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embedded in life expectancy

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Age effect on entry to entrepreneurship: Embedded in life expectancy

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Abstract

Major improvements in life expectancies associate with interesting societal transformations. By changing individuals' preferences for engaging in both productive and non-productive activities across their lifespan, changes in life expectancy paradoxically affect both the financing and the costs of social welfare systems. This raises the importance of knowledge on how life expectancy affects the relationship between age and entry to entrepreneurship. Using lifespan theory, we propose a conceptual model for understanding how age-related psychological effects (i.e., risk-willingness and self-efficacy) on individuals' entry to entrepreneurship are embedded in life expectancy at the societal level. Based on data from 34 Organisation for Economic Co-operation and Development countries, our analysis shows that increased life expectancy at the societal level moves the peak for entrepreneurial entry toward older ages and creates an evener entry distribution across working ages. The results suggest that this effect is driven partly by a cross-level moderation from life expectancy on the relationship between age and individuals' risk-willingness and self-efficacy, which in turn promotes entry to entrepreneurship. These findings highlight the importance of considering entrepreneurial activity in the context of age and of future-time perspective in terms of life expectancy.

Keywords: nascent entrepreneurship, aging, life expectancy, future-time perspective, remaining lifetime, lifespan theory

JEL classifications: L26 J10 J14 J24 M13

1 Introduction

With expanding worldwide developments in longevity (United Nations 2015), the association between age and entry into entrepreneurship becomes increasingly important for economic policy (Organisation for Economic Cooperation and Development [OECD] 2017; OECD and European Commission). Increases in life expectancies are accompanied by, among other things, forecasts of growing economic burdens from providing older people with physical and economic security (Bloom et al. 2015; Harper 2014). At the same time, the expectancy of a longer life may lead individuals to spend more time in the labor market (Chand and Tung 2014), including engaging in entrepreneurial activities. This study contributes to this debate by offering new knowledge about how different levels of life expectancy affect the relationship between age and individuals' entry to entrepreneurship.

Studies on entry to entrepreneurship, defined as individuals' attempt to start a new business (GEM 2016; Kim and Aldrich 2011), predominantly showed a negative relationship with age (e.g., Bohlmann et al. 2017; Gielnik et al. 2018; Heim 2015). Several studies also suggested an inverted U-shape relationship (e.g., Lévesque and Minniti 2006; Minola et al. 2016; Zhang and Acs 2018). Age effects on entry have been explained as a combination of age-dependent constraints that influence resource factors, such as human and financial capital, with psychological factors, such as individuals' life priorities, rigidity, perceived discrimination, risk-willingness, self-efficacy, and goal orientation (Lévesque and Minniti 2006; Zhao et al. 2020). These factors develop with age but, in very complex dynamics, they challenge our understanding of age effects on entrepreneurship. As Zhao et al. (2020, p. 19) noted, "Multiple age-related theoretical mechanisms may intertwine and cancel out the effects of one another".

In this paper, we raise the question of how the relationship between age and individuals' choices to enter entrepreneurship varies with respect to life expectancy at the societal level. This question is particularly pertinent for two reasons. First, the future-time perspective defines a cornerstone in several dominant explanations of the relationship between age and entry to entrepreneurship (Gielnik et al. 2012; Minola et al. 2016; Zhao et al. 2020). According to lifespan theory, the future-time perspective states that individuals' cognitions specifically related to their goals and choices are based not just on their age, but also on how close the individuals are to their expected passing (Carstensen et al. 1999; Kanfer and Ackerman 2004; Lang and Carstensen 2002). Second, most extant studies have treated age as an approximate index for remaining time and lifespan (Bohlmann et al. 2017; Gielnik et al. 2012; Lévesque and Minniti 2006). The likelihood of entering entrepreneurship at age 60 years generally has been considered similar for persons living in a country where the life expectancy at 60 is another 20 years (e.g., Hungary) compared to a country where the life expectancy at 60 is 26 years (e.g., Japan). Recently, this gap led Bohlmann et al. (2017, p. 9) to suggest—without empirical evidence, however—that "the time remaining relative to one's age is not only shaped by individual, chronological age, but also tied to the average life expectancy of a given country".

Without taking into account variation in life expectancy across countries, prior research on age effects is based on the assumption of a stable peak across countries and time (Bohlmann et al. 2017; Gielnik et al. 2012; Lévesque and Minniti 2006). Although this research provides important insights on the effects of age, including understandings of youth entrepreneurship (Chigunta 2002) and senior entrepreneurship (Kautonen et al. 2017), this "stable peak" assumption showcases that knowledge of age effects so far has been under-socialized. This was illustrated by a recent meta-analysis (Zhao et al. 2020), which found that age effects in entrepreneurship vary across countries; however, the broader institutional and contextual explanations remain insufficiently investigated.

Prior research supports that life expectancy in a society shapes entrepreneurship. For instance, Freytag and Thurik's (2007) study showed that at the aggregate level, increased life expectancy is associated with lower levels of latent entrepreneurship. Further, Lévesque and Minniti's (2011) findings suggested that both countries where the population is getting older and countries where it is becoming younger are more likely to experience a decrease in the aggregate level of entrepreneurship. Nonetheless, the underlying individual cognitive mechanisms that explain how macro-level life expectancy affects individuals' choice to enter entrepreneurship has been so far more assumed than empirically investigated (e.g., Kautonen et al. 2017; Lévesque and Minniti 2006, 2011).

To address these shortcomings, we propose a multilevel model in which two cognitions (i.e., risk-willingness and self-efficacy) mediate the relationship between age and entry to entrepreneurship, and the relationships between age and cognitions are sensitive to life expectancy at the societal level. Both risk-willingness (de Blasio et al. 2020; Martina 2020) and self-efficacy (Hechavarria et al. 2012) have been considered important antecedents to entry into entrepreneurship. We propose that risk-willingness decreases with age, and that self-efficacy increases with age, which enables an explanation of the mechanisms underlying an inverted U-shaped relationship between age and entrepreneurship (Haans et al. 2015).

We test our theoretical model using unique data combining two datasets. Specifically, data on individual-level entrepreneurial activity from the Global Entrepreneurship Monitor (GEM) (Bosma et al. 2017) is merged with country-level characteristics from the World Bank for the years 2009 to

2014. The sample consists of 424,788 individuals between the ages of 18 and 64 years in 34 OECD countries.

Our findings contribute to studies on entrepreneurship and age in three significant ways. Specifically, by studying the age effects on entrepreneurship in the context of life expectancy, we first separate the effect of age from the effect of remaining life. Second, we illustrate the embeddedness of the inherent effect of age in a societal context. Finally, we empirically examine the mediation of age effects through risk-willingness and self-efficacy. Together, we contextualize age effects on entry to entrepreneurship. Particularly, we argue that a person's age affects entry to entrepreneurship through two well-known psychological factors, risk-willingness and self-efficacy, and that the strength of these two mediated age effects are conditioned on the level of life expectancy in society.

In the following theory section, we first introduce lifespan theory, its relevance for entrepreneurship, and its under-socialized nature. Then, we present lifespan theory as embedded in a broader institutional context before we develop our hypotheses. Afterwards, we present the research design followed by the results. Finally, we discuss the findings in relation to prior research, elaborate on their contribution, and conclude.

2 Theoretical background

2.1 Lifespan theory

In lifespan theory, it is assumed that aging affects people's mental and socialized resources (Baltes 1993; Baltes et al. 1999). Baltes (1993) distinguished between the biological, evolution-based cognitive function—the "hardware of the mind" (also termed, *fluid intelligence*)—and the "software" that programs it as individuals socialize in different societal contexts (also termed, *crystallized intelligence*). Fluid intelligence, as a neurophysiological part of the mind, includes abilities such as speed and accuracy of information processing and dealing with complex ideas. It develops during childhood and early adulthood but declines with aging (Baltes 1993; Horn and Cattell, 1967; Park et al. 1999). Crystallized intelligence, as a sociocultural- and socialized-based part of the mind, includes abilities such as reading and writing skills, language comprehension, professional skills, and other life abilities. This part also develops during childhood and early adulthood but continues to develop throughout life, although at a slower pace over time (Baltes 1993; Park et al. 1999). Crystallized intelligence compensates for age-related losses in fluid intelligence (Baltes 1993).

Lifespan theory addresses the characteristics and development sequences in fluid and crystallized intelligence throughout people's lives (Baltes et al. 1998, 1999). It focuses on how individuals' psychology and cognition change in values, motivation, and goal orientation (including work-related motives) as a consequence of developmental processes (Baltes and Carstensen 1996; Bohlmann et al. 2017; Kooij et al. 2011).

Importantly, especially for our study, it has been suggested that expectations of remaining lifetime affect psychological and cognitive characteristics (Baltes and Carstensen 1996). Thus, individuals' changes in motivation, in addition to the effect of the nominal age, are embedded in their remaining future-time perspective (Carstensen et al. 1999; Lang and Carstensen 2002). For example, as the awareness of remaining lifetime becomes more prominent in late adulthood, growth goals, risk-taking, and focus on future opportunities decline, thereby raising the opportunity costs and lowering the desirability of engaging in entrepreneurship (Gielnik et al. 2012; Minola et al. 2016; Wennberg et al. 2010). Recent studies also associated younger entrepreneurs' perceptions of time as being open-ended with their giving higher priorities to social goals (Brieger et al. 2020).

The perception of remaining lifetime affects motivation. As older individuals' perceptions of living longer lives increase, potential differences in their goal selection relative to younger individuals will diminish (Carstensen et al. 1999; Lang and Carstensen 2002). We contend that this also will be the case for decisions to enter entrepreneurship. That is, increases in life expectancy postpone age-related psychological and cognitive changes, including changes in individuals' risk-willingness and self-efficacy (Brandtstädter and Rothermund 2003; Mirowsky 1997), both known to shape entrepreneurial activity (Lévesque and Minniti 2006; Minola et al. 2016).

2.2 Lifespan theory in broader institutional contexts

The psychological effects of lifespan and remaining lifetime are embedded in the context of society, as illustrated by several cross-country studies in developmental psychology (Baltes 1993; Gould 1999; Park et al. 1999). Notably, age demographics and expected lifespan vary greatly between countries. According to lifespan theory, such differences may have consequences for the pace and timing of various age-induced psychological changes—including those related to an individual's perceived desirability of entrepreneurship.

Obviously, how age demographics and life expectancy influence age-related mechanisms depend on the individuals' preciseness and ability to estimate such societal demographic characteristics. Extant research has investigated the extent to which subjective life expectancy correlates with actual estimates (e.g., Mirowsky 1999) and life tables (e.g., Bell and Douglas 2020). Although that literature explains sources of bias in estimation, including factors such as sex, health, and education, it simultaneously assumes that people to some extent are aware and able to assess actual estimates and life tables of society life expectancy. Dormont et al.'s (2018, p. 1830 & p. 1851) recent study concluded that although "individuals use private information" when estimating uncertainty related to personal life expectancy, they simultaneously "make rational use of available information". Thus, "individuals are quite rational in adjusting their survival probabilities with respect to their illnesses, lifestyles, and social position". These adjustments are done in comparison to the life tables or societal life expectancy. Post and Hanawald (2013) similarly argued that individuals integrate a prognosis of mean survival probabilities into their decision-making process. They found that subjective estimates match actual life tables with little over- and underestimation.

The interest in the combination of individual age and societal life expectancy goes back to Hamermesh (1985), who argued that considerations of individuals' expected length of life is fundamental to the micro-foundations of macroeconomics. They enable us to understand many behaviors, including retirement age, asset accumulation, health behavior, and especially for our purpose, labor market behavior (Peracchi and Perotti 2014). For instance, Cazenave (2017, p. 2) showed "how the retirement age would evolve driven mainly by demographic changes that can be obtained from life tables". Others similarly showed how retirement-related behavior depends on societal changes in mortality and life expectancy (Kalemli-Ozcan and Weil 2002). Thus, it is reasonable to assume that individuals develop beliefs about their remaining lifetimes based on the average life expectancy in their societies. In sum, individuals' perceptions about their length of life is shaped by their knowledge of their family members', friends', and co-workers' age at death and, "on the aggregate level, subjective life expectancy corresponds to actuarial estimates, although with optimistic and pessimistic bias in some quarters" (Mirowsky 1997, 126).

Altogether, this extant research supported that psychological effects of lifespan and remaining lifetime are embedded in the context of societal life expectancy. This implies that age-related cognitive changes and their ensuing impacts on behavior, including their impact on entry to entrepreneurship, should be understood as a combination of individuals' chronological age and life expectancy in the society where they live (Bohlmann et al. 2017, 9).

3 Hypothesis development

3.1. Age and entry to entrepreneurship

It has been well established that age negatively affects individuals' entry into entrepreneurship (e.g., Bohlmann et al. 2017; Gielnik et al. 2018; Guerrero et al. 2019; Heim 2015) and follows an inverted U-shape relationship (e.g., Lévesque and Minniti 2006; Minola et al. 2016; Zhang and Acs 2018). This effect is explained as a combination of age-dependent opportunities and constraints.

As outlined in a recent review (Zhao et al. 2020), several mechanisms speak for a negative association between age and entry to entrepreneurship. These include declines in personal health (Gielnik et al. 2012), future perspective (Wennberg et al. 2010), and risk propensity (Josef et al. 2016). Conversely, factors such as increasing accumulation of human, social, financial, and emotional capital over the lifetime are argued to support a positive relationship between age and entry to entrepreneurship (Becker 1965; Cooper et al. 1994; Davidsson and Honig 2003).

The age-related changes in cognitive and physical resources for entrepreneurship have been divided into life stages (Cheraghi et al. 2019; Lévesque and Minniti 2006; Minola et al. 2016). Young adulthood is characterized by high individual freedom, low family responsibilities. and low risk aversity, which promote comparatively high levels of entrepreneurial activity. These characteristics gradually decline as more family commitment and obligations set in during middle adulthood, and decline further in late adulthood, when people increasingly face biological and sociological constraints (Cheraghi et al. 2019; Minola et al. 2016). Consistent with this theorizing and prior results, we hypothesize:

Hypothesis 1ab (baseline). *The age effects on entry to entrepreneurship present an inverted U-shape in that (a) the probability of entry into entrepreneurship increases during young adulthood and (b) after reaching the peak, the probability of entry to entrepreneurship decreases in later life.*

3.2. Mediating roles of risk-willingness and self-efficacy

The prior literature put forward a range of mechanisms based on a variety of theories to explain the inverted U-shape relationship. Nevertheless, based on lifespan theory, we emphasize two mechanisms with contrasting effects that are particularly powerful (Haans et al. 2015). Specifically, we use risk-willingness and self-efficacy as two opposing mechanisms to explain the inverted U-shape relationship between age and entry to entrepreneurship.

Fluid intelligence (e.g., speed and accuracy of information processing and dealing with complex ideas) is higher among young individuals, whereas crystallized intelligence (e.g., reading and writing skills, language comprehension, professional skills, and other life abilities) is higher among older individuals (Baltes 1993; Horn and Cattell 1967; Park et al. 1999). These developments in fluid and crystallized intelligence matter for how risk-willingness and self-efficacy mediate the age effect on entry to entrepreneurship.

In general, individuals are expected to choose employment opportunities—that is, choose employment or entrepreneurship—in ways that match their skills and intelligence. Prior lifespan research indicated that fluid intelligence is most appropriately matched with specialist employment opportunities, and crystalized intelligence with generalist employment opportunities (Zhao et al. 2020). Further, prior entrepreneurship research shows that individuals with a broad range of skills—often termed jack-of-all-trades (Åstebro and Thompson 2011; Lazear 2004)—are more likely to enter entrepreneurship because this type of skillset aligns well with entrepreneurship's generalist nature involving a broad range of task requirements (Sorgner and Fritsch 2018).

However, prior entrepreneurship research also showed that matching skills and intelligence with employment opportunities is not all that matters. Cognitions also play a major role (Grégoire et al. 2011)—even though choices based on cognition might not align with choices matching the intelligence types. Lifespan literature also acknowledged that cognitions and future-time perspective matter for life decisions (Baltes and Carstensen 1996; Carstensen et al. 1999; Lang and Carstensen 2002), including in entrepreneurship (Bohlmann et al. 2017). We argue that this occurs because age affects two essential cognitive factors in entrepreneurship: risk-willingness and self-efficacy.

First, although debated, it is generally accepted that people's risk-willingness decreases with age (Kautonen et al. 2014; Lévesque and Minniti 2006; Minola et al. 2016; Parker 2009). In early life stages, individuals have less wealth (Minola et al. 2014) and often no family constraints (Geldhof et al. 2014). However, as they age, family responsibility and financial dependence typically increase, leading to more dramatic anticipated consequences of failure (Minola et al. 2014). These perceptions reduce individuals' risk-willingness (Zhao et al. 2015). Correspondingly, a recent study of serial entrepreneurs found that failure loss increases with age, thereby decreasing re-venture speed (Lin and Wang 2019).

An additional age effect on risk-willingness is associated with perceptions of remaining lifetime. Perceptions of longer remaining life lead individuals to prioritize future-oriented goals; perceptions of shorter remaining life influence them to prioritize mainly present-oriented goals with instant outcomes that fulfill emotional satisfaction (Carstensen et al. 1999). Because entrepreneurial activity typically involves future-oriented goals, we may expect risk-willingness with regards to entrepreneurship to decline with age (Lévesque and Minniti 2006). For these reasons, we expect the relationship between age and entry to entrepreneurship to be mediated partly by age negatively affecting risk-willingness, as well as by risk-willingness promoting entry to entrepreneurship.

Second, older people are more likely to have self-efficacy. Compared to younger people, older individuals are less overconfident (Forbes 2005) but more skilled in evaluating and assessing their own strengths and weaknesses (Baron et al. 2016). Older adults also tend to have accumulated professional skills related to a broad range of tasks (Gielnik et al. 2018; Preisendörfer and Voss 1990; Unger et al. 2011). With such a broad skillset—"jack-of-all-skills"—and crystalized intelligence, they more likely will have entrepreneurial self-efficacy, believing they possess the skills and abilities to start a business. Accordingly, we also expect self-efficacy to take part in mediating the association between age and entry to entrepreneurship—more specifically, that age positively affects self-efficacy, and that self-efficacy positively affects entry to entrepreneurship.

Hypothesis 2ab. *The negative age effects on entry into entrepreneurship are mediated by (a) risk-willingness and (b) self-efficacy. Specifically, age negatively affects risk-willingness, and risk-willingness positively affects entry to entrepreneurship; age positively affects self-efficacy, and self-efficacy positively affects entry to entrepreneurship.*

3.3 Interaction effects of life expectancy

Individuals of the same age but living in two countries with different life expectancies will perceive their remaining lifetimes differently. Individuals in countries with higher life expectancy will perceive a longer remaining life than will those in countries with lower life expectancy. This implies that, to understand age effects, it is necessary to investigate them in combination with life expectancy (Baltes, 1993; Bohlmann et al. 2017).

3.3.1 Risk-willingness and life expectancy

Higher life expectancy often comes with more people achieving longer (higher) education. Due to their extended time as students (Mayer 2001), they enter the labor market at older ages in order to accumulate wealth through job positions that offer higher income. That wealth can be lost. Research has shown that higher life expectancy leads people to settle and establish families at an older age (Schoen and Standish 1995). Thereby, it takes longer before considerations of potential asset losses (e.g., savings), as well as potential social and psychological losses, from entrepreneurship failure start to take prominence (Minola et al. 2014). We argue that later family responsibilities and financial dependence postpone the point in time where risk-willingness starts to decrease. That is, individuals can risk starting a business for a longer period in their early ages of life. If they fail, they will not lose large savings or need to sell acquired property. Even more, they have more time left to recover any potential losses. Indeed, Brandtstädter and Rothermund (2003) showed that longer remaining lifetime reduces the negative effect of any perceived loss because there is more time for compensation.

With increasing life expectancy, individuals also may postpone the time when they increasingly start to prioritize present-oriented goals that fulfill emotional satisfaction and other instant outcomes (Carstensen et al. 1999). Prioritizing future-oriented goals for a longer time is likely to associate positively with higher risk-willingness related to entrepreneurship. Thus, in societies with high levels of life expectancy, risk-willingness will decrease at a slower pace—especially later in life—leading to a less steep negative relationship between age and risk-willingness.

Hypothesis 3a. *Life expectancy moderates the negative linear effect of age on risk-willingness. Specifically, the negative relationship between age and risk-willingness is less pronounced (less steep) with higher levels of life expectancy.*

3.3.2 Self-efficacy and life expectancy

As already discussed, higher life expectancy is affiliated with more people getting longer education and, due to student status (Mayer 2001), becoming involved in the labor market at an older age. In addition to consequences for risk-willingness, such developments also matter for self-efficacy.

Entering the labor market and gaining full-time work experience at a later stage imply a delay in individuals' accumulation of a wide range of professional skills (Gielnik et al. 2018; Preisendörfer and Voss 1990; Unger et al. 2011) and experience in mastering professional tasks (Baron et al. 2016). Along these lines, they take longer to develop crystalized intelligence, implying a delay also in the development of entrepreneurial self-efficacy.

Moreover, increased life expectancy associates positively with higher levels of heath at older ages. Better health conditions later in life change individuals' perceptions of when to be "old," boost their self-efficacy, and increase the importance of setting and pursuing personal goals (Freund et al. 2009). Such goals very well could involve entrepreneurship.

Accordingly, in societies with high levels of life expectancy, self-efficacy will develop later in life and be more highly boosted as age increase. We therefore expect life expectancy to enhance the positive association between age and self-efficacy.

Hypothesis 3b. *Life expectancy moderates the effect of age on self-efficacy. Specifically, the positive relationship between age and self-efficacy is more pronounced (steeper) with higher levels of life expectancy.*

Expecting a positive effect of life expectancy on both risk-willingness and self-efficacy at older ages, we conjecture that the negative association between age and entry to entrepreneurship will be less pronounced for higher levels of life expectancy. In general, lifespan theory anticipates that increases in life expectancy will extend any cognitive transformations that relate to perceptions of remaining lifetime (Lang and Carstensen 2002) caused by a delay in the decay of fluid intelligence (Kanfer and Ackerman 2004), such as improved health conditions associated with improved longevity. Hypothesis 4 expresses the expectation that any such age-related decays in the myriad of cognitions that affect individuals' motivation for entrepreneurship (Zhao et al. 2020) will weaken the negative association between age and entry to entrepreneurship as such cognitions become more equally distributed across age.

Hypothesis 4. *Life expectancy positively moderates the association between age and entry to entrepreneurship. Specifically, higher levels of life expectancy dampen the negative association between age and entry to entrepreneurship.*

Fig. 1 graphically shows the complete theoretical model; that is, it illustrates how age affects entry to entrepreneurship through risk-willingness and self-efficacy and how societal-level life expectancy moderates this mediation.

Insert Fig. 1

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4 Research Design Data and Method

4.1 Data

A unique dataset was created by merging individual-level data from the GEM's Adult Population Survey (APS) with macro-level data from the World Health Organization and World Bank. Merging GEM data with other datasets expands the diversity of research questions that are answerable (Álvarez et al. 2014; Levie et al. 2014). The individual-level GEM survey data were gathered in many countries. By using the same screening protocol across countries and randomized sampling, the APS data are appropriate for cross-country comparison of entrepreneurial activities. In addition, random sampling made it representative of the adult population in each country (Levie et al. 2014). The unique dataset used in our study included a sample of 380,858 adults between the ages of 18 and 64 years in 34 OECD countries. To maximize the number of participating countries, data from 2009 to 2014 were included. Table 1 shows the descriptive macro-level statistics for each country taken from the World Health Organization and World Bank data.

Insert Table 1 about here

4.2 Measures

4.2.1 Dependent variable

Following prior research (Boudreaux et al. 2019; Klyver et al. 2013), we used the condition of whether individuals were "opportunity-driven nascent entrepreneurs" to operationalize our construct, entry to entrepreneurship. Because we are theorizing age effects from a motivational perspective and are interested in the choice to move into entry entrepreneurship, we eliminated entries that were necessity driven (Klyver et al. 2013). The GEM identifies nascent entrepreneurs as those who, at the time of the survey, were actively involved in a start-up effort, owned part or all of the business, and had received wages from that business for less than 3 months. Among nascent entrepreneurs, those who engaged for reasons such as to take advantage of a business opportunity, gain greater independence, or increase personal income were perceived as opportunity driven, in contrast to necessity driven (Bosma et al. 2017). Those not engaged in nascent entrepreneurship or engaged in necessity-driven entrepreneurship were coded 0, whereas those engaged in opportunity-driven nascent entrepreneurship were coded 1.

4.2.2 Independent variables

We used the chronological *age* of respondents in the GEM dataset as the independent variable. *Age* (from 18 to 64) and *squared-age* are used as continuous variables (both centered; Lévesque and Minniti 2006). As our societal-level independent variable, we used *life expectancy at 60*—that is, the average remaining years that a person who is currently 60 years old can expect to live. After survival of the childhood years, this statistic normally is considered a good indicator of adult survival (Maier and Vaupel 2003). Especially because our sample consists of individuals older than 18 years, the life expectancy at 60 is more relevant than is the general life expectancy. People in our sample had already survived the minimum first 18 years, and the mortality rates of those younger are irrelevant to their future decisions. Accordingly, individuals' knowledge of the age of death of their family members, friends, and co-workers shapes their perceptions about their length of life. "On the aggregate level, subjective life expectancy corresponds to actuarial estimates, although with optimistic and pessimistic bias in some quarters" (Mirowsky 1997, 126). Therefore, *life expectancy at 60* is the most appropriate measure for our theorizing and hypotheses. From the GEM dataset, we used the questionnaire item, "Do you have the knowledge, skills, and experience required to start a new business? (1 = yes, 0 = No)" as an indicator of *self-efficacy* (Wennberg et al. 2013). Finally, also from the GEM dataset, we used the reverse-coded questionnaire item, “Would fear of failure prevent you from starting a business (1 = No, 0 = Yes),” as an indicator of *risk-willingness*.

4.2.3 Control variables

We controlled for several confounding factors at the individual level. First, we controlled for *gender* (coded 0 for man and 1 for woman) because previous studies showed a lower level of entrepreneurial activity among women (e.g., Cheraghi et al. 2019). Second, we controlled for *education*, which is measured as a continuous variable in years of education (Unger et al. 2011). We also controlled for *household incom*e (coded 1 for low, 2 for middle, and 3 for high) because previous studies showed a positive association between financial capital and entry to entrepreneurship (Klyver and Schenkel 2013). Finally, we controlled for *current occupation* status, which, according to previous studies, affects individuals’ decisions to enter entrepreneurship (Arenius and Minniti 2005). Current occupation is measured as seven dummy variables: full- or part-time, part-time only, retired or disabled, homemaker, student, not working or other, and self-employed. *Self-employed* was selected as the reference group.

We also controlled for several confounding factors at the country level: fertility rate, unemployment rate, gross domestic product (GDP) per capita, GDP growth, and average retirement age. All variables are selected from the World Bank data for the years 2009 to 2014 for each country, except average retirement age data, which were available only for the year 2016. Evidence suggested that changes in GDP per capita, GDP growth, and fertility rates are related to improved life expectancy (Cervellati and Sunde 2011) and may be alternative explanations for entry to entrepreneurship. We also controlled for the unemployment rate and average retirement age. *Average retirement age* is the mean of six variables (α = .91): “What is the age at which a [man/women] can retire and receive full benefits?” “What is the age at which a [man/women] can retire and receive partial benefits?” and “What is the mandatory retirement age for [men/women]?” All institutional-level variables are standardized.

4.3 Analytical technique

The data contain a hierarchical structure with individual-level variables nested within country-year combinations (country-level data vary over the years of the survey). To accommodate this multilevel structure and to deal with moderated parallel mediation with dichotomous mediators and a dichotomous dependent variable, we employed path analytical methods (Preacher et al. 2010), supported by Mplus 8.4 software (Muthén and Muthén, 2017). Regressions were conducted using multilevel structural equation modeling with Bayes estimation. Variable variances here are decomposed into their latent within-group and between-group components, avoiding potential problems of conflating within- and between-level effects (Preacher et al. 2010). Bayes estimation is recommended for estimating two-level models with random slopes for observed categorical variables (Muthén and Asparouhov 2012). To estimate the hypothesized models, we entered individual-level and country–year-level control variables as fixed effects. Age effects were modelled as random slopes. Following Raudenbush and Bryk (2002), age was therefore centered to the group means of the country–year clusters. Hypotheses 1ab and 2ab were proposed at the individual level (Level 1) but with controls at the country level (Level 2). Hypotheses 3 and 4ab were proposed as cross-level moderation and cross-level moderated mediation effects. Mediation (indirect effects) in Hypotheses 2ab and cross-level moderated mediation (conditional indirect effects) in Hypotheses 3ab were estimated using the Monte Carlo method to generate 95% bootstrapping confidence intervals, which is the recommended method for estimating lower-level mediation in multilevel models (Bauer et al 2006; Preacher and Selig 2012).

5 Results

5.1 Descriptive analysis

Tables 2 and 3 show descriptive statistics of dependent, independent, and control variables, with correlations in Table 2 and the mean, standard deviation, minimum, and maximum for each variable in Table 3. The highest correlation in the data was between *life expectancy* and *GDP per capita* (r = 0.57), indicating multicollinearity was not a serious threat to the results. To check further for the threat of multicollinearity, value inflation factors (VIFs) were calculated for each effect for all models using ordinary least squares. The VIFs were between 1.05 and 2.71, which were well below the maximum acceptable level threshold of 10.00 (Kutner et al. 2004).

Insert Table 2 about here

Insert Table 3 about here

5.2 Empirical analysis and findings

Results from the multilevel logistic regression are shown in Table 4. First, in Model 1 we tested the inverted U-shape effect of age on entry to (opportunity-driven) entrepreneurship. Then, in

Models 2 and 3 respectively, we added the age and age-squared interaction effects with *life expectancy* to test how age effects depend on life expectancy. These models, together with the supplemented test reported in Fig. 2 and Fig. 3, test the theoretical model already suggested and operationalized in the proposed hypotheses.

Hypothesis 1 stated the baseline hypothesis of an inverted U-shape relationship between age and entry to (opportunity-driven) entrepreneurship. In Model 1 (Table 4), the age and age-square coefficients represent the respective random-slope means across the clusters. The significant coefficients for age (b = -0.0117, p < .001) and age-square (b = - 0.0005, p < .001) support Hypothesis 1.

Insert Table 4 about here

In Hypothesis 2a, we expected a negative relationship between age and risk-willingness, implying that risk-willingness negatively mediates the relationship between age and entry to entrepreneurship (age→risk-willingness→entry). Fig. 2 indicates a positive association between age and risk-willingness (b = .0021, p = .001) and between risk-willingness and entry (b = .106, p < *.001*). This result is counter to our Hypothesis 2b that risk-willingness would tend to decline with age. Furthermore, the significant positive coefficient for age-square (b =.0005, p < .001) suggests a convex relationship in which risk-willingness increases slightly and progresses with age. Thus, contrary to our initial expectations, this implies that risk-willingness mediates a positive path between age and entry to entrepreneurship.

Hypothesis 2b stated a positive association between age and self-efficacy, suggesting that self-efficacy positively mediates the relationship between age and entry to entrepreneurship (age→self-efficacy→entry). The positive significant effects between age and self-efficacy (b =.0032, p = .001) and between self-efficacy and entry (b = .405, p < .001) reported in Fig. 2 support Hypothesis 2a. Moreover, the negative coefficient for age-square (b = -.0005, p < .001) suggests a concave relationship where self-efficacy increases with declining speed as individuals go through life.

Insert Fig. 2 about here

Hypothesis 3a stated that life expectancy at 60 moderates the association between age and risk-willingness, and Fig. 3 shows that positive moderation (*b* = .0016, *p* = .004). This finding corroborates Hypothesis 3a, although we initially expected a negative association between age and risk-willingness. As life expectancy at 60 increases, risk-willingness mediates a more positive association between age and entry to entrepreneurship.

Insert Fig. 3 about here

In Hypothesis 3b, we stated that life expectancy at 60 positively moderates the association between age and self-efficacy. In support of Hypothesis 3a, results illustrated in Fig. 3 show the moderation is positive and significant (*b* = .0023, *p* < .001*)*. Thus, the effect of age on self-efficacy increases with higher levels of life expectancy, thereby increasing the positive impact on entry to entrepreneurship mediated by self-efficacy.

Overall, the finding in Fig. 3 presents an overall negative main effect of age on entry to entrepreneurship. This negative effect is dampened by the indirect paths through which age increases individuals' risk-willingness and self-efficacy, thereby increasing their propensity to enter entrepreneurship. This dampening of the overall negative main effect increases with higher levels of life expectancy.

In Hypothesis 4, we proposed an overall positive moderation from life expectancy at 60 on the relationships between age and entry to entrepreneurship. Model 3 in Table 4 shows that—when not considering indirect effects—there is a marginally significant positive moderating effect of life expectancy on the relationship between age and entry (*b* = .0016, *p* = .070) and a negative but insignificant effect on the relationship between age-square and entry (*b* = -.0006, *p* = .23). Generally, a positive moderation of the linear age effect and a negative moderation of the squared-age effect would signify that increasing life expectancy at 60 would shift the peak of the entry curve to the right. Although interpreted with some caution relative to the low significance level, this result is well consistent with the general assumptions in lifespan theory that increasing life expectancy delays significant transitions over individuals' life course, with impacts on their cognitive development. Simultaneously considering direct and indirect paths in Fig. 3 provides a more nuanced picture of this relationship—increasing levels of life expectancy at 60 fortify the positive association between age and entry through both of the two indirect paths. At the same time, there is no significant moderation of the direct path, which in turn indicates a mediated moderation effect.

6 Discussion and Conclusion

6.1 Summary and interpretation of results

In this study, we used lifespan theory to investigate the separate and combined effects of individuals' age and societal life expectancy on entry into entrepreneurship. Lifespan theory states that people's cognitions change over their lifetimes, and the timing and the effects of such changes are embedded in institutional structures (Baltes 1993; Park et al. 1999). From this perspective, we examined the influence of life expectancy on individuals' cognitions in terms of risk-willingness and self-efficacy with consequences for their propensities to enter entrepreneurship at different ages.

At first, our results replicated previous findings of an inverted U-shape effect of age on entry to entrepreneurship, with the peak occurring in the prime age period (Kautonen et al. 2014; Lévesque and Minniti 2006; Minola et al. 2016; Parker 2009). We initially theorized that this inverted U-shape relationship was formed by two opposing age-related cognitive mechanisms—risk-willingness and self-efficacy—with both mechanisms promoting entrepreneurship, but risk-willingness decreasing and self-efficacy increasing with age. This result confirmed the expected positive path from age to self-efficacy and, further, from self-efficacy to entrepreneurship. However, although risk-willingness associated positively with entrepreneurship, counter to our expectations, we found that it also increased with age. Thus, like the effect of self-efficacy, risk-willingness mediated a positive path between age and entrepreneurship.

Seemingly, factors other than the absence of binding responsibilities, the longer remaining lifetime, and the wild spirit of youth exert important influences on the development of risk-willingness over a lifespan. It is possible that as individuals mature and acquire more life experiences, they become more comfortable dealing with riskier career-related decisions. Along these lines, previous studies have shown a positive relationship between self-efficacy and risk-taking (Krueger and Dickson 1994). In our study, we also found a positive although modest correlation (r = .15, p < .000).

A key finding in this study is that individuals' entry to entrepreneurship depends not only on the inherent effects of age, but also on (and in combination with) life expectancy. Specifically, life expectancy affects the relationship between age and cognitive antecedents to entrepreneurship. In our example, both risk-willingness and self-efficacy increase more steeply with age as life expectancy at 60 increases. It thereby injects a dampening on the otherwise overall negative association between age and entry to entrepreneurship. In line with arguments from lifespan theory, we interpret this as a combination of a delay in individuals' self-efficacy development, their willingness to take risks in the entrepreneurship domain, and a delay in the process by which these cognitions may start to decline at older ages (Baltes 1993; Brandtstädter and Rothermund 2003; Mirowsky 1997).

6.2 Contributions

Our study makes important contributions to research on age and entrepreneurship. First, we replicate the age effects on entry to entrepreneurship by using the psychology of aging and lifespan theory. Even though expansion of life expectancy is an important issue in the economy of countries, there has been a lack of studies about the interplay between age and remaining lifetime (Bohlmann et al. 2017). By separating age from remaining lifetime, and by conceptualizing age effects in relation to the future-time perspective, we contribute to understanding age effects in entrepreneurship. Essentially, this extension using life expectancy provides a more sophisticated way to theorize about how age affects individuals.

Second, we contribute an understanding of the societal embeddedness of age differences, which supplements previous studies that considered age as an inherent and universal effect. For instance, in Lévesque and Minniti's (2006) and Kautonen et al.'s (2014) studies, age differences in entrepreneurial activity were shown in terms of an overall pattern and separated from contextual characteristics. These contrast to Minola et al.'s (2016) study, which showed the effect of age on entrepreneurial motivation in the context of culture—specifically, that cultural characteristics moderate the age effects on individuals' motivation in terms of feasibility and desire. Following Minola et al., we extend the societal-dependent perspective on age, showing changes in the universal effect of age when considered in combination with institutional and societal characteristics; in our case, life expectancy. We find that the age-related effects on individuals' cognitions in terms of risk-willingness and self-efficacy associate with individuals' entry into entrepreneurship but do not fully explain the inverted U-shape effect. Especially, these mechanisms did not provide an explanation for why entry to entrepreneurship later in the lifespan relates negatively with age.

Altogether, the results contribute to lifespan theory by testing the embeddedness of aging in sociocultural conditions, as identified in earlier studies (Baltes 1993; Gould 1999; Park et al. 1999). Age-related losses are moderated by life expectancy because they affect individuals' cognitions as a consequence of socialization. As Baltes (1993, p. 580) noted, "The biology of aging sets major limits to what our minds can achieve as we reach the last third of life". However, by enriching the compensatory power of the mind's "software" as a consequence of sociocultural conditioning, "it is possible to have a larger vision that includes the possibility of outwitting the biological limitation and deficits" (592).

The GDP and life expectancy are relatively highly correlated because high GDP allows countries to invest in health, education, and safety, which increase life expectancy over time. However, GDP and life expectancy also are significantly distinct constructs due to a time lag in the GDP effect on life expectancy. That is, GDP is a measure of economic development at a current point in time, whereas life expectancy is the result of decades of economic development and investment in health and education. However, it is a limitation that the life expectancy effect has some common variance with GDP.

6.3 Implications

Several implications for research and policy can be taken from this study, which emphasizes the importance of the embeddedness of age effects within contextual factors. We investigated the embeddedness in life expectancy, as Minola et al. (2016) investigated cultural embeddedness. However, future research should investigate the many other relevant institutional characteristics. One especially interesting characteristic is gender equality, which supposedly influences both the fertility rate (Zhang and Zhang 2005) and life-stage decisions (Cheraghi et al. 2019).

From a policy perspective, this study substantiates the idea of delay and reduction in age-related losses as a buffering effect of life expectancy among individuals in later ages in developed countries. Researchers have recognized this with comments such as, “Old age is still young” (Baltes 1993, p. 592) or “Fifty is a new thirty” (Kautonen and Minniti 2014, p. 1161). This finding should direct policy makers’ efforts toward enhancing “active aging” by encouraging individuals in later ages to participate in entrepreneurial activity. Benefiting more from the accumulated knowledge and resources of a healthy population in older age may be possible by relieving the constraints that seem associated with negative attitudes toward entrepreneurial activity, such as age norms (e.g., Kautonen 2012; Kautonen et al. 2009; Kibler et al. 2015).

Another important policy concern is the general loss of entrepreneurship activity associated with increasing life expectancy that may occur in younger ages. As mentioned, this loss may be related to higher education levels and higher resource demands to start a business. More risk-averse behavior and longer time to develop self-efficacy may relate to the prolonged time it takes get an education, establish a career, and form a family. Another factor is associated with individuals’ accumulation of wealth for their pensions. In some countries, such as the Nordic countries, pension schemes have been highly institutionalized in tax-funded government programs. In other countries, private pensions companies and individuals’ abilities to accumulate wealth from lifelong savings play a major role in securing retirements. Higher life expectancy increases the tax burdens from the former type of pension system and may tempt policy makers to push for development toward the latter system. Alternately, policy makers may be tempted to push for a higher mandatory retirement age. So far, we know little of how such institutional changes may affect individuals' perceptions of the relative risks and benefits from different career paths. Nonetheless, this study's finding that increasing life expectancy seems to shift the peak for entrepreneurial entry toward a higher age and to dampen the overall negative association between age and entrepreneurship speaks of a higher potential for entrepreneurship at older ages.

6.4 Limitations

Despite the strengths of our study, it also has several limitations that point to new avenues for future research. First, we relied on cross-sectional individual-level data. Essentially, this implies that we cannot eliminate the possibility that part of the variance in risk-willingness and self-efficacy caused by age could be attributed to age-cohort or age-period effects (Aldrich 1999). Second, we conducted our study in OECD countries. Importantly, the causes of increased life expectancy and associated demographic changes vary significantly among countries, particularly with respect to each country's stage of economic development (Cervellati and Sunde 2011; Husain 2002; Zhang and Zhang 2005). To a great extent, increased life expectancy in developing countries has arisen through decreased infant mortality. This created populations skewed toward the young and gave rise to associated policy challenges to deal with issues of resource shortages for young prospective entrepreneurs. This is opposite of the dilemmas in many OECD countries, where increasing life expectancy has skewed their populations toward the elderly and led to policy attempts to persuade "active aging" and "old-age entrepreneurship" by delaying retirement. Future research should look carefully into the mechanisms of life expectancy in developing countries.

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Table 1 ***OECD Countries: Observations and Societal Characteristics***

	Country	*N*	Adult population engaged in nascent entrepreneurship (%)	Fertility rate (*M*)	Unemployment rate (*M*)	GDP growth (*M*)	GDP per capita (*M*)	Retirement age (years) (*M*)	Life expectancy at 60 (remaining years) (*M*)
1	United States	29,378	4.70	1.90	8.39	1.17	50,500	64	23.3
2	Greece	12,000	2.48	1.38	19.56	-4.79	24,709	62	23.7
3	Netherlands	18,771	2.90	1.74	5.09	-.18	51,414	67	23.7
4	Belgium	13,856	1.78	1.80	7.95	.18	45,765	65	23.7
5	France	14,050	2.19	2.01	9.67	.32	41,848	66	25.2
6	Spain	144,276	1.77	1.32	22.54	-1.28	30,463	64	25.0
7	Hungary	12,005	3.64	1.30	10.16	-.02	13,403	65	19.7
8	Italy	12,052	1.65	1.42	9.95	-1.76	35,765	66	24.8
9	Switzerland	12,458	2.42	1.51	4.29	1.25	81,046	65	25.2
10	Austria	9,169	5.04	1.44	4.65	.55	49,736	65	24.0
11	United Kingdom	50,027	1.87	1.87	7.68	-1.70	39,047	67	23.8
12	Denmark	10,209	2.35	1.77	7.04	-.23	59,246	67	22.9
13	Sweden	13,107	2.88	1.91	8.12	2.38	57,694	64	24.2
14	Norway	12,032	3.10	1.87	3.36	.97	94,986	64	24.1
15	Poland	8,004	3.17	1.31	9.82	2.77	13,786	65	21.4
16	Germany	30,451	2.61	1.37	6.15	.48	44,268	65	23.4
17	Mexico	13,020	6.37	2.29	5.03	3.31	9,778	65	22.0
18	Chile	34,725	8.75	1.79	7.29	3.73	13,853	62	23.0
19	Australia	6,177	3.93	1.90	5.44	2.30	58,780	67	25.1
20	Japan	11,626	1.73	1.40	4.39	.50	41,732	62	25.8
21	Korea	10,002	1.64	1.22	3.40	3.21	23,019	57	24.2

22	Turkey	44,490	4.29	2.09	9.00	4.49	10,690	59	20.7
23	Canada	5,765	5.45	1.61	7.01	2.32	51,371	60	25.2
24	Portugal	10,022	3.23	1.28	13.95	-.83	22,012	66	23.9
25	Luxembourg	4,079	4.51	1.55	6.00	4.20	115,194	65	24.6
26	Ireland	10,004	3.11	2.00	13.58	1.95	51,240	68	23.7
27	Iceland	4,006	5.89	2.21	7.39	-4.13	40,990	67	24.1
28	Finland	12,069	2.25	1.80	8.11	-.93	48,501	63	23.8
29	Latvia	10,004	4.97	1.42	15.76	-.98	13,219	65	29.7
30	Estonia	6,365	5.55	1.53	8.73	3.20	18,998	61	21.6
31	Slovenia	14,067	2.12	1.55	8.04	-1.42	23,817	65	23.0
32	Czech Republic	7,014	4.81	1.45	6.91	.18	20,340	64	21.4
33	Slovakia	8,007	4.83	1.36	13.72	2.07	17,989	61	20.5
34	Israel	8,126	2.72	3.01	6.82	3.23	31,891	63	24.5

Note. *N* = number of observations in sample; % = percent; *M* = mean; GDP = gross domestic product.

Table 2 ***Descriptive Statistics: Correlations of Dependent, Independent, and Control Variables***

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	17	18	19
1. Entry into entrepreneurship																		
2. Age 18 to 64 years	-.06**																	
3. Self-efficacy	.15**	.01**																
4. Risk-willingness	.08**	.01**	.15**															
5. Gender (female)	-.06**	.02**	-.16**	-.09**														
6. Education (years)	.06**	-.12**	.10**	.02**	-.01**													
7. Household income	.05**	-.02**	.12**	.05**	-.10**	.29**												
8. Occupation (full-time)	-.02**	-.06**	-.00	-.03**	-.16**	.18**	.23**											
9. Occupation (part-time)	-.02**	-.04**	-.07**	-.03**	.16**	.02**	-.04**	-.32**										
10. Occupation (retired)	-.05**	.36**	-.06**	.02**	-.01**	-.12**	-.14**	-.29**	-.11**									
11. Occupation (homemaker)	-.04**	.06**	-.09**	-.03**	.26**	-.16**	-.08**	-.26**	-.09**	-.09**								
12. Occupation (student)	-.02**	-.33**	-.07**	.02**	-.00	.01**	-.04**	-.21**	-.08**	-.07**	-.06**							
13. Occupation (no work)	-.02**	-.07**	.00	-.04**	.00**	-.08**	-.17**	-.31**	-.11**	-.10**	-.09**	-.07**						
14. Occupation (self-employed)	.15**	.05**	.24**	.10**	-.11**	.01**	.06**	-.36**	-.13**	-.12**	-.10**	-.09**	-.12**					
15. Life expectancy at 60																		
16. Fertility rate														.11				
17. Unemployment rate														-.17*	-.28**			
18. GDP growth														-.07	.23**	-.27**		
19. GPD per capita														.57**	.14	-.39**	.01	
20. Average retirement age														.07	.09	.04	-.24**	.27**

Note. GDP = gross domestic product.

*Correlations significant at the 0.05 level (two-tailed); **Correlations significant at the 0.01 level.

Table 3 ***Descriptive Statistics: Variable Means, Standard Deviations, Minimums, and Maximums***

Variable	***M***	***SD***	**Min**	**Max**
1. Entry into entrepreneurial activity	.0386	.1926	0	1
2. Age 18 to 64 years	41.9017	12.6145	18	64
3. Self-efficacy	.48	.496	0	1
4. Risk-willingness	.56	.500	0	1
5. Life expectancy at 60	23.3822	1.5898	19.3	26.1
6. Fertility rate	1.6863	.3560	1.1490	3.050
7. Unemployment rate	8.9754	4.8801	3.100	27.200
8. GDP growth	.7924	3.3283	-14.3489	9.1570
9. GPD per capita	38,881.906	22,564.348	8,861.494	116,612.884
10. Average retirement age	64.1595	2.2854	57.5000	68.00
11. Gender (female)	.4891	.4999	0	1
12. Education (years)	12.0872	4.2333	1	19
13. Household income	2.1472	.8115	1	3
14. Occupation (full-time)	.4700	.4991	0	1
15. Occupation (part-time)	.1040	.3053	0	1
16. Occupation (retired)	.0865	.2811	0	1
17. Occupation (homemaker)	.0705	.2560	0	1
18. Occupation (student)	.0488	.2155	0	1
19. Occupation (no work)	.0959	.2945	0	1
20. Occupation (self-employed)	.1242	.3300	0	1

Note. *M* = mean; *SD* = standard deviation; Min = minimum; Max = maximum.

Table 4 ***Two-Level Probit Regression Predicting Opportunity-Based Entry to Entrepreneurship***

Variable	**Coefficient (*SD*)**		
	Model 1	**Model 2**	**Model 3**
Age 18 to 64 (centered)	-.0117*** (.000)	-.0117*** (.001)	-.0117** (.001)
Age-squared	-.0005*** (.000)	-.0004*** (.000)	-.0005*** (.000)
Age * Life expectancy		.0013+ (.001)	.0016+ (.001)
Age-squared * Life expectancy			-.0006 (.000)
Life expectancy	-.073*** (.021)	-.081*** (.024)	-.075*** (.024)
Fertility rate	.050* (.020)	.049** (.020)	.052** (.020)
Unemployment rate	-.074* (.035)	-.064* (.033)	-.070* (.033)
GDP growth	.016 (.020)	.014 (.020)	.014 (.020)
GPD per capita	-.014 (.024)	-.015 (.023)	-.015 (.023)
Average retirement age	.013 (.021)	.014 (.020)	.014 (.021)
Gender (female)	-.219*** (.009)	-.218*** (.008)	-.221*** (.008)
Education (years)	.031*** (.001)	.032*** (.001)	.031*** (.001)
Household income	.074*** (.006)	.080*** (.005)	.071*** (.005)
Occupation (full-time)	-.648*** (.009)	-.645*** (.012)	-.650*** (.011)
Occupation (part-time)	-.622*** (.017)	-.623*** (.016)	-.621*** 015)
Occupation (retired)	-.914*** (.026)	-.908*** (.021)	-.920*** (.024)
Occupation (homemaker)	-.816*** (.022)	-.801*** (.025)	-.812*** (.026)
Occupation (student)	-.917*** (.026)	-.906*** (.025)	-.917*** (.025)
Occupation (no work)	-.566*** (.015)	-.565*** (.013)	-.577*** (.016)
Occupation (self-employed)	Ref	Ref	Ref
Constant (Thresholds Age)	1.755*** (.025)	1.782*** (.027)	1.735*** (.028)
Number of observations	380,858	380,858	380,858
Number of groups	162	162	162
R^2 within level	.148**	.144***	.147***
R^2 between level	.132**	.120***	.130***

Note: GDP = gross domestic product; Ref = reference group.

+p < 0.10; *p < .05; **p < .01; ***p < .001.

Figures

Fig. 1 ***Theoretical Model***

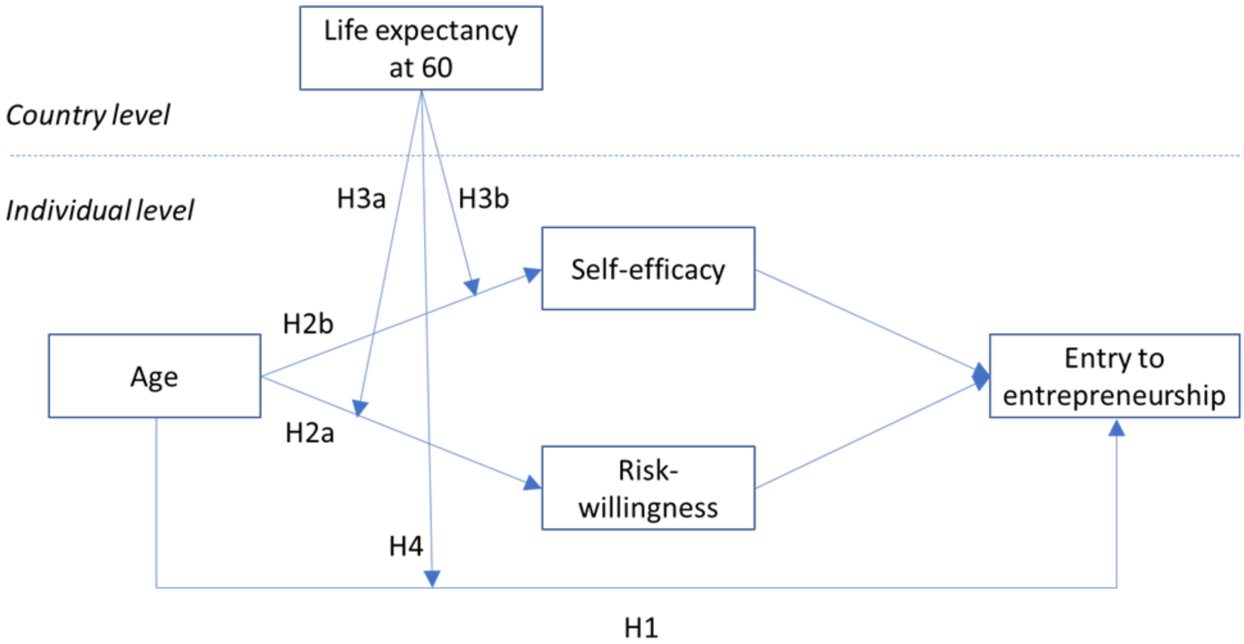
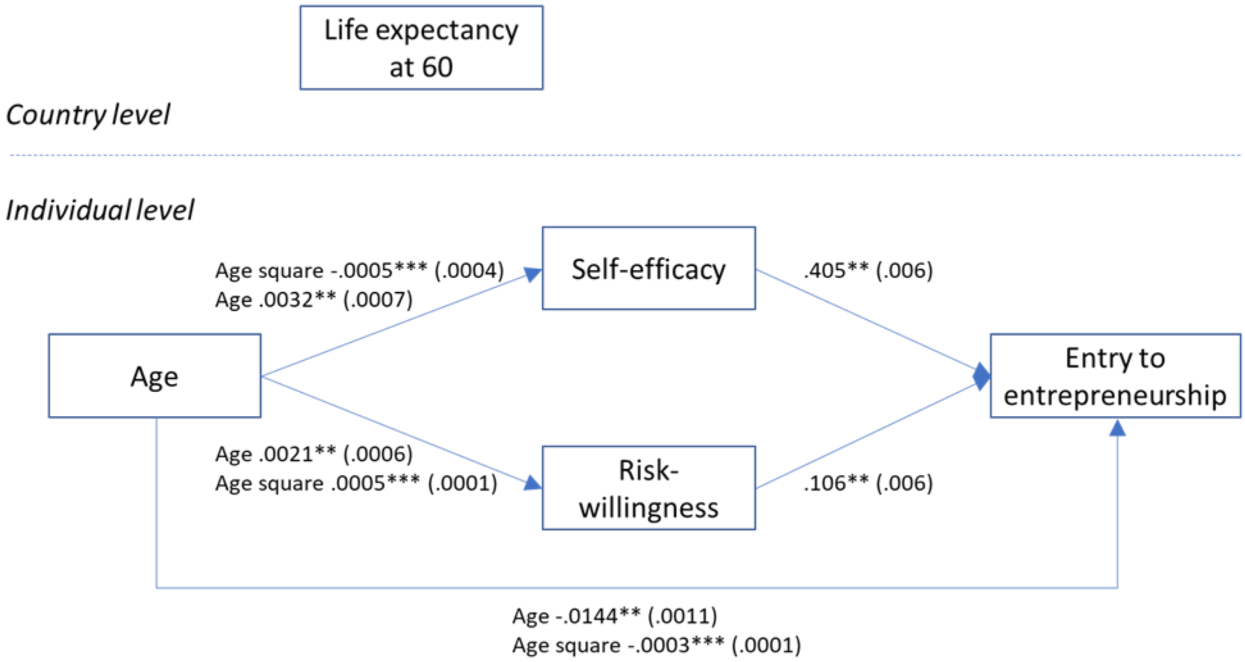
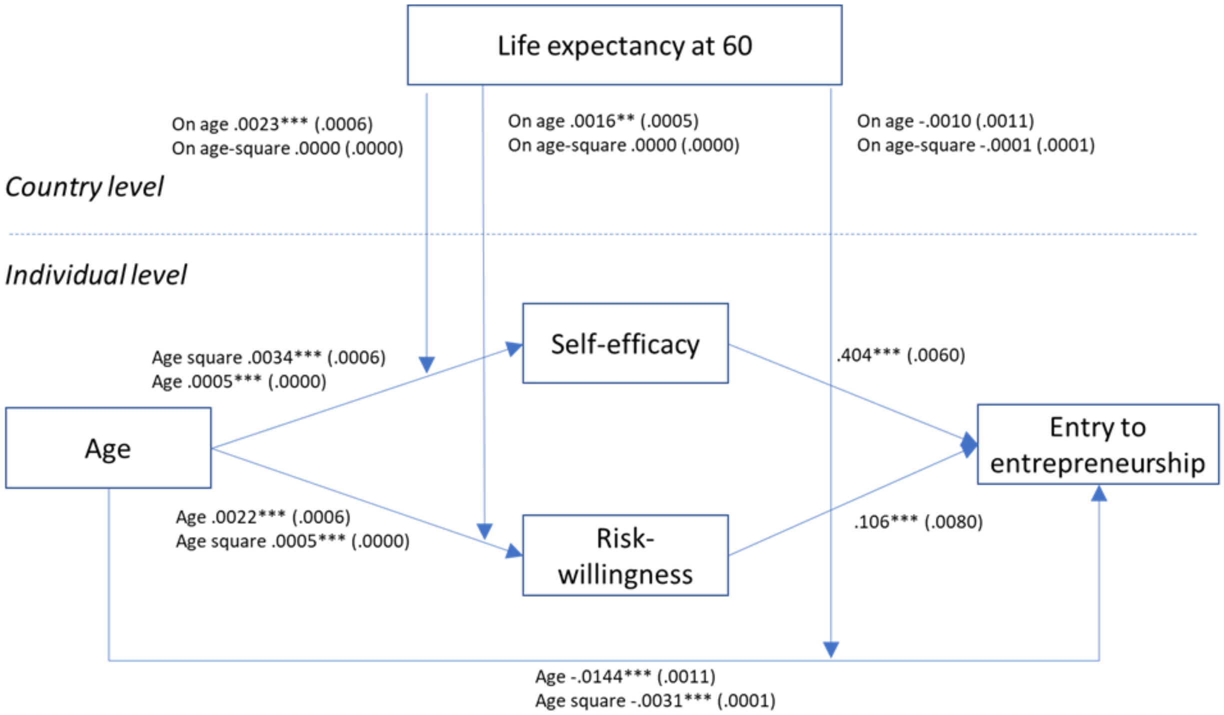


Fig. 2 ***Level 1 Mediation***



Note: Coefficient (posterior standard deviation), significance level: +p < 0.10; *p < .05; **p < .01; ***p < .001.

Fig. 3 ***Cross-Level Moderated Mediation***



Note: Coefficient (posterior standard deviation), significance level: +p < 0.10; *p < .05; **p < .01; ***p < .001.