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Financial Risk Tolerance among Entrepreneurial Households

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Abstract

Entrepreneurs have traditionally been depicted as individuals with a heightened propensity for risk-taking compared to the general population. However, recent scholarly work, including this study, challenges the notion of entrepreneurs as inherently more risk tolerant. By examining financial risk tolerance among entrepreneurial households, we uncover a complex interplay between individual characteristics, contextual influences, and decision-making processes that shape risk attitudes.

The study focuses on households, with a specific emphasis on their entrepreneurial tendencies, and includes comparisons with business and “financial” entrepreneurs. Additionally, we examine whether these behaviors are time-varying by looking at the impact of market volatility on risk tolerance and stock allocation across household types.

Our research uses data collected as part of the Survey of Consumer Finances (SCF), which includes several information on the financial behavior and situation of US households.

The dataset combines the triennial datasets starting from 2007 until 2022 for a total sample size of 33,534 observations.

We empirically test several hypotheses postulated based on the literature that addresses the topic. We analyze financial risk tolerance of business entrepreneurs vis-a-vis other investors. To proxy financial risk tolerance, we use a proxy variable measured using the responses to a specific question from the Survey of Consumer Finances (SCF). We use data from multiple years and control for several demographic variables.

Our findings reveal that business entrepreneurs, compared to dedicated investors, exhibit lower stock market participation and generally demonstrate a reluctance to take financial risks, except in scenarios involving extreme risks or when volatility is high in general. This higher risk aversion could be linked to factors such as lower education, opportunity costs and access to privileged information.

Resumo

Os empreendedores têm sido tradicionalmente retratados como indivíduos com uma maior propensão para assumir riscos em comparação com a população em geral. No entanto, estudos acadêmicos recentes, incluindo esta dissertação, desafiam a noção de que os empreendedores são inerentemente mais tolerantes ao risco. Ao examinar a tolerância ao risco financeiro dos agregados familiares empreendedores, revelamos uma complexa interação entre características individuais, condições de contexto e processos de tomada de decisão que parecem moldar as suas atitudes em relação ao risco.

O nosso estudo foca-se em agregados familiares, com especial ênfase nas suas tendências empreendedoras, e compara empreendedores (de negócios) com outros investidores (empreendedores “financeiros”). Adicionalmente, testamos se a tolerância ao risco financeiro varia ao longo do tempo, examinando o impacto da volatilidade do mercado na alocação dos portfólios a ações dos diferentes agregados familiares.

A dissertação utiliza dados recolhidos do Survey of Consumer Finances (SCF), que reúne múltiplas informações sobre o comportamento financeiro e a situação dos agregados familiares nos EUA. O conjunto de dados utilizado neste artigo combina dados de vários inquéritos trienais, recolhidos entre 2007 e 2022, numa amostra de 33.534 observações.

Testamos empiricamente várias hipóteses postuladas com base na literatura sobre o tema em análise. A tolerância ao risco financeiro é a variável de interesse da nossa pesquisa, que medimos com base nas respostas a uma pergunta específica do Survey of Consumer Finances (SCF). Utilizamos os dados de vários anos e controlamos os efeitos das variáveis demográficas. Os nossos resultados revelam que os empreendedores (de negócios), em comparação com investidores dedicados, apresentam uma menor participação no mercado de ações e, de forma geral, demonstram uma relutância em assumir riscos financeiros, exceto em cenários que envolvem riscos extremos ou quando a volatilidade é alta. Esta maior aversão ao risco poderá resultar ou ser agravada por fatores como o menor nível de educação, custos de oportunidade e o acesso a informação privilegiada.

Keywords

Financial Risk Tolerance, Entrepreneur, Personal Finance, Household Finance, Risk Aversion, Risk Perception, Risk Profile, Volatility, Decision Domains

Palavras-Chave

Tolerância ao Risco Financeiro, Empreendedor, Finanças Pessoais, Finanças Familiares, Aversão ao Risco, Percepção do Risco, Perfil de Risco, Volatilidade, Domínios de Decisão

Acronymns

FRT – Financial Risk Tolerance

ARA – Absolute Risk Aversion

RRA – Relative Risk Aversion

SCF – Survey of Consumer Finances

OR – Odds Ratio

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1. Introduction

Entrepreneurs play a central role in driving economic growth and innovation. Understanding how they approach financial risks in their personal lives is crucial because their decisions can have wide-reaching implications, not only for their households but also for the broader economy. Entrepreneurs are often perceived as natural risk-takers, primarily due to the uncertainties involved in starting and managing businesses. However, little is known about how this risk tolerance in a professional (business) setting extends to personal financial decisions, and how it compares to other groups.

Entrepreneurs are often celebrated for their innovation, risk-taking, and ability to organize resources for profitable ventures—a notion that can be traced back to early economists like Cantillon and Say, who emphasized the inherent link between entrepreneurship and financial risk-taking (Hebert and Link, 1988).

There is currently a significant gap in the existing research when we consider the impact of household-level financial dynamics on entrepreneurial risk tolerance. Most research focuses on individual entrepreneurs' risk-taking behaviour without integrating the broader financial context of their households. The entrepreneur's decision-making and overall risk-taking profile can significantly influence the financial stability, risk tolerance, and resource allocation of a household. Understanding how this risk-taking behaviour translates into personal finance is important because it enables entrepreneurs to make informed decisions that protect their financial health while pursuing business growth.

While the belief in high entrepreneurial risk tolerance is prevalent, empirical evidence shows considerable variation in risk tolerance among entrepreneurs. Some studies suggest that entrepreneurs may not differ significantly from the general population in their overall risk attitudes (Xu and Ruef, 2004), indicating that the relationship between entrepreneurship and risk tolerance is not as straightforward as often assumed, as they do tend to perceive the act of starting a business as inherently less risky. This perception may be linked to their reliance on heuristics, or mental shortcuts, to make swift decisions in uncertain situations—a trait highlighted by Busenitz and Barney (1997).

On the other hand, during periods of market disruption, investors - including entrepreneurs - may experience shifts in their risk expectations, often resulting in a reduced willingness to take risks (Campbell and Cochrane, 1999). This dynamic suggests that Financial Risk Tolerance (FRT) may not be fixed particularly in the context of stock market pricing conditions. As such, Investors would adjust their risk tolerance accordingly. There is a lack of focused research on how entrepreneurs specifically adjust their risk tolerance in response to market fluctuations. Examining how entrepreneurs' risk perceptions and behaviours adapt to varying levels of market volatility could provide valuable insights useful for the purpose of entrepreneurial risk management.

Adding to this complexity, Gentry and Hubbard (2001) suggest that entrepreneurs may indeed be more risk-tolerant than the general population, as evidenced by their investment behaviors, which not necessarily are more conservative than those of non-entrepreneurs. This idea contrasts with March's (1996) argument in the organizational learning literature that adaptation often leads individuals to favor less risky options over time.

Research also highlights how factors such as higher education and household income correlate with increased financial risk-taking (Barsky et al., 1997; Gilliam, Goetz, and Hampton, 2008). However, Arenius and Minniti (2005) caution that higher education might actually reduce entrepreneurial motivation due to the higher opportunity costs associated with leaving well-paying jobs (Amit, Muller, and Cockburn, 1995).

Hsieh, Parker, and Van Praag (2017) also note that while risk aversion can initially deter individuals from pursuing entrepreneurship, it can also drive them to develop the necessary skills, ultimately increasing their likelihood of success. This skill development, combined with the benefits of social capital - gained through interpersonal relationships - provides entrepreneurs with access to valuable information, which can reduce perceived risks and offer a competitive edge (Granovetter, 1985; Podolny, 1994).

Financial literacy is crucial in this argument as well. Entrepreneurs, regardless of age, routinely face decisions regarding resource acquisition, allocation, and utilization, all of which carry significant financial implications (Oseifuah, 2010). Despite their strong technical skills, many micro-entrepreneurs lack the necessary financial literacy, contributing to high failure rates among new ventures (Drexler, Fischer, and Schoar, 2010).

The concept of “decision domains” further illuminates how risk-taking varies. MacCrimmon and Wehrung (1990) identify a spectrum of risk tendencies across different contexts, from games of chance to business ventures. Personal decision-making is particularly influenced by factors such as familiarity and controllability, which affect risk perception (Slovic et al., 1986). Variations in risk tolerance can stem from one's understanding of financial risk, with individuals generally feeling more at ease and perceiving less risk in areas where they possess expertise (Heath and Tversky, 1991). Moreover, a deeper comprehension of risk can mitigate negative emotional responses associated with it (Croson and Gneezy, 2009; Slovic, 1987).

Through this study, we shed light on the nuanced dynamics shaping risk attitudes in entrepreneurial endeavors, and broader financial risk tolerance and decision-making contexts in household finance.

Our research is expected to contribute to the understanding of general risk tolerance among business entrepreneurs, particularly how it differs from the general population and investors. By exploring the unique ways in which entrepreneurs interpret and respond to risk in personal finance contexts, this study aims to shed light on the factors that influence their decision-making processes. We also provide some insights into the role of entrepreneurial characteristics, financial risk tolerance, education, financial literacy and market volatility in shaping entrepreneurial risk behaviour. Additionally, we highlight the potential disconnect between an entrepreneur's corporate decision-making and personal financial behaviour, offering new perspectives on the risk profiles of entrepreneurs.

These contributions should prove valuable for policymakers, educators, and financial advisors that work with entrepreneurs, as well as for entrepreneurs themselves, who may benefit from a deeper understanding of their risk tolerance and financial decision-making tendencies.

To answer our research question, we investigate risk-taking differences among households depending on their entrepreneurial characteristics. The study focuses on households, with a specific emphasis on their entrepreneurial tendencies, and includes comparisons with business owners, those who are self-employed and financial entrepreneurs.

Furthermore, we investigate differences in stock allocation across household types, as this is a simple indicator of actual risk-taking investment behaviour. Furthermore, we examine whether these behaviours are time-varying by looking at the impact of market volatility on portfolio investment choices.

We empirically test several hypotheses postulated based on the existing literature related to the topic in question. We use data from multiple triennial Surveys of Consumer Finances spanning from 2007 to 2022. And control for demographic, economical and attitudinal variables.

Our results suggest that, first, business entrepreneurs have a lower stock allocation when compared to other households.

Second, on average, investors (financial entrepreneurs) have higher risk tolerance compared to business entrepreneurs.

Business entrepreneurs have a different risk profile and are likely willing to take more extreme risks when volatility is high suggesting that they have higher ambiguity tolerance.

Age is a driver of financial risk tolerance, while financial literacy is not.

Finally, when controlling for other variables, business entrepreneurs have a lower level of education compared to other households. This could explain partially the differences regarding other investors.

This study focuses on households, with a specific emphasis on their entrepreneurial tendencies, and includes comparisons with business owners, self-employed and financial entrepreneurs. The research employs multivariate analysis and difference-means t- tests to assess differences between the different household types.

Findings indicate that business entrepreneurs make day-to-day corporate decisions that don't necessarily translate into their personal finance behaviour, when compared with those households that are focused on investing. Business entrepreneurs not only have the lowest stock market participation, but also, when compared to investors, they generally are less willing to take risks, except for extreme ones.

Additionally, market volatility seems to explain the changes in the risk tolerance profile of a business entrepreneur. This supports the argument that their high ambiguity tolerance

makes them more willing to take extreme risks when volatility is high and less risks in general when volatility is low when compared to others. Moreover, higher risk aversion could be driven by of a combination of factors that include lower education, opportunity costs and better access to intelligent resources.

The structure of this dissertation is the following. Chapter 2 presents the Literature Review summarizing and discussing the existing research on the topic, exploring key theories and concepts around the topic and the hypotheses that we raise. We identify gaps in the current literature that this dissertation aims to fill, setting the stage for the research that follows.

Chapter 3 presents the testable hypotheses based on the existing literature gaps that we address in our empirical study.

Chapter 4 outlines the Methodology: we introduce the research design, and the methods employed in this study. Moreover, it presents the approach taken to collect and analyze data, justifying the choices made and discussing any limitations we came across.

Next, in chapter 5 we describe the sample, and we show and discuss our key findings related to our research questions. This chapter also includes a section where we interpret the economic significance of our findings and contributions in light of the literature reviewed earlier. Here, we explore the implications of the results and discuss how they contribute to a deeper understanding of the research topic.

Finally, the dissertation concludes with a Conclusions chapter that summarizes the key findings, and implications, review the limitations of our work and offers recommendations for future research.

2. Literature Review

2.1. Financial Risk Tolerance

Financial risk tolerance, a fundamental concept in finance, encompasses an individual's willingness to endure uncertainty or discomfort when making financial decisions, as delineated by Grable and Joo (2004). It reflects an individual's attitude towards risk, intricately connected with the notion of risk aversion, thereby influencing financial behaviors (Hallahan, Faff, & McKenzie, 2003).

One type of individual which is many times associated with risk and decision-making is the entrepreneur. Entrepreneurs are characterized by their willingness to innovate, take risks, and organize resources to create profitable and sustainable businesses. This perspective traces back to early economists such as Cantillon and Say, who equated entrepreneurship with the ability and motivation to undertake financial risks amidst uncertainty (Hebert & Link, 1988: 21).

According to the Modern Portfolio Theory, as proposed by Markowitz in 1952, investors aim to maximize the expected return of a portfolio for a given level of portfolio risk by carefully selecting the proportion of various assets. A substantial body of literature underscores the correlation between financial risk tolerance and actual financial behavior. Individuals with higher risk tolerance are typically more inclined to invest in risky assets and maintain a relatively high proportion of such assets in their portfolios (Heo et al., 2018).

Haliassos and Bertaut's (1995) research concludes that individuals with higher financial risk tolerance tend to hold larger stock portfolios. These investors often opt for assets with greater risk, such as stocks, in pursuit of amplified long-term returns (Yao, Hanna, & Lindamood, 2004). In contrast, investors with lower risk tolerance typically require greater compensation to embrace uncertainty, particularly when considering investments with variable payouts (Hanna, Waller, & Finke, 2008). Risk-averse investors are inclined to hold cash and bonds (Grable and Lytton, 2003), while those seeking higher returns and growth tend to favor stocks (Keller and Siegrist, 2006). Keller and Siegrist's (2006) findings also

suggest that both risk tolerance and income levels positively influence the propensity to invest in stocks (Gibson et al., 2013)¹.

Some argue that financial risk tolerance (FRT) remains relatively stable over time, but research suggests it can change, especially during market disruptions. Market volatility shapes investors' risk expectations, leading to reduced willingness to take risks. (Campbell and Cochrane, 1999). Pricing patterns in the stock market can also influence FRT, suggesting that investors adjust their risk tolerance based on market conditions.

2.2. Entrepreneurial Perception of Risk

Self-employment has been linked to changes in risk tolerance, with several studies indicating a positive relationship between self-employment and higher risk tolerance. Sung and Hanna (1996) were among the first to identify this positive association. In these studies, self-employed individuals typically derive their income directly from their own business, trade, or profession rather than from salaries or wages paid by an employer.

An assumption prevalent among investment managers is that self-employment status inherently leads to higher levels of risk-taking. According to this assumption, all else being equal, self-employed individuals would tend to opt for riskier investments and exhibit greater tolerance for increased investment volatility compared to those employed on a fixed salary (Grey & Gordon, 1978; MacCrimmon & Wehrung, 1986). Yao, Gutter, and Hanna (2005) also found employment status to be a significant factor in explaining financial risk tolerance, further supporting the idea that self-employment can influence an individual's preferences for risk-taking.

One type of self-employed individual which is many times associated with risk and decision-making is the entrepreneur. Entrepreneurs are characterized by their willingness to innovate, take risks, and organize resources to create profitable and sustainable businesses. This perspective traces back to early economists such as Cantillon and Say, who equated entrepreneurship with the ability and motivation to undertake financial risks amidst uncertainty (Hebert & Link, 1988: 21).

The notion that entrepreneurs inherently embrace risk has long shaped our understanding of entrepreneurship (Gartner and Liao, 2012). Many studies argue that entrepreneurs

¹ With decreasing absolute and relative risk aversion (ARA and RRA, respectively) parameters in underlying utility functions, the amount in dollars and the proportion of wealth invested in risky assets increases as wealth increases.

indeed have a higher tolerance for risk compared to others (Arenius and Minniti, 2005; Cacciotti et al., 2016). However, research on how this risk tolerance affects entrepreneurial entry has yielded conflicting results. Xu and Ruef (2004) and others have noted this inconsistency, suggesting that while entrepreneurs may not differ significantly from others in their overall risk attitude, they perceive fewer risks associated with starting a business.

One possible reason for these mixed findings is that the link between risk tolerance and entrepreneurial entry varies among individuals. Entrepreneurs and potential entrepreneurs differ greatly in their reasons for starting a venture (Block, Sandner, and Spiegel, 2015), their aspirations for growth (Bowen and De Clercq, 2008), and the challenges they face in their specific contexts (Estrin, Mickiewicz, and Rebamann, 2017).

Entrepreneurship scholars emphasize the detrimental effect of high opportunity costs on venturing into entrepreneurship, as individuals facing substantial potential losses tend to perceive greater risk (Amit, Muller, and Cockburn, 1995; Cassar, 2006). This underscores the significance of possessing a heightened level of risk tolerance for those considering entrepreneurial pursuits. Thaler's (1985) concept of viewing outcomes in terms of gains or losses relative to a reference point further demonstrates how initial circumstances shape risk perceptions, consequently influencing the role of risk tolerance in entrepreneurial decision-making.

In situations where the perceived risk of pursuing a business opportunity is significant, risk tolerance becomes a critical factor in the decision-making process, contrasting with scenarios where perceived risk is minimal. Scholars like Cacciotti et al. (2016) underscore how perceptions of the fear of failure negatively influence entrepreneurial intentions, with research suggesting that mitigating these perceptions increases the likelihood of embarking on entrepreneurial ventures (Kollmann, Stockmann, and Kensbock, 2017).

While risk-taking appears central to many definitions of entrepreneurship, entrepreneurs may not inherently possess a greater inclination to embrace risk compared to non-entrepreneurs (Palich and Bagby, 1995). Instead, drawing from cognitive theory, entrepreneurs may simply perceive and interpret stimuli differently from their non-entrepreneurial counterparts. What is commonly perceived as a proclivity for risk among entrepreneurs might actually stem from this distinct cognitive framing. It's not necessarily that entrepreneurs actively seek out risk; rather, they may tend to frame situations more

optimistically, focusing on the potential for favorable outcomes and shaping their behavior accordingly. On the other hand, non-entrepreneurs may lack this "rose garden" perspective, leading them to approach situations with greater caution.

Busenitz and Barney (1997) discovered that entrepreneurs often rely on heuristics and biases to streamline and expedite their decision-making processes, particularly in the intricate and risky contexts typical of startup endeavors.

Additionally, Norton (1975) suggests that individuals with low ambiguity tolerance tend to react hastily when faced with ambiguous situations, whereas those with high ambiguity tolerance perceive ambiguity as stimulating and intriguing, rather than overwhelming. There is evidence supporting the idea that ambiguity tolerance is a crucial trait for entrepreneurs. Tsui (1993) argues that the unpredictable nature of entrepreneurial endeavors requires individuals to be comfortable with ambiguity. Begley (1995) defines ambiguity tolerance as the capacity to view uncertain situations as attractive rather than threatening.

Findings by Sitkin and Weingart (1995) also highlight the role of risk propensities in shaping risk perceptions. Individuals with a higher risk propensity are inclined to perceive risks associated with a decision as less daunting compared to those with lower risk propensities. Consequently, these risk perceptions influence decision-making among various alternatives. Choices made by individuals who perceive a decision set as less risky are anticipated to be riskier than those made by individuals who perceive the set as more risky (Yates, 1990).

2.3. Risk Aversion

Gentry and Hubbard (2001) argue that, based on their observation that entrepreneurs do not invest their personal wealth more conservatively than non-entrepreneurs, may be more risk-tolerant than the general population. Similarly, Moskowitz and Vissing-Jorgensen (2002) find that the average returns from poorly diversified private equity are unattractive, suggesting that one explanation for startup activity is the higher financial risk tolerance of entrepreneurs.

However, counterarguments from organizational theory, present in both strategic and non-strategic models of risk tolerance, propose that entrepreneurs might actually be more risk-averse than the general population, especially if social and psychological goals outweigh economic goals. In the literature on organizational learning, March (1996) demonstrates

that the process of adaptation through sequential sampling naturally leads learners to favor less risky alternatives. The underlying mechanism is that alternatives with relatively beneficial past outcomes are more likely to be sampled than those with relatively poor outcomes. A risky alternative, even if it has the potential to improve with practice and eventually surpass a more certain alternative, is initially likely to perform poorly in comparison. However, the short-term disadvantage might deter further sampling of the risky alternative. Consequently, the adaptation mechanism introduces a bias against choosing the risky option.

In the literature, there is often a correlation noted between higher levels of education and household income with an increased inclination towards financial risk-taking and a propensity for embracing risk (Barsky et al., 1997; Gilliam, Goetz, & Hampton, 2008). This phenomenon is sometimes attributed to what Krueger and Dickson (1994) coined as the self-efficacy effect—the belief in one's capability to make optimal decisions. While literature generally supports education as a factor linked with risk tolerance, findings can vary; for instance, Gibson et al. (2013) found no significant relationship between education and financial risk tolerance. In the realm of entrepreneurship, Arenius and Minniti (2005) present an alternate perspective, suggesting that educational achievements may facilitate the pursuit of traditional employment, potentially dampening the motivation for self-employment due to perceived higher opportunity costs, as outlined by Amit, Muller, and Cockburn (1995).

Denrell and March (2001) further elaborate on this notion by proposing that individuals who learn at a slower pace are more inclined to engage in risky activities compared to faster learners. This is based on the assumption that slower learners take longer to discard poorly performing alternatives in favor of better ones. In the context of navigating the uncertain landscape of startups, entrepreneurs are posited to develop superior capabilities in understanding business risks compared to non-entrepreneurs. Consequently, entrepreneurs are expected to be adept at recognizing and avoiding risky ventures more swiftly than the general population, indicating a tendency towards risk aversion in their decision-making processes.

Knight (1921) distinguishes between situations under uncertainty and those under risk, asserting that individuals possess varying abilities to convert the former into the latter (Miller 2007; Welter and Kim 2018). The rational approach to uncertainty involves

establishing mechanisms to transform it into risk and subsequently developing strategies to manage that risk (Forlani and Mullins 2000). The effectiveness of such strategies hinges on individual capabilities (Hsieh, Parker, and Van Praag 2017; Miller 2007), linking perceived risk to an individual's skills. If an individual can adeptly manage the risks associated with a new venture, they may not necessarily require an exceptionally high level of risk tolerance to initiate the endeavor (Yamakawa and Cardon 2015). Hsieh, Parker, and Van Praag (2017) highlight that risk aversion can motivate individuals to invest in developing their entrepreneurial skills, thereby increasing the likelihood of them pursuing entrepreneurial endeavors.

Entrepreneurs are at the forefront of critical decision-making processes, and entrepreneurial characteristics play a pivotal role in shaping financial decisions (Cassar 2004). For instance, previous research indicates that many entrepreneurs prioritize goals beyond mere value maximization. Concerns such as retaining independence and control over their ventures may lead entrepreneurs to resist raising external equity (Manigart and Struyf 1997; Sapienza et al. 2003). Furthermore, the limited risk tolerance often observed among entrepreneurs may deter them from seeking external debt financing.

A significant level of social capital, manifested in the form of interpersonal relationships, proves invaluable for entrepreneurs by granting access to otherwise inaccessible or costly information (Granovetter 1985). Establishing connections with pertinent individuals and organizations offers entrepreneurs a competitive edge through access to privileged information (Podolny 1994), reducing risk for the entrepreneur.

Given the above, the main implications for the risk profile of business entrepreneurs are:

- i) If business entrepreneurs have indeed higher ambiguity tolerance as some of the literature suggests, they would be willing to take more extreme risks when volatility is high and less when volatility is low. Therefore, market volatility conditions could influence risk tolerance.
- ii) Furthermore, educational achievements may facilitate the pursuit of traditional employment, potentially dampening the motivation for self-employment due to perceived higher opportunity costs. Individuals who learn at a slower pace are more inclined to engage in risky activities compared to faster learners. So,

Business entrepreneurs might have a lower proportion of higher education compared to other households.

2.4. Drivers of Financial Risk Tolerance

2.4.1. Age

The relationship between age and financial risk tolerance is a topic of extensive study, with findings showing that older adults generally exhibit lower risk tolerance compared to their younger counterparts. However, the literature reveals some inconsistencies regarding this relationship, particularly in investment decision-making. For instance, Chang, DeVaney, and Chiremba (2004) found that older individuals, despite having the lowest risk tolerance, paradoxically adopted more aggressive investment strategies. Similarly, Faff, Hallahan, and McKenzie (2009) discovered a positive correlation between age and risk tolerance, but a negative relationship between age-squared and risk tolerance, indicating that risk tolerance initially increases with age before declining at a later stage.

Assessing investors' risk tolerance is challenging due to its dynamic nature, influenced by market conditions and individual investment timelines. This complexity often results in portfolios that do not align perfectly with investors' true risk appetite (Cutler, 1995; Hallahan, Faff, & McKenzie, 2004; Moreschi, 2005). The belief in controlling risk tends to reduce perceived risk aversion, a trend particularly noticeable among younger individuals who may overestimate their control over situations. Despite being aware of risks, younger adults may not incorporate them into their decisions as effectively as older individuals (Greene et al., 2002; Langer, 1975).

Starting a new venture can pose significant challenges for young entrepreneurs. They often face deficits in financial, social, and knowledge capital, and may struggle to gain external resources due to a lack of credibility (Khair, 2010; Zott & Huy, 2007). Scholars have consistently observed higher failure rates among young firms compared to established ones (Baum, Calabrese, & Silverman, 2000). Despite the importance of new ventures, on average, the 5-year survival rate for new ventures is less than 50% (Fritsch & Weyh, 2006), and only 10% of ventures remain in the market ten years after inception (Timmons & Spinelli, 2004).

2.4.2. Financial Literacy

Van Rooij, Lusardi, and Alessie (2011) conducted a comprehensive survey employing a wide-ranging set of questions, leading to the conclusion that households generally possess limited understanding of basic economic concepts, and low levels of financial literacy serve

as a barrier to stock market participation. Their research also unveiled that risk tolerance tends to increase with higher levels of financial literacy.

The implications of financial illiteracy extend to household behavior. Bernheim (1998) was among the first to highlight that not only do most households struggle with basic financial calculations and lack fundamental financial knowledge, and their saving behavior is often guided by simplistic rules of thumb. In more recent studies, Bernheim, Garrett, and Maki (2001) and Bernheim and Garrett (2003) demonstrate that individuals exposed to financial education, whether in high school or the workplace, tend to save more.

Similarly, Lusardi and Mitchell (2006) demonstrate that individuals with low financial literacy are less likely to plan for retirement, leading to significantly lower wealth accumulation (Hilgert, Hogarth, and Beverly, 2003). This finding is corroborated by Stango and Zinman (2007), who show that individuals unable to correctly calculate interest rates from a stream of payments tend to borrow more and accumulate less wealth. Agarwal (2007) further highlight the prevalence of financial mistakes among both young and elderly populations that have the lowest levels of financial knowledge.

According to Gupta and Kaur (2014), entrepreneurs with robust financial knowledge maintain comprehensive business financial records and possess a competitive advantage in accessing external funding compared to counterparts who do not. Likewise, Lusardi (2014) emphasized that entrepreneurial business owners equipped with financial knowledge, and who can apply this knowledge effectively, may experience improved financial well-being. Financial literacy also plays a crucial role in determining stock market participation; individuals with greater financial knowledge are more likely to engage in recommended financial practices (Lusardi, 2013; Wise, 2013).

On the other hand, insufficient business acumen, including poor financial literacy, undermines entrepreneurial activity (Bosma and Harding, 2006). Financial management is identified as a critical managerial competency in the creation and development of new ventures (Timmons and Spinelli, 2007:269). Most scholars agree that entrepreneurs, regardless of age, are consistently engaged in decision-making activities concerning resource acquisition, allocation, and utilization, all of which carry financial implications. Therefore, for entrepreneurs to be effective, they must possess financial literacy (Oseifuah, 2010). However, micro-entrepreneurs often lack the necessary financial literacy to navigate

the complex financial decisions they encounter (Drexler, Fischer and Schoar, 2010). Additionally, they may prefer to focus their decision making and resources on their ventures, which they are more comfortable with.

The implications of the arguments above are:

- i) Younger or recent entrepreneurs have a very different profile compared to more seasoned ones. Therefore, age is an important driver for financial risk tolerance.
- ii) Furthermore, even though financial literacy seems to be a very important requirement for entrepreneurial success, and one of the reasons why so many young entrepreneurs are successful or fail. Therefore, financial literacy may also impact FRT.
- iii) Additionally, there is a logical opportunity cost for entrepreneurs. They may prefer to invest in their ventures rather than in the stock market. Therefore, business entrepreneurs likely have a significantly lower stock allocation when compared to other households.

2.5. Decision Domains

While individuals are often categorized as either risk-averse or risk-seeking, accurately predicting their risky decisions and behavior requires a nuanced approach that considers risk tolerance within specific domains or contexts (Corter & Chen, 2006; Dohmen et al., 2011).

For example, someone who is comfortable taking risks in financial investments might approach activities like extreme sports with caution and risk aversion. Conversely, a household or individual may exhibit high risk tolerance in entrepreneurial endeavours but display more conservative tendencies in personal finance decisions. Each decision-making domain presents unique considerations, and an individual's risk tolerance can fluctuate depending on the circumstances and context at hand. This highlights the importance of assessing risk tolerance in a targeted and context-specific manner to better understand behavior across different areas of life.

Bromiley and Curley (1992) propose a crucial notion regarding the complex interplay between situational factors and individual traits influencing risk-taking behavior: understanding the joint influence of both elements requires a nuanced consideration of

situational nuances before stable individual differences can be identified. This emphasizes the necessity of accounting for situational disparities, either through control or statistical adjustment, to reveal underlying individual predispositions.

MacCrimmon and Wehrung (1990) outline a spectrum of decision domains where individuals exhibit varying propensities for risk-taking, encompassing a diverse array of contexts from games of chance and financial investments to business ventures and personal choices. Notably, within the realm of personal decision-making, further granularity emerges as distinct categories come to light, differing not only in content but also in familiarity and controllability—attributes known to profoundly influence risk perception and subsequent decision-making processes (Slovic et al., 1986).

Disparities in risk tolerance may stem from differences in familiarity and comprehension of the inherent nature of financial risk, as suggested by Sung and Hanna (1996). Generally, individuals feel more comfortable and less inclined to perceive options as risky when dealing with choices within their area of expertise. People tend to prefer choices where they feel knowledgeable and competent, as highlighted by Heath and Tversky (1991). Some argue that a better understanding of the concept of risk diminishes negative emotional reactions towards it (Croson and Gneezy, 2009; Slovic, 1987).

The implication of the above are:

- i) On average, investors (financial entrepreneurs) have higher risk tolerance compared to business entrepreneurs given they are less familiar with financial investments.

3. Research Questions and Hypotheses

The primary objective of the paper is to investigate risk-taking differences among households depending on their entrepreneurial tendencies and whether financial risk tolerance changes over time depending on market volatility conditions. Financial and demographic characteristics of households associated with risk tolerance are also analysed. Another related objective is to evaluate differences in portfolio allocation and education levels between the household types, as they help establish the entrepreneurial financial risk profile.

Following on the literature review of the previous sections, we identify the following questions and testable hypotheses:

- 1) Do Business Entrepreneurs take similar levels of risks in financial investments compared to other households?

H1.1: Business entrepreneurs have a stock allocation similar to that of other households

H1.2 Investors (Financial Entrepreneurs) have a similar risk tolerance profile compared to business entrepreneurs.

If we reject the null for H1, then business entrepreneurs have a different FRT compared to investors and other non-entrepreneurs.

- 2) Does FRT of business entrepreneurs change over time?

H2: Business entrepreneurs are willing to take as much extreme risks when volatility is high.

If we reject the null for H2, then business entrepreneurs are willing to take more risks when volatility is high.

- 3) Is education driving the behavior of business entrepreneurs?

H3: Business entrepreneurs have a similar proportion of higher education compared to other households.

If we reject the null for H3, then business entrepreneurs are slower learners, and therefore are more likely to invest less in risky securities.

4) Does age and financial literacy drive financial risk tolerance?

H4.1. Age does not show a significant relationship with financial risk tolerance.

H4.2. Financial Literacy does not show a significant relationship with financial risk tolerance.

If we reject the null for H4, then age and financial literacy drive financial risk tolerance.

4. Methodology, Data and Variables

4.1. Empirical methodology, tests and estimation methods

This study focuses on examining households, with a specific emphasis on their entrepreneurial tendencies. To examine that, we focus our analysis on the comparison between business entrepreneurs (self-employed) and “financial” entrepreneurs.

We define business entrepreneurs as anyone who works for themselves while owning a business. On the other hand, we define “financial” entrepreneurs as those who invest their money in either stocks or real estate with the purpose of financial gains.

The focus of our analysis is the financial risk tolerance of business entrepreneurs.

We first present some descriptive statistics and perform a few preliminary univariate tests.

To empirically test our hypotheses, we use means difference *t-tests* and logistic regression. The multivariate analysis incorporates four types of independent variables: the survey year, demographic characteristics, and economic and attitudinal characteristics of the households.

The multivariate analysis incorporates four types of independent variables: the survey year, demographic characteristics, and economic and attitudinal characteristics of the households. To estimate the parameters of interest we use Cumulative Logistic Analysis. This is the appropriate estimation technique for a multivariate regression analysis given the dependent variable is ordinal allowing for a comprehensive examination of the relationships influencing financial risk tolerance and it takes into consideration the discrete and rank-ordered nature of the SCF responses which the dependent variable is based on . The independent variables are either binary or categorical.

The model is based on the framework proposed by Yao and Hanna (2004) with the addition of the independent variables *Financial Literacy* and *Ownership of Other Real Estate* (as in SCF surveys). These variables do not conflict with their model.

Economic variables have their category values slightly adjusted due to accumulated inflation. Observations with missing values among the main dependent and independent

variables were excluded. It also follows the proportional odds assumption, which implies that the relationship between the predictors and the odds of being in a higher category is the same across all categories of the dependent variable.

We show cross-tabulations of risk level by year provide comparisons of the actual responses to the risk tolerance question for each survey year. t-tests are used to analyse the significance of changes from one survey year to the next, in each of the four SCF risk tolerance categories as well as the two composite risk categories.

We also compare the percentage of stocks held by each type of household is compared taking business entrepreneurs as the reference. t-tests are performed to assess the statistical significance of the differences of the percentage of stocks held between different types of households.

We use multivariate regression to test our core hypotheses controlling for other variables, since changes in risk tolerance levels could be driven by changes in the factors associated with risk tolerance.

We estimate three empirical models measuring the dependent variable in three alternative ways based on the answer categories to the question:

The answer categories are:

- 1 – Take **substantial** Financial Risk expecting to earn **substantial** financial returns;
- 2 - Take **above average** Financial Risk expecting to earn **above average** financial returns;
- 3 - Take **average** Financial Risk expecting to earn **average** financial returns;
- 4 – **Not willing** to take any financial risks.

In our first model, the variable takes the value of 1 for *Some Risk* (that includes “Substantial”, “Above Average”, and “Average Risk” categories) versus the *No Risk* category, that takes the value of 0.

In the second model, the variable takes the value of 1 for *High Risk* (that includes “Substantial” and “Above Average” risk) versus *Low Risk* (“Average” and “No risk” categories), that takes the value of 0.

Finally, in the third model, the variable takes the value of 1 *Substantial Risk* versus *Less Risk* (that includes “Above Average”, “Average”, and “No Risk” categories).

Three logistic regressions (logit) are estimated with 2007 as the reference year to enable the comparison of the risk tolerance levels in each survey year to those in 2007 and to determine the significance of that relationship with other independent variables controlled.

The economic and statistical significance of the estimated parameters will inform our core hypothesis H1, as well as hypothesis H3, if and how risk tolerance is associated to demographic and other independent variables and by association with the entrepreneur and the other households so we can develop its profile. It will also allow to answer H4 by determining the relationship between risk tolerance with age and financial literacy and its interactions with business entrepreneurs.

To identify the relationship between FRT and the level of education, we measure the proportion of individuals with higher education compared to the total sample, while also considering the subset of individuals younger than 40 to control for age-related variations in risk tolerance. This will allow to evaluate H3 and evaluate whether one of the factors for their risk profile is their low level of education.

Means t-tests are conducted to determine whether and how 'financial' entrepreneurs are more risk-tolerant than business entrepreneurs, based on the literature discussed. We compare the FRT of business entrepreneurs (who do not own stocks) and financial entrepreneurs (who do not own businesses and are not self-employed). Excluding business entrepreneurs with stocks ensures that the risk profile reflects their business activities without the potential confounding effect of financial investments, allowing for a more accurate comparison between these groups. Additionally, we compare over time with market volatility to assess hypothesis H2.

4.2. Data and Variables

4.2.1. Data and Sample

This research uses data collected as part of the Survey of Consumer Finances (SCF), conducted by the Board of Governors of the Federal Reserve System in cooperation with

the Statistics of Income Division of the Internal Revenue Service. The survey has been conducted every three years since 1983.

Our sample comprises observations (responses) from U.S. households that participated in the six Survey of Consumer Finances (SCF) cycles from 2007 to 2022. The SCF is designed to represent a broad cross-section of American households, capturing data on their financial behaviours, assets, liabilities, income, and demographic characteristics.

After cleaning the data to remove incomplete or inconsistent responses, the combined dataset includes a total of 33,534 observations, ensuring a large and diverse sample. This allows the study to investigate risk tolerance across different household types, controlling for key demographic, economic, and behavioural variables such as age, education, employment status, stock ownership, and household income. The resulting dataset provides a comprehensive foundation for analysing how entrepreneurial households differ from other types in terms of financial risk tolerance and investment behaviour over time.

4.2.2. Dependent variable

Financial Risk Tolerance is the dependent variable for this research, which is assessed using responses to a specific question from the Survey of Consumer Finances (SCF). The SCF risk tolerance question allows respondents to express their willingness to take financial risks with four possible responses: substantial, above average, average, or no risk.

To refine the analysis, the research follows the methodology of Yao and Hanna (2004) by creating two composite variables that simplify the original four-category responses into dichotomous variables. These composite variables are HIGHRISK (created by combining the responses that indicate substantial and above average risk tolerance) and SOMERISK (by combining responses that indicate substantial, above average, and average risk tolerance) in addition to the existing SUBSTANTIAL-RISK (created by using responses that indicate substantial risk tolerance).

4.2.3. Independent variables

This study focuses on the respondent's circumstances, who may not be the household head. The Survey of Consumer Finances (SCF) targets the household member most knowledgeable about finances, but it assigns the male as the head in married households, regardless of the actual respondent. Consequently, a risk level might be attributed to a male when a female provided the response. To more accurately analyse how demographic and

employment variables impact risk tolerance, this study emphasizes the responses of the actual respondent.

Demographic variables include first the respondent's age (AGE, represented by a series of dummy variables for different age categories) and education level (EDUC, a series of dummy variables for various educational levels), race/ethnicity (RACE, a series of dummy variables for different categories). We also include other demographic variable such as gender (SEX, dummy variable) marital status (MARRIED, dummy variable). Additionally, the presence of related children under 18 (KIDS, dummy variable), the respondent's employment status (EMPLOYMENT, dummy variables for four employment options), financial literacy (series of dummy variables on basic financial knowledge) and ownership of other real estate (HRE; dummy variable) are included.

The economic variables considered include whether the household's monetary assets surpass three months' income (MONETARY dummy variable), stock ownership (HSTOCKS, dummy variable), non-financial assets (NONFIN dummy variables for different non-financial asset levels), household income (INCOME, a series of dummy variables for different income levels), and the debt situation (DEBT, dummy variable indicating if monthly debt exceeds 40% of monthly income).

Opinion and attitude variables include whether the respondent anticipates a substantial inheritance or asset transfer in the future (INHERIT dummy variable) and their self-assessed health condition (HEALTH, dummy variables for four health categories). In the second multivariate analysis, the respondent's employment status and ownership of stocks or other real estate are excluded to avoid conflicts with the dependent variables. The original risk tolerance categories are incorporated as dummy variables (none, average, above average, substantial).

Additionally, VOLATILITY is computed by using the average annualized volatility of the S&P500 for the previous 3 years (calculated with the daily standard deviation multiplied by the square root of the periods in the year (252)) and is used to gauge whether changing levels for different types of risk over time are driven by volatility. in the mean difference t-tests.

Variables	Obs	Mean	Std. dev.	Min	Max
-----------	-----	------	-----------	-----	-----

<i>Year</i>	33,534	2014	na	2007	2022
<i>Risk Tolerance</i>	33,534	3.053	0.862	1	4
<i>Some risk</i>	33,534	0.649	0.477	0	1
<i>High risk</i>	33,534	0.250	0.433	0	1
<i>Substantial risk</i>	33,534	0.048	0.215	0	1
<i>Business Entrepreneur</i>	33,534	0.092	0.289	0	1
<i>Employment Status</i>	33,534	1.813	0.947	1	4
<i>Sex</i>	33,534	0.229	0.420	0	1
<i>Age</i>	33,534	52.358	16.167	18	95
<i>Education</i>	33,534	3.000	1.029	1	4
<i>Married</i>	33,534	0.367	0.482	0	1
<i>Kids</i>	33,534	0.422	0.494	0	1
<i>Race</i>	33,534	1.540	1.047	1	5
<i>Financial Literacy</i>	33,534	1.140	1.292	0	3
<i>Holding Stocks</i>	33,534	0.245	0.430	0	1
<i>Holding Real Estate</i>	33,534	0.238	0.426	0	1
<i>Debt</i>	33,534	0.079	0.269	0	1
<i>Monetary Assets</i>	33,534	0.292	0.455	0	1
<i>Nonfin</i>	33,534	2.941	1.547	1	5
<i>Income</i>	33,534	3.833	1.087	1	5
<i>Inherit</i>	33,534	0.141	0.348	0	1
<i>Health</i>	33,534	1.993	0.814	1	4
<i>Volatility</i>	33,534	0.1787	0.0655	0.1209	0.2881

Table 1 - Descriptive Statistics (Dependent and Independent Variables)

In the dataset, according to the responses, between 76% and 80% of all answers are from males in every survey. The average *Age* has been increasing considerably (from 51 to 54-55).

There are no major variations over the years in marriage status: except for 2007, the mean was basically the same across all years (about 37% either are married or living with a partner compared with 32% in 2007). 75% of the respondents are working, either employed by others or self-employed (*Employment*). There is also gradually a larger diversity in the sample (from 22% in 2007 to 40% in 2022). The mean *Income Level* was higher in 2007 and 2022, while being lower in 2010 and 2016. The data does not show major fluctuations in terms of debt. Furthermore, only half of the respondents chose to respond to the question pertaining to their financial knowledge.

RISK TOLERANCE demonstrates a positive correlation with variables such as GENDER (males), EDUCATION, MARRIAGE status (married), RACE (white), HOLDINGS OF STOCKS, HOLDINGS OF BUSINESSES, FINANCIAL LITERACY, EMPLOYMENT

STATUS (WORKING), INCOME LEVEL and HEALTH. AGE, however, demonstrates a slightly negative relationship with risk tolerance.

Among high correlations, AGE has a high negative correlation with EMPLOYMENT while MARRIED has a high positive relationship with GENDER (Male). (Table 2)

	<i>RT</i>	<i>ES</i>	<i>S</i>	<i>A</i>	<i>E</i>	<i>M</i>	<i>R</i>	<i>FL</i>	<i>HB</i>	<i>HS</i>	<i>I</i>	<i>H</i>
<i>Risk Tolerance</i>	1.00											
<i>Employment Status</i>	0.20	1.00										
<i>Sex</i>	0.20	0.14	1.00									
<i>Age</i>		-	-									
	-0.07	0.50	0.02	1.00								
<i>Education</i>					1.0							
	0.30	0.13	0.07	0.01	0							
<i>Married</i>					0.0	1.0						
	0.17	0.15	0.68	0.03	8	0						
<i>Race</i>		-			0.1	0.1	1.0					
	0.14	0.05	0.14	0.21	6	4	0					
<i>Financial Literacy</i>		-			0.1	0.0	0.0	1.0				
	0.14	0.01	0.06	0.09	5	6	2	0				
<i>Holding Businesses</i>					0.2	0.2	0.2	0.0	1.0			
	0.29	0.20	0.24	0.15	2	6	0	8	0			
<i>Holding Stocks</i>					0.2	0.1	0.1	0.0	0.3	1.0		
	0.29	0.04	0.18	0.17	7	9	9	8	1	0		
<i>Income</i>					0.0	0.0	0.0	0.0	0.1	0.1	1.0	
	0.10	0.03	0.06	0.07	7	7	6	2	7	2	0	
<i>Health</i>				-	0.2	0.1	0.1	0.0	0.2	0.1	0.0	1.0
	0.23	0.28	0.12	0.11	5	3	0	3	1	8	7	0

Table 2- Correlation Matrix

5. Results

5.1. Actual risk tolerance changes from 2007 to 2022

Examination of the patterns for all levels of risk tolerance shows that willingness to take substantial risk decreases between 2007 and 2013, with the value coming back in 2016 and stabilizing around 5% (Table 3). Willingness to take *above average risk* verified a decrease between 2007 and 2010 before increasing significantly until 2019 and decreasing very slightly in 2022. Except for 2010, where it was verified a significant decrease, willingness to take *average risk* hovered around 40%. Willingness to take *no risk* followed the opposite path of the *above average risk*, as it verified a significant increase between 2007 and 2010 before decreasing until 2019 and then increasing negligibly in 2022. Both willingness to take *some risks* and *high risks* share the same type of variations over time with above average risk. When it comes to higher and lower periods volatility, the types of risks that vary the most are the willingness to take *no risks* and *above average risks*.

	Year of Survey					
	Percent distribution for each year					
	2007	2010	2013	2016	2019	2022
SCF Risk Tolerance						
Substantial	5.16	4.67	3.97***	5.19*	4.97	5.31
Above Average	21.37	16.15*	17.56**	20.76*	23.35*	22.94
Average	42.20	37.92*	39.78**	40.17	40.02	40.02
None	31.27	41.25*	38.69*	33.88*	31.66*	31.73
Composite Risk Tolerance						
High	26.53	20.83*	21.53	25.94*	28.32*	28.25
Some	68.73	58.75*	61.31*	66.12*	68.34*	68.27
Volatility	0.1213	0.2881	0.1576	0.1341	0.1209	0.2400
Number of observations	4,417	6,482	6,015	6,248	5,777	4,595

*Table 3 - Risk Tolerance Composition and Volatility (***, **, * - Significance at 90%, 95% and 99%, respectively)*

5.2. Percentage of Stocks Held by Different Types of Households

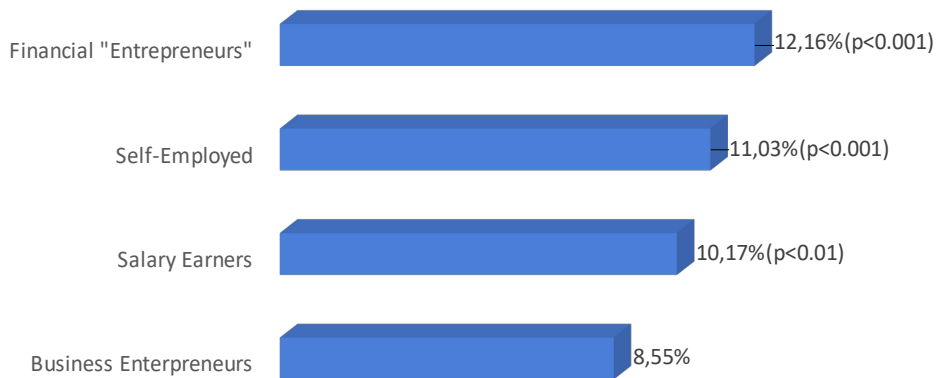


Figure 1 - Percentage of Stocks Held by Different Types of Households

Results obtained reveal that among those who hold stocks, business entrepreneurs have a lower average percentage of stocks (8.55%) compared to salary earners (10.17%), self-employed people who don't own businesses (11.03%) and financial investors (12.16%) (Table 4). All three have statistically significant differences to indicate they hold a higher percentage of stocks compared to business entrepreneurs. As differences in mean values are statistically different, we can reject the null for H1.1.

5.3. Risk Tolerance: Differences between business entrepreneurs and financial investors

While testing differences between business and financial entrepreneurs, it was found that the latter are significantly more willing to take some risks, while business entrepreneurs on the other hand take more extreme or substantial risks, especially when it comes to higher volatility periods (2010 and 2022). On the other hand, even though generally financial entrepreneurs are more willing to take high risks, the differences are not significant. However, considering the big gap in willingness to take substantial risks, it is also possible to assume that financial entrepreneurs take significantly more above average risks compared to their counterparts. As differences in average values are statistically significant

for the specification “Some Risk” and “Substantial Risk”, we can reject H1.2 (Table 4). Additionally, we can reject H2 as business entrepreneurs register significantly different values when compared to “financial” entrepreneurs when volatility is high (2010 and 2022).

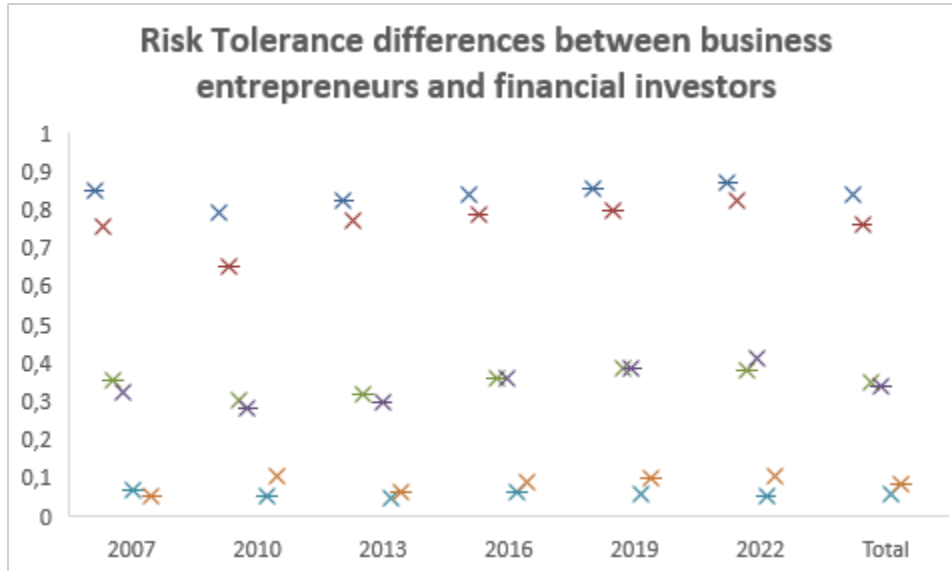


Figure 2 - Risk Tolerance: Differences between business entrepreneurs and financial investors (left side Financial “Entrepreneurs”; right side- Business Entrepreneurs; high values: Some Risk; medium values: High Risk; low values: Substantial Risk)

Some Risk		High Risk		Substantial Risk	
Higher	0.0021	Higher	0.4441	Higher	0.5671
Higher	<0.0001	Higher	0.5606	Lower	0.002
Higher	0.1332	Higher	0.6392	Lower	0.2918
Higher	0.0683	Lower	0.9620	Lower	0.1088
Higher	0.0290	Higher	0.9277	Lower	0.0222
Higher	0.1798	Lower	0.5499	Lower	0.0325
Higher	< 0.0001	Higher	0.51	Lower	0.0001

Table 4 - Risk Tolerance: Differences between financial investors and business entrepreneurs (p-values)

5.4. Distribution of higher levels of education among different types of households

Higher levels of education were found to be more predominant among salary earners, followed by 'financial' entrepreneurs. Both self-employed individuals and business entrepreneurs were found to have lower levels of education. This difference is even more pronounced among young people, where higher education seems to be associated with a lower tendency to engage in entrepreneurship, as they may prioritize more stable career

paths. As the proportion for business entrepreneurs is statistically different from other households (except self-employed), we reject hypothesis H3.

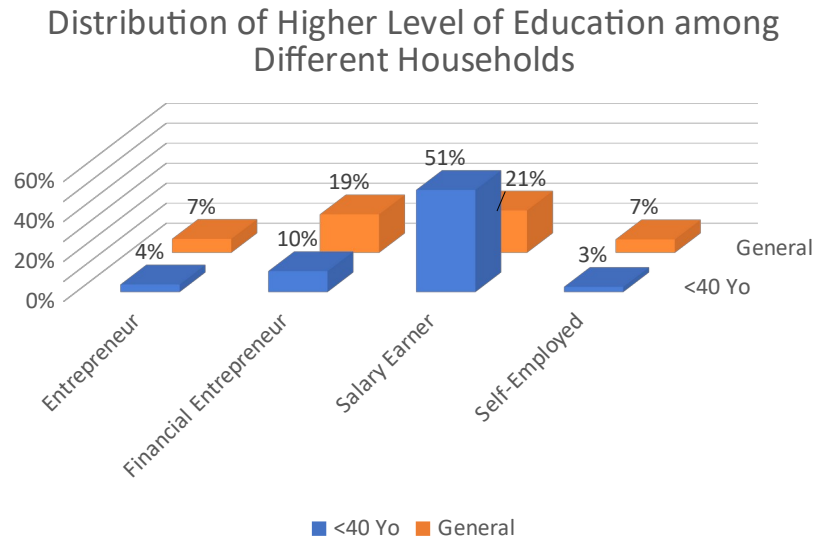


Figure 3 - Distribution of higher levels of education among different types of households

	Entrepreneur	Financial Entrepreneur	Salary Earner	Self-Employed
<40 Yo	0.0373	0.1041**	0.5096*	0.0253
General	0.0687	0.1914*	0.2107*	0.0665

Table 5 - Distribution of higher levels of education among different types of households (*, **, * - Significance at 90%, 95% and 99%, respectively)**

5.5. Logistic results

The logistic regressions of risk tolerance are done for each of three dependent risk tolerance measures (*Substantial*, *High*, and *Some Risk*) Table 7). Each independent variable is represented by a dummy or categorical variable, with a reference set. The “odds ratio” included in the table for each variable indicates the relative effect of the one category vs the other category. For example, for gender (SEX), this means that if the odds ratio for males is greater than 1, it indicates that males have higher odds of falling into the given risk tolerance category compared to females (given that females are the reference group in the category)

5.5.1. Drivers of risk tolerance

The conceptual model proposes that life cycle and other demographic factors relate to financial risk tolerance level (Table 7). The logit model is used to estimate the relationship between the independent variables and financial risk tolerance measures, controlling for the other variables.

Starting with EMPLOYMENT – the estimated parameter suggests a significant positive relationship of self-employed (which has a high correlation with business entrepreneur) across all the three specifications.

AGE overall has a negative relationship with risk tolerance. Initially FRT increases with age before decreasing after reaching a certain point and increasing again at 70-100 years for higher risks. Having stocks and education demonstrated a statistically positive relationship across all three risks.ⁱ FINLIT has a positive relationship in specifications *Some Risk* and *High Risk*. Finally, despite the fact that age also has a relationship with risk tolerance, financial literacy however does not completely relate to financial risk tolerance when it comes to the specification *Substantial Risk*. Therefore, we can only reject the null for H4.1. and partly for H4.2.

Variable	RISK TOLERANCE						
	SOME/NO			HIGH/LOW		SUBSTANTIAL/LESS	
	Coefficient	Odds Ratios		Coefficient	Odds Ratios	Coefficient	Odds Ratio
EMPLOYMENT - Reference: Work for others							
Self-Employed/ Partnership	0.184**	1.202		0.303**	1.353	0.592**	1,808
Retired	-0.197*	0.822		-0.212*	0.809	-0.129	0,879
Not Working	-0.102*	0.903		0.057	1.059	0.347**	1,414
SURVEY YEAR - Reference: 2007							
2010	-0.250**	0.779		-0.155**	0.856	0.000	1,000
2013	-0.113**	0.893		-0.089*	0.915	-0.138	0,871
2016	-0.258**	0.772		-0.064	0.939	0.220	1,246
2019	-0.219**	0.803		0.018	1.018	0.157	1,170
2022	-0.212*	0.80		-0.003	0.99	0.194	1,214

				9			7		
AGE - Reference: 18-29									
30-39	-0.366	**	*	0.69	-0.127	**	0.88	0.001	1,001
				3			1		
40-49	-0.490	**	*	0.61	-0.322	**	0.72	-0.197	* 0,821
				3		*	5		
50-59	-0.679	**	*	0.50	-0.571	**	0.56	-0.404	** 0,668
				7		*	5		
60-69	-1.048	**	*	0.35	-0.886	**	0.41	-0.706	** 0,494
				1		*	3		
70-100	-1.480	**	*	0.22	-1.087	**	0.33	-0.602	** 0,548
				8		*	7		
FINLIT									
1	0.177	*		1.19	0.081		1.08	-0.044	0,957
				4			4		
2	0.208	**		1.23	0.072		1.07	0.007	1,007
				1			5		
3	0.681	**	*	1.97	0.383	**	1.46	-0.104	0,901
				7		*	6		
SEX - Reference: Female									
Male	0.440	**	*	1.55	0.542	**	1.72	0.597	** 1,816
				3		*	0		
EDUC - Reference: High School or Below									
High School Diploma	0.407	**	*	1.50	0.349	**	1.41	0.167	1,181
				3		*	8		
Some College	0.764	**	*	2.14	0.596	**	1.81	0.318	** 1,374
				6		*	5		
College or Higher	1.167	**	*	3.21	0.834	**	2.30	0.338	** 1,402
				3		*	3		
MARRIED - Reference: Not Married / LWP									
Married / LWP	-0.236	**	*	0.79	-0.320	**	0.72	-0.423	** 0,655
				0		*	6		
KIDS - Reference: No Kids									
Yes	-0.089	**	*	0.91	-0.088	**	0.91	-0.038	0,963
				5		*	6		
RACE - Reference: White									
Blacks	-0.024			0.97	0.133	**	1.14	0.431	** 1,539
				6		*	2		
Hispanic	-0.489	**	*	0.61	-0.032		0.96	0.428	** 1,534
				3			8		
Other	-0.312	**	*	0.73	-0.132	**	0.87	0.183	* 1,201
				2			6		
HSTOCKS - Reference: No									
Yes	0.874	**	*	2.39	0.461	**	1.58	0.310	** 1,363
				7		*	5		
HRE - Reference: No									
Yes	0.358	**	*	1.43	0.149	**	1.16	0.184	** 1,202
				0		*	1		
Having Monetary assets >= 3 times monthly income - Reference: No									

Yes	0.307	** *	1.36 0	-0.055	*	0.94 7	-0.244	** *	0,783
NONFIN - reference category: non-financial assets less than \$50,000									
Non-financial assets between \$50,000 to \$149,999	0.051		1.05 3	0.051		1.05 2	-0.002		0,998
Non-financial assets between \$150,000 to \$499,999	0.283	** *	1.32 7	0.198	** *	1.21 9	-0.101		0,904
Non-financial assets between \$500,000 to \$999,999	0.488	** *	1.62 9	0.257	** *	1.29 3	-0.383	** *	0,682
Non-financial assets > \$1,000,000	0.711	** *	2.03 5	0.567	** *	1.76 3	0.406	** *	1,501
Annual household income year before survey - reference category: less than \$10,000									
Income between \$10,000 and \$24,999	-0.222	**	0.80 1	-0.328	** *	0.72 0	-0.480	** *	0,619
Income between \$25,000 and \$49,999	0.000		1.00 0	-0.295	** *	0.74 5	-0.552	** *	0,576
Income between \$50,000 and \$149,999	0.444	** *	1.55 9	-0.101		0.90 4	-0.500	** *	0,607
Income more than or equal to \$150,000	1.063	** *	2.89 7	0.176	*	1.19 2	-0.332	**	0,718
DEBT - Reference: Less than 40% of monthly income									
Yes (more than 40%)	-0.084	*	0.92 0	0.197	** *	1.21 7	0.482	** *	1,620
INHERIT - Reference: No									
Yes (inherit)	0.387	** *	1.47 3	0.175	** *	1.19 2	0.107		1,113
Health - Reference: Poor									
Fair	0.174	**	1.19 0	0.057		1.05 9	0.166		1,181
Good	0.369	** *	1.44 6	0.209	**	1.23 2	0.085		1,088
Excellent	0.465	** *	1.59 3	0.329	** *	1.38 9	0.313	*	1,367
_cons	-0.799	** *	0.45 0	-2.140	** *	0.11 8	-3.402	** *	0,033
Concordance	0.831			0.736			0.694		
	11466.1			4481.2					
X2 test of likelihood ratio	3		<0,0001	7		<0,0001	761.22		<0,0001

Table 6 -Multivariate Logistic Regression (*, **, *** 90%,95% and 99% confidence level)

5.6. Discussion

Risk tolerance is dynamic and influenced by both external factors, like financial crises, and internal factors, such as age, wealth, and personal experience. In times of economic downturns, like the 2008 Global Financial Crisis or the COVID-19 pandemic, people experience a loss of confidence in financial markets. This leads to a "flight to safety," where investors shift away from riskier assets, such as stocks, to safer investments like bonds or cash equivalents. As investors grow older or experience changes in personal circumstances, their financial risk tolerance also may evolve.

Based on our mean *t*-tests results, we reject Hypothesis 1.1. Business entrepreneurs have a lower percentage of stocks compared to those who work, those who are self-employed without being entrepreneurs and financial investors, and the difference is even more staggering when comparing between young entrepreneurs and non-entrepreneurs. When we consider only households who have stocks, the non-entrepreneurs invest a higher proportion, eventually because they have less opportunity costs for the money invested. Business entrepreneurs may prefer to invest a higher slice of their wealth in their ventures rather than in the stock market due to differences in familiarity and comprehension of the inherent nature of financial risk with regards to their venture risks (Sung and Hanna, 1996).

Based on the logit results, Hypothesis 1.2. is also rejected. Business entrepreneurs take fewer risks than financial or other households. However, they take significantly more extreme risks, especially in times of crisis (2010 and 2022). *High Risk* is higher for financial and non-financial entrepreneurs but the difference? is not significant.

While individuals are often labelled as either risk-averse or risk-seeking, accurately predicting their risky decisions and behaviours necessitates a nuanced approach that considers risk tolerance within specific domains or contexts (Corter & Chen, 2006). Individuals feel more comfortable and less inclined to perceive options as risky when dealing with choices within their area of expertise. The same happens with the "financial" entrepreneur who will invest a larger proportion in stocks because he is more familiar and understands these risks relatively better.

Based on out mean *t*-tests results, Hypothesis 2 is rejected. Market volatility influences investors' risk appetite, leading to reduced willingness to take risks. Individuals with low ambiguity tolerance tend to react hastily when faced with ambiguous situations, whereas those with high ambiguity tolerance perceive uncertainty as stimulating and intriguing, rather than overwhelming. Tsui (1993) argues that the unpredictable nature of entrepreneurial endeavors requires individuals to be comfortable with uncertainty which can be verified by the results obtained.

Based on the logit results, Hypothesis 3 is also rejected. Business entrepreneurs are on average less educated as compared to financial entrepreneurs and salary earners, and this is exacerbated further with younger individuals. This goes in tandem with Arenius and Minniti (2005) that suggest that educational achievements may facilitate the pursuit of traditional employment, potentially dampening the motivation for self-employment due to perceived higher opportunity costs, as outlined by Amit, Muller, and Cockburn (1995). Furthermore, individuals who learn at a slower pace are more inclined to engage in risky professional activities compared to faster learners (Denrell and March, 2001).

Moreover, we find a negative relationship between age and financial risk tolerance. This occurs because the belief in controlling risk tends to reduce perceived risk aversion, a trend that is particularly noticeable among younger individuals who may overestimate their control over situations. Despite being aware of risks, younger adults may not incorporate them into their decisions as effectively as older individuals (Greene et al., 2002). Furthermore, scholars have consistently observed higher failure rates among young firms compared to established ones (Baum, Calabrese, & Silverman, 2000).

Financial Literacy shows a positive relationship with FRT, in *Some Risk* and *High Risk* specifications. This result agrees with Gupta and Kaur (2014), that claim that many entrepreneurs are armed with robust financial knowledge maintain comprehensive business financial records and possess a competitive advantage in accessing external funding compared to counterparts who do not. However, financial literacy has as unclear relationship in the Substantial Risk specification That questions the actual impact of financial literacy when it comes to business entrepreneurs, as they prefer to take substantial risks compared to other groups. Additionally, the lack of financial literacy is a common cause of business failure (Bosma and Harding, 2006). Indeed, many entrepreneurs are

highly technically specialized but may disregard their financial knowledge, before venturing into business (Drexler, Fischer and Schoar, 2010).

6. Conclusion

Overall, the findings in this dissertation are consistent with our hypotheses, indicating that business entrepreneurs risk tolerance differs from their financial risk tolerance. Business entrepreneurs make day-to-day corporate decisions that are not in tandem with their personal finance choices, as the evidence above suggests. Business entrepreneurs not only have the lowest stock market participation, but when compared to other investors, they are less willing to take risks, except for the most extreme ones.

Market volatility and age seem also explain the risk tolerance profile of business entrepreneurs. Their high ambiguity tolerance could make them more willing to take extreme risks when volatility is high and less risks in general when volatility is low when compared to others. Higher risk aversion could stem from a combination of factors that include low education, opportunity costs and access to privileged information.

Our work has some limitations that must be acknowledged. First, most part of the entrepreneurs in the database are “successful” to different extents and it is not possible to identify individuals who had previous failures in entrepreneurship or how long has it been since they founded their venture. It would be interesting to see whether the results vary, with a different database that identifies such cases. Second, our research was conducted for US households, which may limit the generalization of the findings to other contexts. Cultural, economic, and social factors unique to the studied context may influence the results. As such, replicating this study in different settings could help determine the broader applicability of the conclusions.

Additionally, in methodological terms, we used the allocation of risky assets (stocks and real estate) as independent variables. Indeed, we are aware that risk tolerance influences the allocation of assets into stocks and real estate assets. This reverse causality was not adequately dealt in our model and our estimates may reflect that. As such, our findings should be interpreted with caution given endogeneity issues: the relationship between risk tolerance and asset allocation decisions may be confounded by reverse causation or omitted variables. Specifically, risk tolerance drives investment choices, leading to higher

holdings of risky assets. Conversely, the experience of holding diverse investments might shape or alter an individual's risk tolerance over time. Additionally, omitted variables and broader economic conditions could influence both risk tolerance and portfolio asset allocation decisions.

To address these issues, various methodological approaches such as instrumental variables, lagged variables, and robustness checks should be employed. While the effectiveness of these methods in fully resolving causality and endogeneity concerns is limited by the availability and appropriateness of instruments and data, further work needs to address that using more robust estimation techniques

Notes

ⁱ Linear regression assumes a continuous dependent variable, making it unsuitable in this case. In an ordered logistic model, all categories of the dependent variable are analyzed simultaneously in relation to the independent variables. This approach prevents obtaining distinct estimates for each category of the dependent variable, and statistical testing confirms its inadequacy for this analysis. The multinomial logistic model is also rejected, as it disregards the ordered structure of the dependent variable.

ⁱⁱ The presence of related children under 18 and being married has a significant, negative relationship with Some Risk and High Risk. Variables that generally have a statistically positive relationship with all specifications of risk include Sex, the level of non-financial assets, having real estate, being self-employed, income level, expecting a substantial inheritance, and level of health. Having monetary assets worth more than three months of income has a positive and significant relationship to some risk but has a negative significant relationship with Substantial Risk. Having higher levels of debt shows a positive relationship with both high Risk and Substantial Risk. Three minority status categories (Black and Other) have a significant negative relationship with Some Risk, but Black and Hispanic have a significant positive relationship with Substantial Risk.

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