makers who want to boost entrepreneurship: the focus should be turned on raising entrepreneurial intentions. On top of that, intentions are again shown to be significantly affected by certain perceptual variables. Nevertheless, different perceptions are found to affect entrepreneurial intentions in developed and developing countries, further directing policy actions. Specifically, government officials in developing countries should attempt to raise perceived opportunities whereas the focus should be shifted to improving self-efficacy for developed countries. Next to the above policy recommendations, the establishment of youth entrepreneurship as an important cause of growth can persuade politicians to shift the policy focus on younger populations. However, according to the role of age in the intent model, intentions more easily convert to entrepreneurial actions among the older population, creating *de facto* difficulties in the attempts of politicians to boost youth entrepreneurship. This means that increased efforts are required.

Finally, this study validates the causal link from environment to perceptions. It specifically examines the role of environment on perceived opportunities in developing countries and on self-efficacy in developed countries. In either set of countries, media representation of successful entrepreneurship and presence of entrepreneurial role models are found to be strong predictors of the relevant perceptions. Hence, policy makers are encouraged to promote and raise awareness of entrepreneurial examples. Beyond that, governments in the developing world are advised to enhance the bureaucratic system, strengthen the democratic values and improve the cultural disposition of the society toward entrepreneurship. Similarly, this paper recommends officials in developed countries to decrease taxation, offer enhanced entrepreneurial programs and education as well as promote equality and economic freedom. All these are actions that can improve people's perceptions of entrepreneurship. In turn, these actions, according to the intent model, are suggested to boost entrepreneurship through the mediating role of entrepreneurial intentions. However, the effect does not stop there as greater levels of entrepreneurship bring more economic growth, which has always been the underlying fundamental focus of all politicians and economists.

9. Appendix

Appendix A. Literature review: the discrepancy between intentions and entrepreneurship

Contrary to the logic of the intent model, a set of studies locate direct effects of perception on new entrepreneurship. Arenius and Minniti (2005) explore the role of perceptual variables with venture creation. Using GEM data from 28 countries in 2002, they identify the role of a set variables on business formation; these variables are confidence about one's skills, alertness to opportunities and fear of failure. This was the first paper to include perceptions as determinants of entrepreneurship. Arenius and Minniti argue that perceptions need not be realistic to be significant

and point to the importance of biased perceptions in explaining entrepreneurship. In addition, Koellinger, Minniti and Schade (2007) provide evidence of the critical effect of subjective and often biased perceptions on venture creation. In particular, they find that perceived opportunities and the ability to act entrepreneurially positively affect business creation, which is seen as an intentional act to exercise control. This again hints to the significance of intention in explaining entrepreneurship. Hence, research asserts that entrepreneurial intention formation precedes entrepreneurial behavior (step 3). However, this is shown to not be a 100% transformation, meaning that some individuals do not become entrepreneurs over time even though they intent to.

This discrepancy between entrepreneurial intentions and business creation has been a major critic against entrepreneurial intention models (Brännback, Krueger, Carsrud, Kickul, & Elfving, 2007; Edelman, Brush, Manolova, & Greene, 2010; Bird & Schjoedt, 2017). Armitage and Conner (2001) are the first to conduct a meta-analysis on intention models to show that behavioral intentions only explain 27% of the variance in behavior. Ajzen, Czasch and Flood (2009) respond by presenting a study that raises this number to 93%. However, more recent studies establish a 30% to 60% transformation rate from entrepreneurial incentives to new venture creation (Goethner, Obschonka, Silbereisen, & Cantner, 2012; Kautonen, Van Gelderen, & Tornikoski, 2013; Liñán & Fayolle, 2015; Kautonen, van Gelderen, & Fink, 2015). This disparity in intention-action is often explained by the limitations of intention models and particularly the exclusion of time-lagged or reciprocity effects between perceptions, intentions and behavior (Katz, 1990; Bird, 1992; Katz, 1995; Ryan & Deci, 2000; Brännback, Krueger, Carsrud, Kickul, & Elfving, 2007). Alternatively, it is suggested that the mismatch is coming from the discrepancy between either attitude and entrepreneurial intentions or attitude and startup creation (Bosma & Schutjens, 2011; Bosma, Wennekers, & Amorós, 2012).

Many researchers try to explain and capture the entrepreneurial intention-behavior mismatch by extending intention models to also include mediators and moderators between incentive and business formation. Shapero, already in 1982, establishes the significance of perceived barriers and facilitators before entrepreneurial action. Since then, implementation intention which extends intention measure to include conditional action, individual commitment, preference changes, personal judgment, self-discipline, self-control, propensity to act and motivation have all been considered and tested positively as mediators in the incentive-entrepreneurship link (Shapero & Sokol 1982; Gollwitzer, 1999; Blanchflower, 2004; Fayolle, Basso & Tornikoski, 2011; Carsrud & Brännback, 2011; Kautonen, van Gelderen, & Fink, 2015; Adam & Fayolle, 2016). Finally, Kautonen et. al. (2015), based on Baron's (2009) description of entrepreneurship as surrounded by uncertainty, risk, change, complexity and resource constraints, explain that intentions may lack stability or elaboration and fail to motivate the individual sufficiently to probe action. This reveals the need to extend the link between intention and entrepreneurship by considering the role of other variables, particularly that of perceptions (Shook & Bratianu, 2010; Carsrud & Brännback, 2011; Moriano, Gorgievski, Laguna, Stephan, & Zarafshani, 2012). Kautonen, van Gelderen and Fink (2015) respond by showing that moderating effects, although present, are small, supporting step 2 of the intent model

Appendix B. Literature review: the relevance of attitude, perceived opportunity, self-efficacy and fear of failure in the intent model

Attitudes toward entrepreneurship and perceived entrepreneurial opportunities have been established as important elements of the intent model. Specifically, Kirzner (1973) declares opportunity perceptions as the most distinctive and fundamental characteristic of entrepreneurial behavior. Stevenson (1990) justifies this claim by explaining that seeking and acting on opportunities lie at the core of startup formation. In other words, the ability of individuals to recognize entrepreneurial opportunities is the decisive factor in their decision to start a business (Stevenson & Jarillo, 1990; Mota, 2019). At the same time, Chell (2013) links entrepreneurial skills with both opportunity recognition theory. The importance of entrepreneurial attitudes are similarly not under presented. Ajzen (1991) defines attitudes as the favorable or unfavorable evaluation of the behavior of interest. Building on this interpretation, several researchers establish the relevance and significance of positive attitudes toward self-employment in business creation (Lee & Wong, 2003; Veciana, Aponte, & Urbano, 2005; Juračak & Tica, 2016).

Perceived capability, also known as self-efficacy, is another main predictor of intention in the entrepreneurial literature. Bandura (1977) is the first to speak of self-efficacy which he defines as the belief in one's capabilities to perform an action. This concept has been linked with entrepreneurial intentions by Gartner (1985) who describes business creation as an intentional act involving repeated attempts to exercise control over the process and attain the desired outcome. Later research has verified the reinforcing role of perceived capabilities in both business creation (Harper, 1998; Baron, 2000; Alvarez, Urbano, & Coduras, 2011; Ferreto Gutiérrez, Lafuente, & Leiva, 2018) and entrepreneurial intentions formation (Boyd & Vozikis, 1994; Autio, Keeley, Klofsten, Parker, & Hay, 2001; Bosma, Jones, Autio, & Levie, 2008; Shook & Bratianu, 2010; Naktiyok, Karabey, & Gulluce, 2010; Krueger & Day, 2010; Zellweger, Sieger, & Halter, 2011; Kalitanyi & Bbenkele, 2019). Finally, age is shown to moderate the effect between self-efficacy and entrepreneurial intention whereas perceived opportunities are also associated with entrepreneurial innovativeness (Koellinger, 2008; Gómez-Araujo, Lafuente, Vaillant, & Gómez Núñez, 2015).

Lastly, fear of failure, or scare of failing, is the only measure of perceptions considered in the intent model that discourages entrepreneurship (Arab & Sofiyabadi, 2013; Chua & Bedford, 2016). Research has confirmed that increased fear of failure impedes business creation (Wagner, & Stenberg, 2004; Alon & Lerner, 2008; Li, 2011; Morgan & Sisak, 2016; Ferreto Gutiérrez, Lafuente, & Leiva, 2018). At the same time, scare of failing is shown to hinder entrepreneurial intention (Bird, 1988; Busenitz & Lau, 1996; Zhao, Seibert, & Hills, 2005; Sandhu, Sidique, & Shoaib, 2011). Formulating the intuition behind this negative effect, Weber and Milliman (1997) as well as Liñán, Santos, & Fernández (2011) assert that a bigger fear for failure translates to higher perceived risks which in turn hamper entrepreneurial intentions. However, Mitchell and Shepherd (2011) claim that scare of failing can enhance, as well as halt, entrepreneurial thinking and acting. They explain the positive effect by arguing that fear of failure can enhance attention to rewards in the social environment and thus promote entrepreneurship (Cacciotti, Hayton, Mitchell, & Giazitzoglu, 2016).

Therefore, perceived opportunity, attitudes, self-efficacy and fear of failure have all been motivated to be the main perceptual variables in the intent model.

Appendix C. Literature review: environmental determinants of entrepreneurship and intention

Culture has already been established as driver of perceptions (section 3.3). However, research also shows that culture directly drives entrepreneurship. In this literature, Inglehart and Hofstede definitions and measures of cultural values are used. Inglehart (1997) views culture as the set of basic common values shaping behavior. However, Hofstede and Hofstede (2005) argue that the notion of culture also includes patterns of thinking, feeling and acting and thus define culture as the collective programming of the mind which distinguishes groups from each other. The relevance of culture in entrepreneurship is established by Mitchell et al. (2002) who identify significant differences in entrepreneurial cognitions among different nations. Many papers demonstrate the direct impact of culture on entrepreneurship (Mitchell, Smith, Seawright, & Morse, 2000; Wennekers, Uhlaner, & Thurik, 2002; Stephan & Uhlaner, 2010; Alvarez, Urbano, Coduras, & Ruiz-Navarro, 2011; Autio, Pathak, & Wennberg, 2013). More specifically, uncertainty avoidance (the extent to which the members of a culture feel threatened by ambiguous or unknown situations), individualism (the extent to which ties between individuals are loose), social norms (accepted behavior that an individual is expected to conform), post materialism (the extent to which prevalent values emphasize self-expression and quality of life over economic and physical security) constitute cultural values found to exert some influence on business creation (Wennekers, Thurik, van Stel, & Noorderhaven, 2007; Uhlaner & Thurik, 2010; Pinillos & Reyes, 2011; Fernández-Serrano & Romero, 2014; Sampaio, Correia, Braga, & Braga, 2018).

Networking has also been found to foster entrepreneurship (Ardagna & Lusardi, 2008). Specifically, De Clercq, Danis and Dakhli (2010) find positive relationship between venture creation and associational activity whereas regulatory and institutional burdens moderate this relationship. Similarly, Hindle and Meyer (2008) also provide evidence on the moderating role of networking on the influence of culture on new entrepreneurship. A possible mechanism through which networking boosts entrepreneurship can be the increase in the pool of knowledge available to the member of the social group (De Clercq & Arenius, 2006). Role models can also play an important role within social groups and are thus considered facilitators of entrepreneurship (Vaillant & Lafuente 2007). Bosma, Hessels, Schutjens, Van Praag and Verheul (2012) establish the presence and importance of entrepreneurial role models in business formation. A moderator of this link is proposed to be the media and its coverage of successful entrepreneurship stories (Hindle & Klyver, 2007).

Apart from its direct effect on entrepreneurship, culture has also been considered an important determinant of entrepreneurial intentions, presenting a different line of thought. Liñán, Urbano and Guerrerón (2011) argue that a more positive social valuation of entrepreneurship can lead to increased incentives to start a business. Culture is suggested to affect self-employment intentions through social legitimation and through promoting positive attitudes to entrepreneurship (Liñán & Santos, 2007). The literature also emphasizes the significance of cultural values as a potential

mechanism (Adler, Doktor, & Redding, 1986; Bird 1988; Davidsson 1995; Busenitz 1996). In particular, subjective norm (the perceived social pressure to be or not to be an entrepreneur), need for achievement, uncertainty avoidance and generosity appear to promote entrepreneurial intentions (Tang, 2008; Moriano, Gorgievski, Laguna, Stephan, & Zarafshani, 2012; Schlaegel, He, & Engle, 2013; Tsai, Chang, & Peng, 2016; Popescu, Bostan, Robu, & Maxim, 2016). On the contrary, levels of stigma, individualism, assertiveness and inequality are found to impede venture formation incentives (Schlaegel, He, & Engle, 2013; Simmons, Sharon, Wiklund, & Levie, 2014). Finally, apart from cultural variations between nations, regional culture is also found to affect intentions to start business (Hervas-Oliver, Jaén, & Liñán, 2013).

Culture is also suggested to affect entrepreneurial incentives through its influence on personality (Liñán & Fayolle, 2015). Many articles have centered on the influence of personality traits, such as the Big Five, on venture formation intentions (Zhao, Seibert, & Lumpkin, 2010; Saeed et al., 2013). More specifically, locus of control, innovativeness, optimism, stable cognitive styles, narcissism, creativity, low fear of failure, identification as entrepreneurial personality, credibility, emotional intelligence and career anchors such as talents, motives, values are all found to positively influence entrepreneurial intention formation (Lee & Wong, 2004; Guerrero, Rialp, & Urbano, 2008; Zampetakis, Kafetsios, Bouranta, Dewett, & Moustakis, 2009; Ahmed et. al., 2010; Kickul, Gundry, Barbosa, & Simms, 2010; Zellweger, Sieger, & Halter, 2011; Zampetakis, Gotsi, Andriopoulos, & Moustakis, 2011; Mathieu & St-Jean, 2013; Nabi & Liñán, 2013; Jarvis, 2016; Ozaralli & Rivenburgh, 2016). Finally, social networking is also detected to help in entrepreneurial incentives formation (Zafar, Yasin, & Ijaz, 2012). Particularly, family, peer groups, role models and their media representation have been established to influence self-employment intentions (Radu & Redien-Collot, 2008; Fernández, Liñán, & Santos, 2009; Laspita, Breugst, Heblich, & Patzelt, 2012).

Hence, this subsection validates the importance of including cultural and networking variables in the intent model. It also complements the already established variables in Table 2 with the inclusion of the following variables: social norms, cultural values, uncertainty avoidance, individuality, post materialism, social valuation of entrepreneurship, subjective norm, generosity, innovativeness, media representation of entrepreneurship (underlined variables in Table 2). Following the same procedure, the next subsection illustrates the importance of the institutional, economic and labor framework in the intent model.

Although the institutional framework is indeed displayed to influence perceptions, institutions are also shown to directly affect venture creation. This stems from institution theory asserting that social structure can promote or halt entrepreneurship (Selznick, 2011). Drawing from this theory, Stenholm, Acs and Wuebker (2013) find that differences in institutional arrangements are associated with variance in both the rate and type of entrepreneurial activity across countries. Normative, cognitive, and regulatory institutional structures are established to affect entrepreneurship activity (Spencer & Gómez, 2004). More specifically, economic freedom (the freedom to prosper within a country without intervention from a government or economic authority), intellectual property rights, legal system, and liberalization are all found to encourage entrepreneurship (Autio & Acs, 2010; Du & Vertinsky, 2011; Korosteleva & Mickiewicz, 2011;

Kuckertz, Berger, & Mpeqa, 2016). On the contrary, corruption, lack of competition and barriers to growth are shown to hinder business creation (Alon & Lerner, 2008; Anokhin & Schulze, 2009; Doern, 2009). Gender institutions are also found to exert some influence. In particular, restriction on freedom of movement away from home reduces female and total entrepreneurship (Estrin & Mickiewicz, 2011).

Governance and finance are also thought to guide entrepreneurship. Bjørnskov and Foss (2008), using GEM data for 29 countries in 2001, establish that government size (ratio of government expenditures to GDP), monetary policy consistency, legal and regulatory quality all advance venture formation. On the other side, unemployment, government corruption and administrative burden are found to impede entrepreneurship (Djankov, La Porta, Lopez-de-Silanes & Shleifer, 2002; Ritsilä & Tervo, 2002; Aidis, Estrin, & Mickiewicz, 2010). Parallel to government structure, industrial structure and finance have been considered important origins of entrepreneurship (Lee, Florida, & Acs, 2004). In particular, findings reveal that access to capital and foreign direct investment stimulate business creation whereas minimum capital requirement and labor market regulations discourage it (Van Stel, Storey, & Thurik, 2007; De Clercq, Hessels, & Van Stel, 2008; De Clercq, Lim, & Oh, 2013). Interestingly, migration is established to increase the chances of an individual to become an entrepreneur (Levie, 2007).

Apart from their direct effect on entrepreneurship, institutions have also been considered an important determinant of entrepreneurial intentions, presenting a different line of thought. Particularly, both formal and informal institutions are shown to shape intentions to form businesses (Engle, Schlaegel, & Dimitriadi, 2011). Informal institutions such as tradition and social norms are consistently proven to be significant causes of venture formation incentives further reaffirming the relevance of culture in the intent model (Kristiansen & Indarti, 2004; Veciana, Aponte, & Urbano, 2005; de Janasz, de Pillis, & Reardon, 2007; Engle et. al., 2010). Additionally, structural support to entrepreneurs, informal investments, progressivism (support for social reform), sustainability orientation and gender are exhibited to raise entrepreneurial intentions (Ho & Wong, 2007; Turker & Sonmez, 2009; Kuckertz & Wagner, 2010; Sánchez-Escobedo, Díaz-Casero, Hernández-Mogollón, & Postigo-Jiménez, 2011). Institutions are not always tantamount within a country and variations at a regional level may be present and modify local self-employment incentives (Bosma & Schutjens, 2007). Kiber (2013) considers regional variations in population density, wealth distribution and manufacture industry employment to explain variations in intentions to form ventures.

Economic development has also been considered a facilitator of entrepreneurial incentives (Nabi & Liñán, 2013). Nabi, Liñán, Iakovleva, Kolvereid, and Stephan (2011) demonstrate that developing country citizens exhibit stronger entrepreneurial intentions than those from developed countries, although this may depict a necessity-driven rather than opportunity-driven motivation. An important mediator between economic development and business formation intentions may constitute education and training available to potential entrepreneurs. Several articles examine and verify the positive link between education or startup training, on one side, and self-employment incentives, on the other side (Delmar & Davidsson, 2000; Pittaway & Cope, 2007; Martínez, Levie, Kelley, SÆmundsson, & Schøtt, 2010; Farashah, 2013; Samašonok, Išoraitė, & Leškienė-Hussey,

2016). Finally, a recent contribution by Hatak Harms and Fink (2015) proposes and verifies that employees are less inclined to act entrepreneurially as they age while their entrepreneurial intentions are lower the more they identify with their jobs.

Hence, this subsection validates the importance of including economic, regulatory and education variables in the intent model. It also complements Table 2 with the inclusion of the following variables: economic freedom, level of competition, structural support to entrepreneurs, foreign direct investment (FDI), access to capital, investments, liberalization, progressivism, corruption, government size, monetary policy consistency, administration quality and sustainability orientation.

Appendix D. Data analysis: from intention to entrepreneurship; testing step 3 of the intent model

The basis of all intention models lies in the assumption that entrepreneurial intentions precede entrepreneurship. To test step 3 of the intent model, nascent entrepreneurship is regressed on intentions which is lagged for one or two years in two separate estimations (Table 6). The choice of 1 and 2 year lag is made due to the way intentions are measured; only if the individual intends to start a business within 3 years of the time of the survey, will they be considered to have entrepreneurial intentions. In addition, the choice of lag agrees with Kautonen, van Gelderen and Fink (2015) who claim that statistical analysis needs to allow preferably one or more years for intentions to transform to business creation. The regression is complemented with the control variables of GDP growth, unemployment and population growth. All are considered to play an important role on the formation of entrepreneurship and hence help to determine the true effect of intentions.

The results, presented in Table 12, support the first proposition. Intentions do predict entrepreneurship. With only time fixed effects, the variable of intentions is statistically significant at 1% while it appears to increase entrepreneurship by around 0.17 percentage points for every percentage point increase for intentions, *ceteris paribus*. The inclusion of country fixed effects drops the coefficient of interest to approximately 0.07 although it still remains statistically significant at the margin (10% significance level) for the two-year lagged intention. If, however, the estimation is repeated with heteroskedasticity robust standard errors, instead of country-level clustered standard errors, both lags of intentions turn significant at 1%. These standard errors are displayed in brackets in the variables of interest for the estimation with time and country fixed effects.

Table 12: Intention to entrepreneurship

VARIABLES	(23)=(11) Nascent entrepreneurship	(24) Nascent entrepreneurship	(25)=(14) Nascent entrepreneurship	(26) Nascent entrepreneurship
Intentions (1 year lagged)	0.0641 (0.0405) [0.0196]	0.164*** (0.0265)		
Intentions (2 year lagged)			0.0756* (0.0445) [0.0232]	0.188*** (0.0344)
GDP growth	-0.0279 (0.0601)	0.00440 (0.0645)	0.0429 (0.0499)	0.0674 (0.0549)
Unemployment	-0.137** (0.0552)	-0.108** (0.0504)	-0.0720 (0.0667)	-0.0727 (0.0547)
Population growth	0.221 (0.141)	0.659*** (0.177)	0.430* (0.237)	0.838*** (0.281)
Constant	9.403*** (0.900)	7.721*** (0.840)	8.396*** (1.013)	7.108*** (0.884)
Time fixed effects	YES	YES	YES	YES
Country fixed effects	YES	NO	YES	NO
Observations	630	630	577	577
Number of countries	87	87	91	91
Adjusted R-squared	0.4425	0.6040	0.5170	0.6044

Country-level clustered standard errors in parentheses

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

The effect of intention on entrepreneurship, although statistically significant, appears to be considerably below the estimations from past research, as presented in the literature review section. Most papers reveal that intentions explain 30% to 60% of the variance in entrepreneurship. However, due to data limitations and difficulty in surveying the same individuals over time, the majority of past research measures the contemporaneous impact of intentions to entrepreneurship, possibly overrating the effect. Another major difference of this paper with past research lies on the inclusion of time and country fixed effects, on the estimations used. This lowers the chances of omitted variable bias but also results in the smaller coefficient of interest since more variation of the dependent variable is captured. Despite its lower magnitude than what already proposed, intentions do remain significant predictors of entrepreneurship, pointing to the rejection of the first null hypothesis.

Finally, the role of crisis in the relationship between intentions and entrepreneurship is examined. In particular, the lagged intention variable is interacted with two time dummies, one equal to one for the financial crisis years of 2007 to 2010, and another dummy for the remaining years. The estimation results are shown in Table 13. Although, intentions appear to stimulate entrepreneurship more in non-crisis years, as would be hypothesized due to increased difficulties to open a business

during a crisis, the difference between the coefficients in the two interactions is not statistically significant to reach a safe conclusion. This points to data limitation issues.

*Table 13: The effect of crisis in the relationship between intentions and entrepreneurship
(step 3 of the intent model)*

VARIABLES	(27) Nascent entrepreneurship	(28) Nascent entrepreneurship	(29) Nascent entrepreneurship	(30) Nascent entrepreneurship
1-year-lagged-intention dummy for crisis years *	0.0722* (0.0383)	0.158*** (0.0321)		
1-year-lagged-intention dummy for non-crisis years *	0.0622 (0.0446)	0.164*** (0.0293)		
2-year-lagged-intention dummy for crisis years *			0.0971** (0.0386)	0.197*** (0.0300)
2-year-lagged-intention dummy for non-crisis years *			0.0682 (0.0632)	0.185*** 0.0324
GDP growth	-0.0312 (0.0596)	0.00589 (0.0631)	0.0316 (0.0483)	0.0629 (0.0545)
Unemployment	-0.141*** (0.0525)	-0.106** (0.0498)	-0.0831 (0.0665)	-0.0759 (0.0560)
Population growth	0.222 (0.139)	0.655*** (0.175)	0.395* (0.218) (0.0479)	0.830*** (0.284) (0.0369)
Constant	9.461*** (0.957)	7.717*** (0.883)	8.635*** (1.048)	7.201*** (0.938)
Time fixed effects	YES	YES	YES	YES
Country fixed effects	YES	NO	YES	NO
Observations	630	630	577	577
Adjusted R-squared	0.4405	0.6037	0.5071	0.6044
Number of countries	87	87	91	91

Country-level clustered standard errors in parentheses

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

Appendix E. Data analysis: from perceptions to intention; testing step 2 of the intent model

Step 2 of the intent model concerns the impact of perceptions on intention. The literature review has revealed five main perceptual variables that are proposed to influence entrepreneurial intentions (hypotheses 2 to 6 in Table 3). Hence, to test step 2 of the intent model, these perceptions

are regressed on intention (Table 15). A number of control variables are included in order to attempt to capture the causal effect of the perceptions at hand. The Global Entrepreneurship Monitor Adult Population Surveys provides with most such controls. The Equality index measures the percentage of working age population who agree that most people in their country would prefer that everyone had a similar standard of living. The *Motivation index* is the ratio of opportunity-driven over necessity-motivated entrepreneurs. The *Services* variable measures the percentage of nascent entrepreneurship in the business services sector (e.g. IC, Finance, Real Estate). Lastly, the *Media* variable is the percentage of working age population who often see stories in the public media about successful new businesses. GDP growth and unemployment (World Bank) complete the list of the control variables.

Table 14: List of developed and developing countries

Developed countries		Developing countries	
Argentina	Kuwait	Algeria	Madagascar
Australia	Latvia	Angola	Malawi
Austria	Lithuania	Bangladesh	Malaysia
Barbados	Luxembourg	Belize	Mexico
Belgium	Netherlands	Bolivia	Montenegro
Canada	New Zealand	Bosnia Herzegovina	Morocco
Chile	Norway	Botswana	Mozambique
Croatia	Panama	Brazil	Namibia
Cyprus	Poland	Bulgaria	Nigeria
Czech Republic	Portugal	Burkina Faso	North Macedonia
Denmark	Puerto Rico	Cameroon	Pakistan
Estonia	Qatar	China	Peru
Finland	Saudi Arabia	Colombia	Philippines
France	Singapore	Costa Rica	Romania
Germany	Slovak Republic	Dominican Republic	Russian Federation
Greece	Slovenia	Ecuador	Senegal
Hong Kong SAR, China	Spain	Egypt, Arab Rep.	Serbia
Hungary	Sweden	El Salvador	South Africa
Iceland	Switzerland	Ethiopia	Sudan
Ireland	Trinidad and Tobago	Georgia	Suriname
Israel	Arab Emirates	Ghana	Syrian Republic
Italy	United Kingdom	Guatemala	Thailand
Japan	United States	India	Tonga
Korea, Rep.	Uruguay	Indonesia	Tunisia
		Iran, Islamic Rep.	Turkey
		Jamaica	Uganda
		Jordan	Vanuatu
		Kazakhstan	Venezuela, RB
		Kosovo	Vietnam
		Lebanon	Zambia
		Libya	

Table 15: Perceptions to intention

VARIABLES	All countries		Developed countries		Developing countries	
	(31) Intentions	(32) Intentions	(33)=(20) Intentions	(34) Intentions	(35)=(17) Intentions	(36) Intentions
High status	-0.115 (0.0769)	-0.0859 (0.0599)	-0.120 (0.0675)	-0.101 (0.0654)	0.000 (0.140)	0.0251 (0.101)
Career choice	0.114 (0.0784)	0.149** (0.0624)	0.129* (0.0708)	0.130** (0.0569)	0.0301 (0.153)	0.0699 (0.124)
Perceived opportunities	0.102** (0.0476)	0.163*** (0.0496)	0.0325 (0.0422)	0.0379 (0.0384)	0.290*** (0.0810)	0.456*** (0.0765)
Self-efficacy	0.188** (0.0914)	0.296*** (0.0686)	0.194** (0.0835)	0.213*** (0.0583)	0.0142 (0.121)	0.172* (0.0910)
Fear of failure	-0.00957 (0.0714)	-0.0381 (0.0694)	-0.0216 (0.0751)	-0.0672 (0.0723)	-0.0837 (0.103)	-0.126 (0.0977)
Services (% of nascent entrepreneurship)	0.0453 (0.0534)	-0.0953* (0.0495)	-0.0206 (0.0463)	-0.0617 (0.0456)	0.355** (0.167)	0.191 (0.120)
Motivation index	-0.0349 (0.0718)	-0.230** (0.0984)	0.0356 (0.0506)	-0.0713 (0.0648)	-0.238 (0.320)	-0.551 (0.487)
Equality index	0.0662 (0.0632)	0.0266 (0.0569)	0.0416 (0.0477)	0.0158 (0.0422)	0.0473 (0.0858)	0.0277 (0.0681)
Media representation of entrepreneurship	0.0459 (0.0587)	0.0160 (0.0524)	-0.0758 (0.0577)	-0.0592 (0.0454)	0.258*** (0.0902)	0.109 (0.0757)
Unemployment	0.291 (0.193)	0.244* (0.141)	-0.0218 (0.150)	-0.127 (0.127)	1.251** (0.475)	0.200 (0.206)
GDP growth	-0.0730 (0.126)	-0.0702 (0.132)	-0.0611 (0.121)	0.0176 (0.0950)	-0.110 (0.221)	-0.286 (0.263)
Constant	-3.533 (7.755)	-5.033 (6.292)	4.519 (7.002)	6.905 (5.782)	-15.72 (12.88)	-8.278 (8.333)
Time fixed effects	YES	YES	YES	YES	YES	YES
Country fixed effects	YES	NO	YES	NO	YES	NO
Observations	556	556	333	333	223	223
Adjusted R-squared	0.4553	0.6010	0.3799	0.4610	0.2963	0.6272
Number of countries	97	97	45	45	52	52

Country-level clustered standard errors in parentheses

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

The estimated equation for step 2 is repeated first for all countries (equations 31 & 32) and then for developed (equations 33 & 34) and developing (35 & 36) countries. Developed countries here are considered those with label “High Income” in the Word Data Development Indicator database whereas the rest countries are categorized as developing. The complete list of countries in either category is displayed in Table 14. This country distinction is made to test whether a different stage of economic development plays a role on the quality and magnitude of the impact of perceptions

on intention. This is verified in the results. Whereas perceived opportunity and self-efficacy appear to be statically significant positive predictors of intentions for all countries, each variable is significant only for one set of countries. Specifically, self-efficacy is the main perceptual variable that shapes entrepreneurial intentions in developed countries, whereas, perceived opportunity is the only significant perception that drives intentions in developing countries. Both are statistically significant; at 5% significance level for self-efficacy in developed countries and 1% for perceived opportunity in developing countries; the null hypotheses 4 and 5 (Table 3) are thus rejected. Hence, there is support in favor of propositions 4 and 5 (Table 3), namely that perceived opportunities and self-efficacy enhance entrepreneurial intention formation.

Next to these two perceptions, only career choice shows some signs of statistical significance for the developed countries (10% significance level with country fixed effects and 5% without). Due to this limiting evidence, the null hypothesis (number 3 in Table 3) of zero correlation between subjective norm and intentions can only be rejected at 10% significance level. Regarding the remaining two perceptions, high status and fear of failure do not appear to significantly affect intentions in none of the six equations of step 2. One could argue that the simultaneous inclusion of both self-efficacy and fear of failure may underrate the contribution of the latter on intentions. Repeating the estimations (equation 31 to 36) excluding Self-efficacy does not turn Fear of failure statistically significant in none of the equations. Hence, there is not enough evidence to reject hypotheses 2 and 6 (Table 3). This does not mean that attitudes toward entrepreneurship and fear of failure do not matter in the intent model; it is only that their impact cannot be confirmed with the available data and variation.

Finally, incorporating the role of crisis in the above estimations (equation 31 to 36) does not change the quality or magnitude of the coefficients. Similar to the previous step, the equations are repeated including time dummies that interact with perceived opportunity and self-efficacy for developing and developed countries respectively. Hence, there is evidence on the irrelevance of crisis periods on how perceptions shape intentions. However, the limited number of observations combined with the small variation in the variables of interest may be an explanation of this outcome. As a result, no clear conclusion can be drawn on the role of crises on step 2 of the intent model: from perceptions to intention.

Appendix F. Data analysis: from environment to perceptions

This section displays all environmental variables (Table 16) used in this research to test their effect on the five main perceptual variables, namely attitudes, subjective norm, perceived opportunities, self-efficacy and fear of failure. Estimation with the full set of countries, with only developed countries and with only developing countries have been utilized for all variables. Although most of the environmental factors are not found to have statistically significant effect on any given perceptual variable, this does not mean that the environmental factor is irrelevant. It only shows that the data is inconclusive on the effect of the specific variable on perceptions. This possibly comes due to limited variation and the relatively small number of observations in the data. In addition, the output for the effect of environment on subjective norm is shown for developed countries (Table 17).

Table 16: Definitions and description of all environmental variables tested

Category	Variable	Description	Source
Economy	GDP growth	GDP growth (annual %)	World Bank
	GNI	Gross national income per capita (GNI) converted to current USA dollars using purchasing power parity rates	World Bank
	Market dynamics	The level of change in markets from year to year (index)	GEM, NES
	GINI index	GINI index (World Bank estimate)	World Bank
	Market openness	The extent to which new firms are free to enter existing markets (index)	GEM, NES
	Poverty gap	Poverty gap at \$3.20 a day (2011 PPP) (%)	World Bank
	Favorable cultural norms toward entrepreneurship	The extent social and cultural norms encourage new business methods or activities (index)	GEM, NES
Education	School entrepreneurship	The extent training on SMEs is incorporated in primary and secondary education (index)	GEM, NES
	Secondary education	Percentage of population with not higher than secondary education	GEM, APS
	Tertiary	Percentage of population with tertiary education	GEM, APS
	Entrepreneurship training	The extent training on SMEs is incorporated in higher education (index)	GEM, NES
	Edu expenditure government	Government expenditure on education, total (% of GDP)	World Bank
Labor framework	Population density	Population density (people per sq. km of land area)	World Bank
	Unemployment	Unemployment, total (% of total labor force)	World Bank
	FDI	Foreign direct investment, net inflows (% of GDP)	World Bank
	Finance	The availability of financial resources ,equity and debt for SMEs (index)	GEM, NES
	Physical infrastructure	Ease of access to physical resources, communication, utilities for SMEs (index)	GEM, NES
	Capital formation	Gross capital formation (% of GDP)	World Bank
Networking	Refugees	Refugee population by country or territory of asylum	World Bank
	Entrepreneurial role model	Percentage of working age population who personally know someone who started a firm in the past two years	GEM, APS
	Media representation of entrepreneurship	Percentage of working age population who often see stories in their national public media about successful new businesses	GEM, APS
Rule of law/ Regulation	Procedures to register business	Start-up procedures to register a business (number)	World Bank
	Bureaucracy	The extent to which public policies and administrative procedure are complicated (index)	GEM, NES
	Commercial infrastructure	The presence of property rights and institutions to support SMEs (index)	GEM, NES
	Doing business	Measure of the ease of doing business (index)	World Bank

	Index of economic freedom	Freedom Heritage Index of economic freedom, average of the next 12 components	Heritage foundation
	Property rights	Component of index of economic freedom (index)	
	Government integrity	Component of index of economic freedom (index)	
	Judicial effectiveness	Component of index of economic freedom (index)	
	Tax burden	Component of index of economic freedom (index)	
	Government spending	Component of index of economic freedom (index)	
	Fiscal health	Component of index of economic freedom (index)	
	Business freedom	Component of index of economic freedom (index)	
	Labor freedom	Component of index of economic freedom (index)	
	Monetary freedom	Component of index of economic freedom (index)	
	Trade freedom	Component of index of economic freedom (index)	
	Investment freedom	Component of index of economic freedom (index)	
	Financial freedom	Component of index of economic freedom (index)	
Governance	Polity index	Democracy index minus Autocracy index	Polity IV
	Democracy index	Presence of democratic values in the government (index)	
	Autocracy index	Presence of authoritarian values in the government (index)	
	Freedom average	Average of the five freedom Fraser variables below (index)	Fraser institute
	Legal system property rights	Index that measures protection/respect for rights of people to their own lives and properties	
	Freedom to trade internationally	Measures the extent of trade and barriers to trade and capital flows	
	regulation	Freedom from government regulations and controls in labor, financial and goods markets	
	Sound money	Consistency of monetary policy on rate & variability of inflation & monetary control (index)	
	Size of government	Extent government intervenes in the economy (e.g. consumption, transfers, investments, taxation)	
	Inflation	Inflation, consumer prices (annual %)	World Bank
	Labor tax	Amount of taxes/mandatory contributions on labor paid by the business (% profits)	World Bank
	Profit tax	Amount of taxes on profits paid by the business (% of commercial profits)	World Bank
	Green energy consumption	Renewable energy consumption (% of total final energy consumption)	World Bank
	Government support	The extent public policies support entrepreneurship and view entrepreneurship as relevant issue (index)	GEM, NES
	Programs	Presence/quality of programs directly assisting SMEs at all levels of government (index)	GEM, NES

Table 17: Effect of environment on subjunctive norm for developed countries

Category	VARIABLES	Developed countries	
		(37) Career choice	(38) Career choice
Culture	Norms	-1.196 (1.690)	-1.851 (1.511)
Labor framework	Unemployment	-0.314 (0.296)	-0.217 (0.267)
Labor framework	Capital formation	0.145 (0.249)	0.199 (0.237)
Networking	Media	0.340*** (0.0919)	0.326*** (0.0872)
Rule of law	Sound money	2.394** (0.984)	1.298 (1.112)
Governance	Inflation	-0.232 (0.241)	-0.307 (0.237)
Governance	Labor tax	-0.745*** (0.258)	-0.130 (0.147)
	Constant	38.50*** (11.06)	34.14*** (12.79)
	Time fixed effects	YES	YES
	Country fixed effects	YES	NO
	Observations	245	245
	Adjusted R-squared	0.4084	0.3896
	Number of countries	42	42

Country-level clustered standard errors in parentheses

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

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