

2173

Discussion Papers

Deutsches Institut für Wirtschaftsforschung

2026

Personality Traits of Entrepreneurs and the Size of Their Firms

Berfin Kardaslar, Alexander S. Kritikos, Lukas Menkhoff

Opinions expressed in this paper are those of the author(s) and do not necessarily reflect views of the institute.

IMPRESSUM

© DIW Berlin, 2026

DIW Berlin
German Institute for Economic Research
Anton-Wilhelm-Amo-Str. 58
10117 Berlin

Tel. +49 (30) 897 89-0
Fax +49 (30) 897 89-200
<http://www.diw.de>

ISSN electronic edition 1619-4535

Papers can be downloaded free of charge from the DIW Berlin website:
<http://www.diw.de/discussionpapers>

Discussion Papers of DIW Berlin are indexed in RePEc and Econstor:
<http://ideas.repec.org/s/diw/diwwpp.html>
<https://www.econstor.eu/handle/10419/10>

Personality Traits of Entrepreneurs and the Size of their Firms

Berfin Kardaslar ¹, Alexander S. Kritikos ², and Lukas Menkhoff ³

Abstract: In this study, we examine the relationship between personality traits, captured by risk tolerance and the Big Five traits, and firm size, as measured by the number of employees. We show that the personality of entrepreneurs matters for the size of their firm they operate. We use a novel add-on to the German Socio-Economic Panel that includes a sub-sample of owner-managers running larger firms. High levels of risk tolerance – associated with an increased likelihood of firm exit in existing research – is positively associated with firm size for entrepreneurs in the market. High scores in extraversion are also associated with larger firms. However, a high level of openness for experience, a main driver of founding ventures, is negatively related to firm size. Overall, we show that running larger firms is associated with traits that are partially different from those that increase the likelihood of entrepreneurial entry or survival.

JEL Classification: L26 (Entrepreneurship), D81 (Criteria for Decision-Making under Risk and Uncertainty), J24 (Human Capital; Skills; Occupational Choice; Labor Productivity)

Keywords: Entrepreneurship, risk tolerance, Big Five personality traits, firm size © 2026 The Author(s)

¹ *Humboldt-Universität zu Berlin and DIW Berlin; berfinkardaslar@gmail.com*

² *DIW Berlin (German Institute for Economic Research), 10108 Berlin, Germany, IZA, and University of Potsdam; akritikos@diw.de*

³ *DIW Berlin (German Institute for Economic Research), 10108 Berlin, Germany, Humboldt-Universität zu Berlin, and IfW Kiel; lmengkhoff@diw.de*

Corresponding author: Alexander S. Kritikos, DIW Berlin, Anton-Wilhelm-Amo-Straße 58, 10117 Berlin, Germany. E-mail: akritikos@diw.de, Phone: +49 30 89789 157, ORCID: <https://orcid.org/0000-0002-6150-8794>.

1. INTRODUCTION

While firm size is a fundamental metric of economic impact ([Lucas, 1978](#)), the size of an organization may also reflect the psychological dispositions of the entrepreneur who owns and manages the firm ([Baum & Locke, 2004](#)). Despite a robust literature connecting personality to entrepreneurial activities, we lack understanding of the psychological drivers of organizational scale. This gap is critical, as the firm size distribution is characterized by a prevalence of small firms and a limited number of larger firms, suggesting that the psychological traits associated with managing a large-scale organization may differ from the traits that drive firm entry.

Existing research in this context so far examines how the personality traits of entrepreneurs influence decisions and outcomes, such as venturing a new firm, firm survival ([Kerr et al., 2018](#); [Koch & Menkhoff, 2025](#); [Kritikos, 2022](#); [Zhao & Seibert, 2006](#)), hiring first employees ([Caliendo et al., 2022](#)), and income from entrepreneurship ([Hamilton et al., 2019](#); [Levine & Rubinstein, 2017](#)), also clarifying from an empirical perspective that personality is an important determinant of entrepreneurial decision making. Therefore, we aim to move beyond existing studies and identify in firms, where entrepreneurs are the key decision-makers, those personality traits that are associated with the size of their firms ([Baron, 2024](#)).

Following Upper Echelons Theory ([Hambrick & Mason, 1984](#)), we argue that running larger firms requires distinct psychological processes. First, managing such firms is associated with risky decisions and with absorbing uncertainty. Accordingly, the risk tolerance of entrepreneurs is regarded as a core characteristic ([Stewart & Roth, 2001](#)). Yet, it is not clear how risk tolerance is associated with firm size. Evidence focuses on the extensive margin, like firm survival. Empirical findings show that a medium level of risk tolerance increases firm survival, while high levels of risk tolerance are rather detrimental ([Caliendo et al., 2010](#); [Hvide & Panos, 2014](#); [Nieß & Biemann, 2014](#)). This observation is interpreted in different ways. It is claimed that individuals with high risk tolerance are more likely to start marginal businesses with less ambitious

ideas (Nieß & Biemann, 2014). In contrast to this, it is also argued that these individuals are willing to start rather larger and more ambitious projects with higher risks, potentially yielding larger firms (Caliendo et al., 2010). To reveal which of the two interpretations prevail, i.e. how risk tolerance is associated with firm size, an empirical analysis is required. Managing larger firms is also associated with complex decision-making processes (Hambrick & Mason, 1984), with the institutionalization of processes and resource mobilization that require managerial abilities of entrepreneurs. Despite these theoretical alignments, empirical evidence regarding how these traits manifest in the context of organizational scale remains remarkably scarce.

To close this gap, this paper examines whether, and if so, how the personality traits of entrepreneurs are associated with the size of their firms. To do so, we use information on the Big Five personality construct (Zhao & Seibert, 2006) and on risk tolerance, arguably an important personality trait regarding the development of their firms (Caliendo et al., 2022) that is only imperfectly captured by the Big Five (Paunonen & Ashton, 2001). For our empirical analysis, we focus on the German economy. It provides a proper environment to study entrepreneurial characteristics because it is dominated by family-owned firms, the German "Mittelstand." These firms are mostly run by entrepreneurs providing a perfect setting for our research. To capture the full range of these firms, we utilize a novel combination of representative household data, the German Socio-Economic Panel (SOEP), and a targeted entrepreneurial sample, the so-called "SOEP-P" survey of entrepreneurs (owner-managers) of rather larger firms.

In our empirical analysis, we find that personality matters for firm size. Most importantly, while previous research observes that the likelihood of firm exit increases with the risk tolerance of their entrepreneurs, our research reveals that, for entrepreneurs in the market, high levels of risk tolerance are positively associated with firm size. High scores in extraversion, not related to firm exit, are also associated with larger firms, while high levels of openness for experience, a main driver of founding ventures, is rather associated with solo-entrepreneurship.

With our analysis, we contribute to the literature on personality and entrepreneurship by expanding the analysis of personality traits to their association with firm size. We demonstrate that the personality traits that increase the likelihood of entrepreneurial entry or survival are mostly distinct from those associated with firm size. We refine the 'risk paradox' in entrepreneurship, by showing that risk tolerance, inducing higher firm exit rates (Caliendo et al., 2010; Hvide & Panos, 2014; Nieß & Biemann, 2014), is associated with managing larger firms. We show that this seeming paradox is consistent with a simple selection mechanism. Risk tolerance widens the dispersion of entrepreneurial outcomes, placing risk-tolerant entrepreneurs disproportionately in both tails, among the exits and among the largest firms.

The article is structured into five further sections. The following sections develop hypotheses regarding specific traits, describe our methodology, before we show our findings on the relationship between the personality traits of entrepreneurs and the size of their firms. Finally, we discuss the implications of our findings for entrepreneurship, before we conclude.

2. THEORETICAL CONSIDERATIONS

Research has established that personality traits are a central factor for understanding entrepreneurial activities (Zhao & Seibert, 2006). For this study, we use the Big Five model (Costa & McCrae, 1992), with the addition of risk tolerance. Existing research investigates how these traits influence entrepreneurial decisions, including the entry decision, the decision to hire employees for the first time, and the exit decision. It further examines how personality is related to income from entrepreneurship being loosely related to the outcome variable, firm size.

Managing larger firm involves complex decision-making and distinct administrative demands, such as process formalization, resource mobilization, staff management in a way that employees work productively, and strategic innovation (Hambrick & Mason, 1984). We discuss how such requirements likely correspond to personality traits serving as the dispositional foun-

dations for the strategies and objectives associated with larger firms (Baum & Locke, 2004).

Risk tolerance. Every entrepreneurial decision requires risk tolerance to some degree because the outcome of any given investment cannot be fully predicted. Accordingly, risk tolerance is an established core characteristic of entrepreneurs, with studies showing a causal relation (Chanda & Unel, 2021; Nieß & Biemann, 2014). From previous research, we also know that high risk tolerance is associated with a higher probability of firm failure, with research pointing to a U-shaped relationship between this variable and exit from entrepreneurship (Caliendo et al., 2010; Nieß & Biemann, 2014). Yet, making investments in larger firm and employing people are risky decisions, as much as delegating responsibilities to them (Caliendo et al., 2022; Kihlstrom & Laffont, 1979). Similarly, larger firms that are defined by capital intensity and by high innovation rates, are working in a high-risk, high-reward environment, as it demands innovation and other high-risk strategic projects to maintain firm size. Therefore, we propose

Hypothesis 1 The risk tolerance of entrepreneurs is positively associated with firm size.

Conscientiousness. Conscientiousness addresses personality traits around need for achievement and dependability. Individuals scoring high in this trait are well organized and persistent. This is positively related to job performance and the creation of new jobs (Caliendo et al., 2022). As larger firms require standard operating procedures, hierarchies, and stable relations with business partners, dependability should also be positively related to firm size (Rauch & Frese, 2007; Zhao & Seibert, 2006). Need for achievement is similarly critical for entrepreneurial activities, as entrepreneurs, due to their status, are in more control of the performance of their venture and efforts to pay themselves off. Therefore, we hypothesize

Hypothesis 2 High conscientiousness of entrepreneurs is positively associated with firm size.

Extraversion. Extraversion describes the extent to which people are outgoing, optimistic, and talkative (Zhao et al., 2010). They tend also to be more assertive, confident, and energetic. Extraverted individuals tend to have more social relationships than introverted, which is

why it also influences the entry decision into entrepreneurship (Caliendo et al., 2014). In that sense, extraversion is important for entrepreneurs managing larger firms as they must establish and maintain relations – interacting with external stakeholders, including customers, partners, employees, suppliers, labor unions, and financiers. Thus, extraversion facilitates the social networking necessary to pull external sources into the firm. We propose

Hypothesis 3 The extraversion of entrepreneurs is positively associated with firm size.

Neuroticism. Neuroticism is associated with being unstable, anxious, and showing low levels of emotional stability. Individuals with high scores in neuroticism also tend to be less stress tolerant, less self-confident, more worrying, and more vulnerable (Zhao et al., 2010). When focusing on entrepreneurial decisions related to firm size, emotional stability (the opposite of neuroticism) allows for handling unexpected situations and cognitive processing during crises inherent to large firms, while not losing focus on important entrepreneurial tasks. We propose

Hypothesis 4 The neuroticism of entrepreneurs is negatively associated with firm size.

There are two traits with ambivalent impact. *Openness.* Given that individuals scoring high in openness have an innovation-seeking personality (Zhao & Seibert, 2006), we may expect, on the one hand, that openness is positively related to firm size because firms may have to stay innovative if they aim to maintain the size of their firm or even expand it (Baumann & Kritikos, 2016), requiring this kind of openness among the entrepreneurs. On the other hand, making firms large necessitates the ability to implement consolidating strategies toward firm development that do not constantly require more innovation. High scores in openness may, as Hamilton et al. (2019, p. 664f.) argue, “undermine entrepreneurial success if it means that individuals are less committed to a new business venture once it has been started,” thus needing individuals who score low in this trait. *Agreeableness.* Entrepreneurs scoring high in agreeableness mirror individuals with cooperative values and preferences for positive interpersonal relationships, qualities that might be particularly important for operating large firms (Zhao & Seibert, 2006).

By contrast, low levels of agreeableness may increase the willingness to set (sometimes necessary) personal boundaries, standing up for one's own goals, and the willingness to negotiate for personal interests ([Hamilton et al., 2019](#)) or in the interest of the own venture ([Caliendo et al., 2014](#)), and vice versa. In that sense, rather low levels of agreeableness, may be important for entrepreneurs once they have established their firms and grown them large. As it is unclear which effect prevails for these traits, we refrain from formulating a hypothesis on the relation between agreeableness and firm size, as well as between openness and firm size.

3. METHOD

3.1. Sample

The data employed in this research comes from the German Socio-Economic Panel (SOEP) study, a comprehensive survey capturing a representative sample of approximately 30,000 individuals across 15,000 households in Germany annually. In this paper, most data used was collected in the 2019 wave, when an additional new sample known as SOEP-P was introduced within the SOEP framework. It uses the identical questionnaire and interviewing methodology. The SOEP-P sample which is a random draw from the 600,000 residents in Germany with the largest company shares as identified in the global company database ORBIS, provided by Bureau van Dijk. Consequently, SOEP-P exhibits a high representation of entrepreneurs ([Schröder et al., 2020](#)) compared to the SOEP-Core, with entrepreneurs in SOEP-P typically managing larger firms than their counterparts in the SOEP-Core sample. This addresses the small-firm bias that is prevalent in most representative population surveys, such as the SOEP data, the British household panel (BHPS) data, and the US Panel Study of Income Dynamics (PSID). The selection process of SOEP-P results in a larger sample of entrepreneurs and provides the necessary variance in firm size, required to test our hypotheses for the full organizational scale.

The entrepreneurs sample used in our analysis encompasses adult individuals. We exclude

the bottom and top one percent of the age distribution to reduce potential noise from unusually young or old entrepreneurs. The remaining 98 percent of the entrepreneurs in our dataset fall within the age range of 24 to 79 years, with a median age of 54. Our dataset comprises a total of 2,815 entrepreneurs, of which 1,557 belong to the SOEP-P and 1,258 belong to the SOEP-Core. Additionally, we use longitudinal data from the SOEP-Core that provide panel information on the entrepreneurs' individual characteristics and previous working experience, allowing us to track them over time. These data enable us to make various robustness checks.

3.2. Measures

Dependent variables: entrepreneurs and the size of their firms The core survey item identifying entrepreneurs in this study centers on the respondents' main occupational status. Individuals are classified as entrepreneurs if they self-report being owner-manager or holding a managing partner role within their firms in which they are owners of the firm. We exclude two specific groups of self-employed individuals: farmers and those assisting family members.¹

We operationalize firm size as the number of employees. While metrics like sales or firm value are available (Kumar et al., 1999), employee count is a reliable proxy for organizational complexity in this dataset. In addition to our core measure of firm size, we utilize firm value as a robustness check in our analysis, albeit with availability limited to a smaller sample.

Independent variables: personality traits Regarding traits, the established measure in the literature is the Big Five personality construct (Costa & McCrae, 1992). Traits are constructed based on individual self-reports concerning specific characteristic descriptions. Participants rate the extent to which each characteristic applies to them by assigning a score between 1 and 7 for fifteen items - three items for each trait. The items of these traits, as surveyed in the SOEP, are shown in Table 1 and A1 in the Appendix, alongside a description of items for each trait.

¹The exclusion of farmers is motivated by the potential for bias introduced by incentives and subsidies prevalent in the agriculture industry in Germany, financed by EU funds. Similarly, we exclude individuals assisting family members in their businesses as they may not hold significant decision-making authority within the firms.

<Table 1>

In measuring risk tolerance, we use the self-assessment of individuals' risk tolerance on a scale from 0 (no willingness to take risk) to 10 (fully willing to take risk). For our analysis, we standardize the risk tolerance scale to 1-7. This adjustment aligns the risk tolerance measurement with Big Five personality factors, thereby facilitating comparability of the effects of these traits on firm size. Our personality measures rely on self-reported items. This raises the question of whether they capture actual dispositions as reliably as incentivized elicitation methods or observed behavior. For the risk tolerance item, this concern has been addressed directly. [Dohmen et al. \(2011\)](#) validate the SOEP survey question in an incentivized field experiment and show that it predicts risk-taking across a wide range of real-world domains, including self-employment. More broadly, survey-based and incentivized risk measures are positively correlated across elicitation methods and country contexts ([Menkhoff & Sakha, 2017](#)), and self-reported measures have been shown to predict behavior as well as experimental tasks, which are themselves subject to considerable measurement error ([Gillen et al., 2019](#)). We are therefore confident that our self-reported items provide meaningful measures of the underlying traits. For the Big Five, the short inventory used in the SOEP has been validated against the full instrument ([Rammstedt & John, 2007](#)), and SOEP-based Big Five measures have been shown to predict entrepreneurial outcomes in numerous studies ([Caliendo et al., 2014](#)).

Control variables Given that our research aim is to identify how the personality of entrepreneurs is associated with the size of the firms they run, we must control for individual characteristics that are known to affect these kinds of entrepreneurial outcomes. Such variables include characteristics such as the age ([Azoulay et al., 2020](#)), or gender ([Fairlie & Robb, 2009](#)) of the entrepreneur, the human capital of the entrepreneur ([Unger et al., 2011](#)), the marital status, and whether there is a migration background. There are also well-known business-related characteristics that we must control for, such as the age of the firm and its industry.

3.3. Selective descriptive statistics.

Firm size distribution of entrepreneurs. The share of solo-entrepreneurs among all entrepreneurs in the SOEP-Core is close to 60%, those with less than ten employees make up 30% of the firms, and 3% of the covered firms have more than 100 employees; the respective shares in the SOEP-P are 9% solo-entrepreneurs, more than 50% having one to ten employees, and 10% having more than 100 employees. Overall, 81% of all firms with more than 100 employees stem from the SOEP-P, indicating why this new sample is valuable for our research. Figure 1 shows the distribution of the number of employees per firm. As a first descriptive analysis, we relate the number of employees to risk tolerance of the respective entrepreneurs. Figure 2 shows that the larger the firm, the higher is the risk tolerance of the respective entrepreneur.

<Figures 1 and 2>

In Table 2, we provide descriptive statistics on all individual characteristics of the two samples, then distinguish between entrepreneurs and the others. We show results in Panels A (personality) and B (socio-demographics) of Table 2, indicating whether differences between entrepreneurs and others are statistically significant. Results tentatively confirm what we know about entrepreneurs ([Caliendo et al., 2014](#); [Zhao et al., 2010](#)). Going into new territory, the differentiation into two samples, SOEP-Core representing all entrepreneurs and SOEP-P covering mainly entrepreneurs with larger firms, indicates that the group of entrepreneurs are more heterogeneous than expected when based on general population surveys.

<Tables 2 and 3>

Firm characteristics. There is information about the industry in which they operate (Table 3). Our dataset has high coverage of industry information (96.65%). The willingness to respond to the question regarding firm value is lower at 55% of all entrepreneurs (Table 2).

3.4. Empirical Strategy

We start analyzing those factors that are associated with an individual's likelihood of being an entrepreneur using the total sample. Our predictor variables of interest are risk tolerance and the Big Five personality traits, both alongside socio-demographic characteristics. We employ four logit regression models to assess the relationship between individual characteristics and the likelihood of entrepreneurship. The combined logit model prediction equation is:

$$\Pr(\text{entrepreneur} = 1) = F(\beta_0 + \beta_1 \text{demographics} + \beta_2 \text{risk tolerance} + \beta_3 \text{big five}) \quad (1)$$

where

$$F(z) = \frac{e^z}{1 + e^z} \quad (2)$$

is the logistic cumulative distribution.

To examine the potential contribution of entrepreneurs' personality traits in elucidating firm size, our predictor variables of interest encompass individual risk tolerance and the Big Five personality traits, while we control for socio-demographic characteristics. We employ Ordinary Least Squares (OLS) regressions on the total sample. In our dataset, the firm sizes of the entrepreneurs are reported in intervals. Utilizing OLS regression, we treat the firm size categories as a continuous variable. Consequently, a significantly positive coefficient suggests a positive association of individual entrepreneurial characteristics with the likelihood of having a larger firm. In our main analysis, when we consider all potentially relevant variables, the OLS model we employ is as follows:

$$\text{size} = \beta_0 + \beta_1 \text{demographics} + \beta_3 \text{industry dummies} + \beta_4 \text{risk tolerance} + \beta_5 \text{BigFive traits} + \varepsilon. \quad (3)$$

4. RESULTS

4.1. Entrepreneurs' characteristics relative to other individuals

We start by comparing the individual characteristics of entrepreneurs to the general population. Table 4 presents the results. We employ hierarchical regression, and, while socio-demographics were significant, our focus remains on the full model (column 4) that includes the personality dimensions. The likelihood ratio test indicates that including all personality traits significantly improves the model fit. The coefficients of socio-demographic variables have the signs as expected from the literature in all specifications (Caliendo et al., 2014). We find that a higher level of risk tolerance and of openness exhibit a positive association with an individual's likelihood of being an entrepreneur, as do a higher score in extraversion and a lower score in neuroticism, confirming earlier research (Caliendo et al., 2014; Zhao & Seibert, 2006) and, thus, further establishing the validity of our data.

4.2. Entrepreneurs' characteristics in relation to firm size

The main focus is examining the contribution of entrepreneurs' personality traits in elucidating firm size. We employ three nested OLS regressions to investigate the relationship between personality traits and firm size. The inclusion of all Big Five traits and of risk tolerance in one specification (Step 4) increases the adjusted R-squared over the baseline model of demographics and firm characteristics, suggesting that dispositional traits enhance the model fit.

Table 5 presents the results of the hierarchical OLS regressions (columns 1 to 4) and of the ordered logit (column 5) in relation to firm size. Consistent with Hypothesis 1, risk tolerance is positively associated with firm size even after controlling for human capital and industry effects. Hypothesis 3 is also supported; extraversion exhibits a positive association with organizational scale. However, a critical divergence emerged regarding openness to experience. While openness increases the likelihood of being an entrepreneur (Table 4), it is negatively

associated with firm size (Table 5). Hypotheses 2 and 4 are not supported, as conscientiousness and neuroticism have no significant relationship with firm size, although for neuroticism we observe a negative association to firm size when not controlling for risk tolerance. Last, agreeableness which is left without hypothesis, has also no association with firm size. Results on socio-demographic characteristics are consistently associated with firm size throughout all specifications. Advancing in age, being married, male, and having higher education increase the probability of having a larger firm, confirming earlier research ([Azoulay et al., 2020](#); [Mata, 1996](#)). Having a migration background is associated with a significantly smaller firm size. Last, but not least, firm size tends to increase with firm age, which is a natural progression as firms require time to grow.

Since firm size is reported in ordered categories, column (5) of Table 5 re-estimates this specification with an ordered logit. All results from the OLS estimation are fully confirmed, in terms of signs and significance of the coefficients.

<Tables 4 and 5>

4.3. How traits relate to firm size for different kinds of entrepreneurs

We provide in the following additional information on the relationship between personality traits and firm size. More specifically, to further understand the observed differences between entry into entrepreneurship and firm size, we compare solo entrepreneurs with those who employ at least one person. ([Rauch & Frese, 2007](#)).

Solo-entrepreneurs vs. entrepreneurs running firms with employees. To examine the probability of being a solo-entrepreneur relative to those who hire at least one other person, the empirical setup employs a Logit regression. Results are presented in Table 6, column (1). Note that coefficients now have the opposite signs for the self-employed without employees when compared to the former analysis. For example, while risk tolerance is higher among those becoming

entrepreneurs relative to non-entrepreneurs, risk tolerance is lower among solo-entrepreneurs relative to entrepreneurs having firms with employees. Solo-entrepreneurs are also more open to new experiences than entrepreneurs who hire employees.

Entrepreneurs with employees. In Table 6, column (2), the regression from Table 5 column (4) is repeated, with column 2 considering those entrepreneurs who employ other people in their firm. Overall, this sample is more homogeneous and, accordingly, coefficients become tentatively smaller. Our earlier results are confirmed, with high scores for risk tolerance and extraversion, but low scores of neuroticism being positively associated with firm size, highlighting their role in managing organizational complexity rather than being a mere solo-entrepreneur.

Explaining firm size within different age groups. Moreover, we examine whether the relationship between characteristics and firm size differs between two age groups of firms. To this end, we distinguish between firms that are less than five years old and those that are five years or older. The results are shown in columns (3) and (4) of Table 6. These results essentially mirror those in column (2); however, they are less significant for younger firms. In particular, the coefficients on personality traits are insignificant. This suggests that any associations between these traits and firm size only become significant in the estimation after firms have matured. Therefore, a combination of high scores in risk tolerance and extraversion alongside low scores in openness and neuroticism remains important throughout.

<Table 6>

4.4. Robustness tests

We check the robustness of our findings in four ways. We (i) analyze the non-linear relation between risk tolerance and firm size; (ii) use another measure of firm size, firm value; (iii) check the main relations by applying them to the SOEP-Core sample; and (iv) use the panel data from (iii) to analyze whether our results are consistent with what we know about firm survival.

Non-linear consideration of risk tolerance. Results so far suggest that there is a linear positive association between risk tolerance and firm size. In the first robustness check, we add an additional squared risk term to the benchmark regression, explaining firm size, as shown in Table 5, column (4). We present this regression in column (4) of Table 7. All coefficients beyond risk tolerance are basically unchanged; i.e. similar to Table 5 column (4). The linear coefficient on risk is now insignificant, while the squared term is positive and significant, such that larger firm size again coincides with high risk tolerance.

Firm value as alternative measure. We use (the log of) firm value as the measure of firm size; however, data is missing as there are now fewer observations. As the first step, we repeat the benchmark regression from Table 5 (column 4), explaining firm size, for the new reduced sample. Likely due to the smaller sample, explanatory power is reduced as the comparison of adjusted R-squared indicates. Results presented in column (1) of Table 8 largely confirm what we know from the larger sample (see Table 5, column 4). Using this benchmark, results with firm value (column 2) confirm the previous results on firm size shown in column (1): high scores in risk tolerance and low scores of neuroticism are positively associated with firm value.

<Tables 7 and 8>

Relationships when using only SOEP-Core. In this analysis, we use only the SOEP-Core but for a longer period, i.e. covering 2000-2019. Thus, we include all individuals who were entrepreneurs at some point during this period, in total 5,721 persons. To prevent survival bias in the OLS regression for firm size, we also include those who exited. This approach ensures that the size regression uses the full sample of entrepreneurs, not just those who survived; each firm captured by the SOEP-Core over the sample period is included once. This sample implies that larger firms now make up only a small fraction relative to our total sample used so far, given that SOEP-P is omitted. Accordingly, results may not fully reflect what we previously revealed from the complete sample including SOEP-P.

Table 7, column 1, presents the results explaining firm size using the same specification as in Table 5, column 4, but now without the entrepreneurs from SOEP-P. The coefficients with this sample are smaller in magnitude compared to the results of our original complete sample (in Table 5, column 4). Socio-demographic relations hold, as do the coefficients on risk tolerance and openness. The coefficient on conscientiousness becomes significant while the coefficient for extraversion becomes insignificant, both keeping their signs. Overall, these results tend to confirm our previous findings, but also demonstrate why the inclusion of the SOEP-P is important as it increases heterogeneity in firm size and, thus, has more explanatory power. It includes entrepreneurs who take on more risk, which is associated with running larger firms.

<Figure 3>

Analysis of firm survival. Studies show that individual characteristics are associated with firm survival. We test whether our results fit into this literature. Given that the analysis requires panel data to observe both firm survival and firm exit over time, we use the SOEP-Core sample from 2000 to 2019. To analyze the probability of survival, we employ a Probit regression. A crucial variable to understand survival is risk tolerance and, in particular, its non-linear impact. Earlier studies find that the survival probability is highest for entrepreneurs with moderate risk tolerance. Thus, to test these results, we introduce a squared term in addition to the conventional linear term for risk tolerance.

Column 2 of Table 7 shows the results of the respective Probit regression, where the dependent variable is the probability of exit. Regarding the coefficients on risk tolerance, these indicate, as the literature expects, an inverse U-shaped relationship between risk tolerance and survival, as depicted in Figure 3. This suggests that the level of risk tolerance for maximizing survival probability is between 7 and 8 on a scale from 0 to 10. Entrepreneurs with lower or higher risk tolerance are less likely to survive, in line with literature.

Column 3 presents the results of the Cox proportional hazards model, where the hazard is

the event of exit, and the hazard time is measured as the age of the entrepreneur at exit. The Cox results also suggest an inverse U-shaped relationship between risk tolerance and survival. Initially, higher risk tolerance reduces the hazard of exit, increasing the survival probabilities. However, after reaching a certain threshold, higher risk tolerance begins to increase the hazard of exit, reducing survival. This non-linear relationship implies that while moderate risk-taking can be beneficial for survival, high levels of risk-tolerance increase the likelihood of exit. In terms of Big Five personality traits, we confirm previous findings, according to which high levels of conscientiousness alongside low levels of agreeableness and neuroticism reduce exit probabilities ([Caliendo et al., 2014](#); [Ciavarella et al., 2004](#)).

The comparison between columns (2) and (4), which explain firm exit and firm size with specifications as close as possible to each other, reveals a diverging associations among traits across entrepreneurial margins. Notably, the functional forms for risk tolerance diverge, concave for survival, convex for firm size; we return to this asymmetry in Section 5. Conscientiousness and neuroticism, both unrelated to firm size in our main specification, are significantly related to exit. High conscientiousness lowers the probability of leaving the market, while high neuroticism raises it. Rather than interpreting the null results in the size regressions as the absence of a role for these traits, the survival regression locates where their role lies. Dependability and emotional stability appear essential for keeping a firm in the market, but they do not distinguish entrepreneurs of larger firms from those of smaller ones. Consistent with this interpretation, conscientiousness turns significantly positive for firm size when the sample is restricted to the SOEP-Core (column 1), i.e., predominantly smaller firms, suggesting that its returns are concentrated at the lower end of the size distribution. This margin-specific pattern is a further manifestation of the dispositional divergence at the core of this paper, namely which traits matter depends on which entrepreneurial outcome is at stake.

5. DISCUSSION

While research has established that personality traits are an essential determinant of entrepreneurial activities ([Zhao & Seibert, 2006](#)), our findings highlight a significant dispositional divergence across different entrepreneurial outcomes. Using a novel sample of the German Socio-Economic Panel, which incorporates information on entrepreneurs and owner-managers of larger firms, we demonstrate that personality traits influencing firm entry or survival differ from those linked to firm size. Most notably, we find divergent associations regarding risk tolerance: while it characterizes entrepreneurs managing larger firms, it also coincides with higher hazard of firm exit ([Caliendo et al., 2010](#); [Koch & Menkhoff, 2025](#); [Nieß & Biemann, 2014](#)).² Also, openness to experience, which increases the likelihood of entering entrepreneurship, is positively associated with solo-entrepreneurship, but negatively with firm size. The results suggest that the personality of entrepreneurs is uniquely aligned with specific organizational states.

The divergent associations for risk tolerance offer a psychological perspective on the skewed distribution of firm sizes. Managing organizational scale involves navigating substantial uncertainty, such as capital intensity and hierarchical expansion. Accordingly, entrepreneurs found in the upper tail of the firm size distribution are characterized by the capacity to absorb this uncertainty. Notably, this attribute represents a double-edged sword, as it simultaneously coincides with a higher hazard of firm exit. If high risk tolerance is associated with entrepreneurial choices of higher variance — more ambitious projects, larger and riskier investments, then highly risk-tolerant entrepreneurs should be overrepresented in both tails of the distribution of entrepreneurial outcomes, among those who exit the market and among those who end up managing larger firms. The concavity of survival and the convexity of size are the hallmarks of a variance-driven selection mechanism. Under this interpretation, the two findings are not contradictory but two sides of the same process. High risk tolerance does not make firms large

²See also [Benítez et al. \(2024\)](#) who investigate risk tolerance at the other end of the risk scale, namely for hybrid entrepreneurs.

per se. It widens the dispersion of outcomes, and, conditional on remaining in the market, the survivors among the highly risk-tolerant are disproportionately found among the largest firms. We nevertheless emphasize that our cross-sectional data allow us to document this pattern, not to test the mechanism directly. Panel data tracking entrepreneurs' growth trajectories would be required for such a test.

Moreover, while openness to experience aligns with creativity and divergent thinking (Caliendo & Rodríguez , 2024) required for market entry and for solo ventures, it is negatively associated with firm size; the management of larger firms is characterized by a shift toward convergent, stabilizing structures that may be less compatible with high levels of openness. Entrepreneurs with high openness might be more likely to invest in continued product development rather than exploiting existing products. Consequently, firms led by less open entrepreneurs tend to grow through production- and output-driven investment.

Conversely, while extraversion exerted no influence on firm survival, it characterizes entrepreneurs managing larger organizations. This likely reflects the interpersonal and resource-mobilization facets of extraversion, which align well with the demands of larger firms that require the management of complex stakeholder networks, including employees, investors, and large-scale partners. A transformational, extraversion-driven management style that mobilizes stakeholders, employees, and investors appears to be a plausible behavioral channel through which extraversion translates into organizational scale.

Regarding neuroticism, our findings suggest a nuanced role for this trait across different organizational outcomes. While low neuroticism negatively influences firm entry to some extent, its relationship with firm size does not appear robust, surfacing primarily in our sensitivity analyses. This distinction suggests that emotional stability may function as a dispositional baseline for entrepreneurship by providing the resilience necessary for remaining in operation. In contrast, conscientiousness and agreeableness, which both influence firm survival, show no signifi-

cant relationship with firm size. Although this suggests that dependability of conscientiousness and low levels of agreeableness may be essential for maintaining a viable business, these do not appear to be the primary markers that distinguish larger firms from smaller ones.

Together these findings support a contingency view of entrepreneurial characteristics, by demonstrating that traits that predict business founding and business survival are distinct from, and sometimes at odds with those that are associated with firm size.

Implications. Our findings have critical implications for the strategic selection and development of entrepreneurs. The observed divergence in personality traits implies a fundamental trade-off: traits associated with organizational scale, such as high risk tolerance and extraversion, do not necessarily align with traits that predict survival. Consequently, interventions aiming for organizational scale must be prepared to navigate the higher hazard rates associated with the risk-tolerant leadership. Furthermore, our results suggest that, as firms mature beyond solo ventures, founders may need partners or managers who possess social and administrative traits associated with larger organizational structures.

Limitations, future research, and further data infrastructure requirements. Our research has several limitations. Our analysis identifies associations between personality traits and firm size. It does not identify causal effects. Three concerns caution against a causal reading, with the first one being reverse causality. However, the Big Five traits and risk tolerance show relatively high stability in adulthood and change little even in response to major life events ([Cobb-Clark & Schurer, 2012](#); [Fitzenberger et al., 2021](#)) suggesting that reverse causality is not a primary threat to these findings. A second is sample selection. Since we observe entrepreneurs in the market, those managing large firms are by definition survivors, so the traits we associate with size may partly reflect traits required to survive at scale. Third, unobserved factors such as cognitive ability or access to capital may shape both personality expression and firm size. Two features of our setting mitigate, though they do not eliminate, these concerns. Personality traits are formed,

as mentioned before, largely early in life, so the temporal ordering plausibly runs from traits to firm-size outcomes that accumulate over decades of entrepreneurial activity. Moreover, our robustness checks drawing on the SOEP-Core panel confirm the main patterns. Our estimates should nevertheless be read as correlations. Moving toward causal evidence requires panel data in which personality is measured prior to, and repeatedly over, the life-cycle of the firm. These are data that, for entrepreneurs of larger firms, do not yet exist.

Thus, future research, also for other countries, should address these limitations by analyzing panel data that specifically include samples of entrepreneurs managing larger firms. More specifically, future research should explore the mediating behaviors that link traits to size. For example, does extraversion lead to larger firms through increased venture capital acquisition or through more effective labor recruitment? Moving beyond associations to these behavioral mediators will refine our understanding of the psychological reach of entrepreneurs. Moreover, future research should also dig more deeply into the critical distinction between firm-specific types of risks, for instance separating existential operational risk (prevalent in small firms) from necessary strategic risk (more prevalent in large firms). In a similar direction, our observation of a risk-paradox related to firm survival and firm size requires a more coherent model that reflects the evolving relationship between risk tolerance and firm size across the organizational life-cycle of a firm. However, such research requires better research data infrastructure. In this sense, the German SOEP has certainly provided an example for the collection of novel data, which now must evolve into panel data.

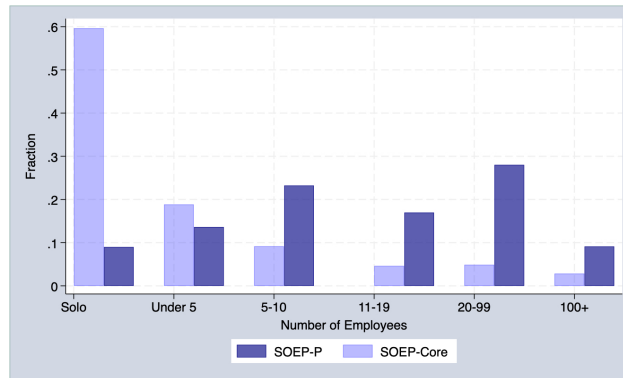
6. CONCLUSION

Our study shows that the psychological traits of entrepreneurs, as measured by risk tolerance and the Big Five personality traits, are significantly associated with firm size. Using a novel sample of entrepreneurs that captures the full distribution of firm sizes, our findings highlight a

notable difference in traits associated with managing larger firms compared to those increasing the likelihood of entrepreneurial entry or survival. While high risk tolerance is linked to higher exit rates, it is a key characteristic of those managing larger firms in the distribution. Rather than a contradiction, this pattern points to risk tolerance as a driver of outcome dispersion. It raises both the chance of failure and the chance of exceptional scale. And while openness to experience facilitates entry, it appears to be a liability for firm size. Extraversion, not affecting the likelihood of firm survival, is associated with managing larger firms. These findings suggest that the psychological demands of entrepreneurship shift as a firm matures from a solo venture into a complex organization.

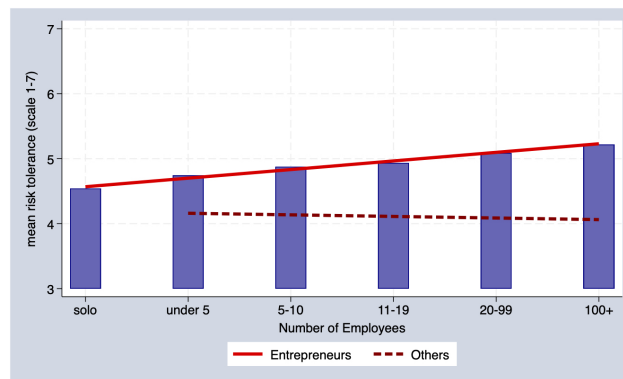
TABLES AND FIGURES

Figure 1: Firm size distribution



Data based on SOEP 2019.

Figure 2: Risk tolerance by firm size



Data based on SOEP 2019.

Table 1a: Personality Items in the SOEP Questionnaires

Personality Trait	Questionnaire Wording	Item's Short Name
<i>Big Five Factor Model (Scale: 1 to 7)</i>		
Openness to experience	is original, comes up with new ideas	original
	values artistic experiences	artistic
	has an active imagination	imaginative
Conscientiousness	does a thorough job	thoroughworker
	does things effectively and efficiently	efficient
	tends to be lazy (inverted)	lazy
Extraversion	is communicative, talkative	communicative
	is outgoing, sociable	sociable
	is reserved (inverted)	reserved
Agreeableness	has a forgiving nature	forgiving
	is considerate and kind to others	considerate
	is sometimes somewhat rude to others (inverted)	rude
Neuroticism	worries a lot	worries
	gets nervous easily	nervous
	is relaxed, handles stress well (inverted)	relaxed
<i>Risk tolerance (Scale: 0 to 10)</i>		
Risk tolerance	Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?	risk tolerance

Table 1b: Description of the Control Variables

Variable	Definition
Firm age	Age of the firm since foundation
Years of education	Total number of years of education in school and university
Entrepreneur's age	Age of entrepreneur
Migration background	Dummy for one of the parents not having German as their native language
Female	Dummy for being a woman
Marital status	Dummy for being single
Industry	Dummy for one of seven broad industry categories: (1) Primary & secondary sectors, (2) Construction, (3) Trade & hospitality, (4) Transport & communication, (5) Financial services, (6) Business services, (7) Public & personal services
Firm/asset value	Value of firm in Euros

Note: Dummy variables equal 1 if condition holds and 0 otherwise.

Table 2: Individual characteristics

Panel A	SOEP-Core			SOEP-P		
	Entrepreneurs	Others	Difference	Entrepreneurs	Others	Difference
<i>Personality traits</i>	(1)	(2)	(3)	(4)	(5)	(6)
<i>Risk tolerance</i>	4.53	3.90	0.64***	5.04	4.39	0.65***
<i>Openness</i>	5.05	4.53	0.53***	5.09	4.77	0.32***
<i>Conscientiousness</i>	5.87	5.76	0.11***	6.01	5.97	0.04
<i>Extraversion</i>	5.07	4.88	0.19***	5.24	5.07	0.16***
<i>Agreeableness</i>	5.36	5.41	−0.06**	5.45	5.51	−0.06
<i>Neuroticism</i>	3.34	3.64	−0.30***	2.98	3.45	−0.47***
<i>Number of observations</i>	1,258	26,207		1,557	883	

Panel B	SOEP-Core			SOEP-P		
	Entrepreneurs	Others	Difference	Entrepreneurs	Others	Difference
<i>Socio-demographic characteristics</i>	(1)	(2)	(3)	(4)	(5)	(6)
<i>Female</i>	0.41	0.52	−0.12***	0.25	0.59	−0.34***
<i>Single</i>	0.20	0.27	−0.07***	0.11	0.14	−0.03**
<i>Years of education</i>	13.85	11.91	1.94***	14.23	13.76	0.47***
<i>Migration background</i>	0.15	0.18	−0.03***	0.07	0.07	0.01
<i>Firm/asset value</i>	365.0k	700.0k	−335.0k	1.82m	1.9m	−80.0k
<i>Number of observations</i>	1,258	26,207		1,557	883	

Note: The means of individual characteristics are compared between entrepreneurs and others, along with the differences between these means.

The analysis is conducted within the SOEP-Core and within SOEP-P. Data based on SOEP 2019.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 3: Industry composition

	SOEP-Core (1)	SOEP-P (2)	Total (3)
<i>Wholesale and retail trade</i>	3.99%	12.69%	16.68%
<i>Professional, scientific activities</i>	7.64%	7.82%	15.46%
<i>Manufacturing</i>	2.99%	10.74%	13.73%
<i>Construction</i>	3.36%	6.64%	10.00%
<i>Health and social work activities</i>	6.38%	2.10%	8.49%
<i>Information and communication</i>	2.84%	3.87%	6.72%
<i>Total</i>	44.58%	55.42%	100.00%
<i>Number of observations</i>	1,208	1,502	2,710

Note: The first two rows indicate the share of high-tech and medium-tech sectors in the SOEP-Core and SOEP-P, respectively, and provide the significance of the difference between the two samples. Subsequent rows detail the composition of entrepreneurs' industries when information is available. Data based on SOEP 2019.

Table 4: Likelihood of being an entrepreneur

Dependent variable:	Indicator of entrepreneurship			
	(1)	(2)	(3)	(4)
<i>Entrepreneur's age</i>	0.328*** (0.000)	0.333*** (0.000)	0.326*** (0.000)	0.330*** (0.000)
<i>Entrepreneur's age squared</i>	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
<i>Marital status : single</i>	0.059 (0.378)	0.077 (0.258)	0.064 (0.351)	0.069 (0.324)
<i>Female</i>	-0.972*** (0.000)	-0.768*** (0.000)	-1.013*** (0.000)	-0.866*** (0.000)
<i>Years of education</i>	0.170*** (0.000)	0.172*** (0.000)	0.150*** (0.000)	0.155*** (0.000)
<i>Migration background</i>	-0.095 (0.183)	-0.109 (0.134)	-0.156** (0.031)	-0.151** (0.039)
<i>Risk tolerance</i>		0.442*** (0.000)		0.349*** (0.000)
<i>Openness</i>			0.341*** (0.000)	0.267*** (0.000)
<i>Conscientiousness</i>			0.058** (0.036)	0.052 (0.065)
<i>Extraversion</i>			0.141*** (0.000)	0.076*** (0.001)
<i>Agreeableness</i>			-0.032 (0.185)	0.018 (0.471)
<i>Neuroticism</i>			-0.157*** (0.000)	-0.093*** (0.000)
<i>Observations</i>	23,446	23,446	23,446	23,446
<i>Pseudo R²</i>	0.131	0.171	0.165	0.188

Note: The columns present the results of logistic regressions conducted with the dependent variable as the indicator of entrepreneurship, where the dependent variable is set to 1 if the individual is an entrepreneur and 0 otherwise. Data is based on SOEP 2019.

** $p < 0.05$; *** $p < 0.01$

Table 5: Personal traits and firm size

Dependent variable:	Firm Size				
	(1)	(2)	(3)	(4)	(5)
<i>Firm age</i>	0.040*** (0.000)	0.039*** (0.000)	0.039*** (0.000)	0.038*** (0.000)	0.049*** (0.000)
<i>Entrepreneur's age</i>	0.043** (0.027)	0.043** (0.027)	0.046** (0.019)	0.045** (0.021)	0.083*** (0.001)
<i>Entrepreneur's age squared</i>	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
<i>Marital status : single</i>	-0.588*** (0.000)	-0.588*** (0.000)	-0.542*** (0.000)	-0.540*** (0.000)	-0.612*** (0.000)
<i>Female</i>	-0.366*** (0.000)	-0.313*** (0.000)	-0.354*** (0.000)	-0.313*** (0.000)	-0.366*** (0.000)
<i>Years of education</i>	0.074*** (0.000)	0.073*** (0.000)	0.078*** (0.000)	0.078*** (0.000)	0.101*** (0.000)
<i>Migration background</i>	-0.221** (0.030)	-0.250** (0.014)	-0.194 (0.056)	-0.217** (0.032)	-0.265** (0.037)
<i>Risk tolerance</i>		0.126*** (0.000)		0.118*** (0.000)	0.160*** (0.000)
<i>Openness</i>			-0.082*** (0.003)	-0.107*** (0.000)	-0.146*** (0.000)
<i>Conscientiousness</i>			0.030 (0.394)	0.031 (0.377)	0.055 (0.210)
<i>Extraversion</i>			0.127*** (0.000)	0.108*** (0.000)	0.137*** (0.000)
<i>Agreeableness</i>			-0.023 (0.478)	-0.000 (0.999)	-0.002 (0.961)
<i>Neuroticism</i>			-0.075*** (0.005)	-0.051 (0.059)	-0.052 (0.116)
<i>Observations</i>	2,473	2,473	2,473	2,473	2,473
<i>Adjusted R²</i>	0.198	0.207	0.209	0.215	
<i>Pseudo R²</i>					0.081

Note: In columns (1)–(4), OLS regressions were conducted with the dependent variable 'firm size,' measured as the number of employees. The number of employees is provided in brackets in the data and treated as a continuous variable, as follows: 1 represents solo entrepreneurs, 2 corresponds to a range of 1–4 employees, 3 corresponds to the range of 5–10 employees, 4 corresponds to the range of 11–19 employees, 5 corresponds to the range of 20–99 employees, and 6 corresponds to firms with 100 or more employees. Column (5) reports an ordered logit regression using the same dependent variable. The reported coefficients are log-odds coefficients; positive (negative) coefficients indicate a higher (lower) likelihood of belonging to a larger firm-size category. The sample comprises both SOEP-P and SOEP-Core entrepreneurs. Regressions are controlled for seven broad industry categories. Data is based on SOEP 2019.

** $p < 0.05$; *** $p < 0.01$

Table 6: Different size and age groups

Dependent variable:	Solo	Firm Size		
Sample:	Total	Not solo entrepreneurs	Young firms (-5)	Old firms (+5)
	(1)	(2)	(3)	(4)
<i>Firm age</i>	-0.060*** (0.000)	0.020*** (0.000)	0.192*** (0.000)	0.034*** (0.000)
<i>Entrepreneur's age</i>	-0.127*** (0.000)	-0.022 (0.351)	0.025 (0.466)	0.008 (0.769)
<i>Entrepreneur's age squared</i>	-0.002*** (0.000)	0.000 (0.941)	-0.000 (0.250)	-0.000 (0.082)
<i>Marital status : single</i>	0.716*** (0.000)	-0.345*** (0.001)	-0.394 (0.055)	-0.574*** (0.000)
<i>Female</i>	0.541*** (0.000)	-0.093 (0.224)	-0.307** (0.038)	-0.299*** (0.000)
<i>Years of education</i>	-0.104*** (0.000)	0.051*** (0.000)	0.032 (0.204)	0.085*** (0.000)
<i>Migration background</i>	0.145 (0.376)	-0.236** (0.034)	-0.387** (0.027)	-0.137 (0.261)
<i>Risk tolerance</i>	-0.145*** (0.000)	0.085*** (0.001)	0.084 (0.108)	0.128*** (0.000)
<i>Openness</i>	0.218*** (0.000)	-0.024 (0.406)	-0.073 (0.240)	-0.116*** (0.000)
<i>Conscientiousness</i>	-0.150** (0.012)	-0.049 (0.177)	0.153 (0.057)	0.006 (0.873)
<i>Extraversion</i>	-0.134*** (0.007)	0.071** (0.019)	0.123 (0.077)	0.099*** (0.002)
<i>Agreeableness</i>	0.004 (0.943)	0.007 (0.831)	0.049 (0.488)	-0.007 (0.849)
<i>Neuroticism</i>	0.020 (0.653)	-0.058** (0.035)	0.044 (0.428)	-0.072** (0.017)
<i>Observations</i>	2,473	1,705	429	2,044
<i>Adjusted R²</i>		0.077	0.183	0.184
<i>Pseudo R²</i>	0.214			

Note: In column (1), a logit regression is conducted with the dependent variable being 1 if the entrepreneur is solo and 0 if she has at least one employee. In columns (2) to (4) OLS regressions were conducted separately for different groups of entrepreneurs. The first pair of columns represents different size groups: In column (2), the sample of entrepreneurs does not include solo entrepreneurs. The last two columns represent different age groups: In column (3), the analysis includes only firms classified as young (age 5 or less), and in column (4), the sample comprises only older firms (age more than 5). Regressions are controlled for seven broad industry categories. Data is based on SOEP 2019.

** $p < 0.05$; *** $p < 0.01$

Table 7: Survival analysis

Dependent variable:	Firm Size	Exit Rate (Probit)	Exit Rate (Proportional Hazard)	Firm Size
	(1)	(2)	(3)	(4)
<i>Firm age</i>	0.018*** (0.000)	-0.035*** (0.000)		0.038***
<i>Firm size</i>		-0.074*** (0.000)	-0.214*** (0.000)	
<i>Entrepreneur's age</i>	0.013*** (0.000)	-0.026*** (0.000)	0.009*** (0.001)	0.046** (0.018)
<i>Entrepreneur's age squared</i>	-0.000*** (0.000)	0.001*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)
<i>Marital status : single</i>	-0.182*** (0.000)	0.068 (0.067)	0.190*** (0.000)	-0.531*** (0.000)
<i>Female</i>	-0.238*** (0.000)	0.192*** (0.000)	0.370*** (0.000)	-0.310*** (0.000)
<i>Years of education</i>	0.021*** (0.000)	-0.032*** (0.000)	-0.033*** (0.000)	0.080*** (0.000)
<i>Migration background</i>	-0.011 (0.844)	0.052 (0.442)	0.390*** (0.000)	-0.224** (0.027)
<i>Risk tolerance</i>	0.059*** (0.000)	-0.202*** (0.002)	-0.175*** (0.006)	-0.249 (0.057)
<i>Risk tolerance squared</i>		0.018** (0.019)	0.018** (0.017)	0.041*** (0.004)
<i>Openness</i>	-0.065*** (0.000)	-0.028 (0.084)	-0.026 (0.131)	-0.110*** (0.000)
<i>Conscientiousness</i>	0.085*** (0.000)	-0.082*** (0.000)	-0.126*** (0.000)	0.022 (0.540)
<i>Extraversion</i>	0.000 (0.986)	0.008 (0.646)	-0.008 (0.677)	0.105*** (0.000)
<i>Agreeableness</i>	-0.027 (0.072)	0.026 (0.150)	0.056*** (0.003)	0.002 (0.948)
<i>Neuroticism</i>	-0.003 (0.812)	0.049*** (0.001)	0.072*** (0.000)	-0.053** (0.047)
<i>Observations</i>	5,721	5,721	5,721	2,473
<i>Adjusted R²</i>	0.067			0.218
<i>Pseudo R²</i>		0.090	0.016	

Note: In columns (1) to (3), the sample consists of entrepreneurs from SOEP-Panel, excluding SOEP-P. Column (1) presents the results of an OLS regression with the dependent variable as firm size. Column (2) displays the results of a probit model, where the dependent variable is the probability of exit. Column (3) shows the coefficients from Cox proportional hazards model estimation; the coefficients indicate the effect of each variable on the hazard of exit. Column (4) replicates Table 5, Column (4), with the addition of a risk-squared term. Data is based on SOEP-Panel 2000-2019.

** $p < 0.05$; *** $p < 0.01$

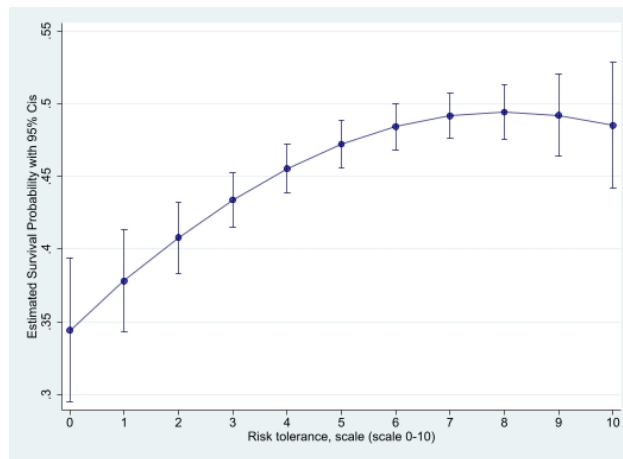
Table 8: Personal traits and firm value

Dependent variable:	Firm Size	Firm Value
	(1)	(2)
<i>Firm age</i>	0.036*** (0.000)	0.042*** (0.000)
<i>Entrepreneur's age</i>	0.005 (0.875)	0.065 (0.188)
<i>Entrepreneur's age squared</i>	−0.000 (0.216)	−0.001 (0.051)
<i>Marital status : single</i>	−0.695*** (0.000)	−0.573*** (0.005)
<i>Female</i>	−0.162 (0.102)	−0.344** (0.034)
<i>Years of education</i>	0.072*** (0.000)	0.074*** (0.003)
<i>Migration background</i>	−0.205 (0.162)	0.106 (0.657)
<i>Risk tolerance</i>	0.109*** (0.001)	0.268*** (0.000)
<i>Openness</i>	−0.047 (0.211)	−0.038 (0.538)
<i>Conscientiousness</i>	0.005 (0.913)	0.103 (0.181)
<i>Extraversion</i>	0.048 (0.216)	0.030 (0.634)
<i>Agreeableness</i>	0.003 (0.953)	0.008 (0.911)
<i>Neuroticism</i>	−0.065 (0.072)	−0.136** (0.021)
<i>Observations</i>	1,362	1,362
<i>Adjusted R²</i>	0.125	0.100

Note: OLS regressions. The sample comprises entrepreneurs for whom industry information and value information are available. In column (1) the dependent variable is firm size, and in column (2) the dependent variable is the logarithm of firm value. Regressions are controlled for seven broad industry categories. Data is based on SOEP 2019.

** $p < 0.05$; *** $p < 0.01$

Figure 3: Survival analysis by risk tolerance



Note: Predicted probability of survival by risk tolerance from probit model estimation. Data is based on SOEP-Panel 2000-2019.

REFERENCES

- Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of Economic Growth*, 1, 385–472.
- Azoulay, P., Jones, B. F., Kim, J. D., & Miranda, J. (2020). Age and high-growth entrepreneurship. *American Economic Review: Insights*, 2(1), 65–82.
- Baron, R. A. (2024). Importing knowledge from psychology: how it broadens the scope of entrepreneurship research—and helps it avoid the “multi-tower effect”. *Small Business Economics*, 63, 1355–1363.
- Baum, J. R., & Locke, E. A. (2004). The relationship of entrepreneurial traits, skill, and motivation to subsequent venture growth. *Journal of Applied Psychology*, 89(4), 587–598.
- Baumann, J., & Kritikos, A. S. (2016). The link between R&D, innovation and productivity: Are micro firms different? *Research Policy*, 45(6), 1263–1274.
- Benitez, I., Bonilla, C. A., & Vergara, M. (2024). Hybrid entrepreneurship and risk. *Small Business Economics*, 63, 1171–1196.
- Bloom, N., & Van Reenen, J. (2007). Measuring and explaining management practices across firms and countries. *The Quarterly Journal of Economics*, 122(4), 1351–1408.
- Caliendo, M., Fossen, F. M., & Kritikos, A. S. (2010). The impact of risk attitudes on entrepreneurial survival. *Journal of Economic Behavior & Organization*, 76(1), 45–63.
- Caliendo, M., Fossen, F., & Kritikos, A. S. (2014). Personality characteristics and the decisions to become and stay self-employed. *Small Business Economics*, 42, 787–814.
- Caliendo, M., Fossen, F., & Kritikos, A. S. (2022). Personality characteristics and the decision to hire. *Industrial and Corporate Change*, 31(3), 736–761.
- Caliendo, M., & Rodríguez, D. (2024). Divergent thinking and post-launch entrepreneurial outcomes: non-linearities and the moderating role of experience. *Small Business Economics*, 62, 1523–1553.
- Chanda, A., & Unel, B. (2021). Do attitudes toward risk taking affect entrepreneurship? Evidence from second-generation Americans. *Journal of Economic Growth*, 26(4), 385–413.
- Ciavarella, M. A., Buchholtz, A. K., Riordan, C. M., Gatewood, R. D., & Stokes, G. S. (2004). The Big Five and venture survival: Is there a linkage? *Journal of Business Venturing*, 19(4), 465–483.
- Cobb-Clark, D. A., & Schurer, S. (2012). The stability of Big-Five personality traits. *Economics Letters*, 115(1), 11–15.
- Costa, P. T., & McCrae, R. R. (1992). *Revised NEO personality inventory (NEO-PI-R) and NEO five factor inventory (NEO-FFI) professional manual*. Odessa, FL: PAR.
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. G. (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the European Economic Association*, 9(3), 522–550.
- Fairlie, R. W., & Robb, A. M. (2009). Gender differences in business performance: Evidence from the Characteristics of Business Owners. *Small Business Economics*, 33, 375–395.

- Fitzenberger, B., Mena, G., Nimczik, J. S., & Sunde, U. (2021). Personality traits across the life cycle: Disentangling age, period and cohort effects. *The Economic Journal*, 132, 2141–2172.
- Gillen, B., Snowberg, E., & Yariv, L. (2019). Experimenting with measurement error: Techniques with applications to the Caltech Cohort Study. *Journal of Political Economy*, 127(4), 1826–1863.
- Hambrick, D. C., & Mason, A. Ph. (1984) Upper Echelons: The Organization as a Reflection of Its Top Managers. *The Academy of Management Review*, 9 (2), 193–206.
- Hamilton, B. H., Papageorge, N. W., & Pande, N. (2019). The right stuff? Personality and entrepreneurship. *Quantitative Economics*, 10(2), 643–691.
- Heckman, J. J., & Rubinstein, Y. (2001). The importance of noncognitive skills: Lessons from the GED testing program. *American Economic Review*, 91(2), 145–149.
- Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Hvide, H. K., & Panos, G. A. (2014). Risk tolerance and entrepreneurship. *Journal of Financial Economics*, 111(1), 200–223.
- Kerr, S. P., Kerr, W. R., & Dalton, M. (2019). Risk attitudes and personality traits of entrepreneurs and venture team members. *Proceedings of the National Academy of Sciences*, 116(36), 17712–17716.
- Kerr, S. P., Kerr, W. R., & Xu, T. (2018). Personality traits of entrepreneurs: A review of recent literature. *Foundations and Trends in Entrepreneurship*, 14(3), 279–378.
- Kihlstrom, R. E., & Laffont, J.-J. (1979). A general equilibrium entrepreneurial theory of firm formation based on risk aversion. *Journal of Political Economy*, 87(4), 719–748.
- Knight, F. H. (1921). *Risk, uncertainty, and profit*. Boston: Houghton Mifflin.
- Koch, M., & Menkhoff, L. (2025). The non-linear impact of risk tolerance on entrepreneurial profit and business survival. *Small Business Economics*, 64(4), 1643–1670.
- Kritikos, A. S. (2022). Personality and entrepreneurship. In K. F. Zimmermann (Ed.), *Handbook of labor, human resources and population economics*. Cham: Springer.
- Kumar, K. B., Rajan, R. G., & Zingales, L. (1999). What determines firm size? *NBER Working Paper No. w7208*.
- Levine, R., & Rubinstein, Y. (2017). Smart and illicit: Who becomes an entrepreneur and do they earn more? *Quarterly Journal of Economics*, 132(2), 963–1018.
- Levine, R., & Rubinstein, Y. (2020). Selection into entrepreneurship and self-employment. *CEP Discussion Paper No. 1722*. London School of Economics.
- Lucas, R. E., Jr. (1978). On the size distribution of business firms. *Bell Journal of Economics*, 9(2), 508–523.
- Mata, J. (1996). Markets, entrepreneurs, and the size of new firms. *Economics Letters*, 52, 89–94.

- Menkhoff, L., & Sakha, S. (2017). Estimating risky behavior with multiple-item risk measures. *Journal of Economic Psychology*, 59, 59–86.
- Nieß, C., & Biemann, T. (2014). The role of risk propensity in predicting self-employment. *Journal of Applied Psychology*, 99(5), 1000–1009.
- Obschonka, M., & Stuetzer, M. (2017). Integrating psychological approaches to entrepreneurship: The Entrepreneurial Personality System (EPS). *Small Business Economics*, 49, 203–231.
- Paunonen, S. V., & Ashton, M. C. (2001). Big Five factors and facets and the prediction of behavior. *Journal of Personality and Social Psychology*, 81(3), 524–539.
- Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, 41(1), 203–212.
- Rauch, A., & Frese, M. (2007). Let's put the person back into entrepreneurship research: A meta-analysis on the relationship between business owners' personality traits, business creation, and success. *European Journal of Work and Organizational Psychology*, 16(4), 353–385.
- Stewart, W. H., Jr., & Roth, P. L. (2001). Risk propensity differences between entrepreneurs and managers: A meta-analytic review. *Journal of Applied Psychology*, 86(1), 145–153.
- Schröder, C., Bartels, C., Grabka, M., König, J., Kroh, M., & Siegers, R. (2020). A novel sampling strategy for surveying high net-worth individuals – a pretest application using the Socio-Economic Panel. *Review of Income and Wealth*, 66, 825–849.
- Unger, J. M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical review. *Journal of Business Venturing*, 26(3), 341–358.
- Vereshchagina, G., & Hopenhayn, H. A. (2009). Risk taking by entrepreneurs. *American Economic Review*, 99(5), 1808–1830.
- Zhao, H., & Seibert, S. E. (2006). The Big Five personality dimensions and entrepreneurial status: A meta-analytical review. *Journal of Applied Psychology*, 91, 259–271.
- Zhao, H., Seibert, S. E., & Lumpkin, G. T. (2010). The relationship of personality to entrepreneurial intentions and performance: A meta-analytic review. *Journal of Management*, 36, 381–404.