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Entry into entrepreneurship, endogenous adaption of risk attitudes and entrepreneurial survival

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Entry into entrepreneurship, endogenous adaption of risk attitudes and entrepreneurial survival

by Matthias Brachert*, Walter Hyll*⁺, and Mirko Titze*

Abstract

Empirical studies use the assumption of stability in individual risk attitudes when searching for a relationship between attitude to risk and the decision to become and survive as an entrepreneur. We show that risk attitudes do not remain stable but face endogenous adaption when starting a new business. This adaption is associated with entrepreneurial survival. The results show that entrepreneurs with low risk tolerance before entering self-employment and increased risk tolerance when self-employed have a higher probability of survival than similar entrepreneurs experiencing a decrease in the willingness to take risks. We find the opposite results for entrepreneurs who express a higher willingness to take risks before becoming self-employed: in this case, a decrease in tolerance of risk is correlated with an increasing survival probability.

Keywords: Endogenous attitudes, Risk attitudes, Entrepreneurial survival, SOEP

JEL classification: D03, D81, M13

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1. Introduction

Several empirical studies propose that risk attitudes are a defining characteristic of both the individual decision to become an entrepreneur and entrepreneurial survival. Regarding entry, a higher willingness to take risk is supposed to increase the probability of starting a business (Hartog et al., 2002; Cramer et al., 2002; Caliendo et al., 2009; Ahn, 2010; Caliendo et al., 2014). The relationship between risk attitudes and survival is not expected to be linear but to follow an inverse u-shaped curve (Chell et al., 1991; Caliendo et al., 2010, 2014). Caliendo et al. (2014); for instance, present evidence that entrepreneurs with a medium degree of willingness to take risk are most likely to survive in a business context.

All studies measure individual willingness to take risk in a similar way. Based upon the assumption of (short-term) stability of risk attitudes, they use one-point measures in time to identify differences between groups of entrepreneurs and non-entrepreneurs (Barsky et al., 1997; Ahn, 2010; Caliendo et al. 2009, 2010, 2014). That is, risk attitudes are measured when persons are already active in their current employment status, explaining entry and survival ex-post (see Caliendo and Kritikos [2008] for similar arguments in the context of personality traits and entrepreneurial entry). However, a recent study by Brachert and Hyll (2014) shows that starting a business itself is, on average, related to an increase in the individual willingness to take risk in one's occupation, implying an endogenous adaption of risk attitudes when entering entrepreneurship. This potential reverse causality issue calls into question findings where occupational status and risk attitudes are measured at the same time.

Using information on individuals' risk attitudes at different points in time, Brachert and Hyll (2014) find eroding pre-entry differences between *future* entrepreneurs and non-entrepreneurs. In addition, they present indirect evidence that changes in risk attitudes differ in individuals entering entrepreneurship and failing, and in those who enter and remain entrepreneurs. This leads us to the research question of this paper. We go beyond the assumption of stable attitudes and ask: are changes in individual willingness to take risk when starting a business associated with entrepreneurial survival?

In contrast to the majority of existing studies, we do not focus on active entrepreneurs and compare them to the group of regularly (un)employed persons or specific occupations such as managers. Instead, we focus on individuals who become entrepreneurs

and we rely on risk measures that were added to the German Socio-Economic Panel (SOEP) in 2004 and 2009. That is, our data allows us to take into account the change in attitudes to risk that occurs while entering entrepreneurship. In a way, our analysis complements the study of Caliendo et al. (2010, 2014) in showing that their observed inverse u-shape risk-exit relationship is at least partially endogenously determined by risk adaption. Our estimation results suggest that a decisive factor in whether an individual succeeds as an entrepreneur or not is not only the base level attitude to risk, but how that individual *adjusts* his or her risk attitudes. We find that individuals with a low base risk level benefit – in terms of survival probability – from an increase in their willingness to take risks in occupation. In contrast, individuals with high base level attitudes to risk benefit in terms of survival from a decrease in the willingness to take risk. Finally, we observe an inverse u-shaped relationship between risk attitudes and survival probability, which corresponds to the results shown by Caliendo et al. (2010).

The paper is structured as follows: section 2 summarizes findings of empirical studies on the relationship between individual risk attitudes and entrepreneurial survival. Section 3 explores the underlying dataset and the indicators measuring attitudes to risk, entrepreneurial entry and survival. It is complemented by some basic descriptive statistics for differences in risk adaption of surviving and failing entrepreneurs. Section 4 presents the results of the empirical analysis on risk attitudes as a determinant of entrepreneurial survival. Section 5 concludes the paper.

2. Risk attitudes and entrepreneurial survival

While the majority of empirical studies focus on research into the effects of risk attitudes on the decision to become an entrepreneur (Cramer et al., 2002; Hartog et al., 2002; Fairlie, 2002; Kan and Tsai, 2006; Ahn, 2010; Caliendo et al., 2010, 2014), the question of whether risk attitudes affect survival has gained less attention. The first economic study to explore this relationship was conducted by Caliendo et al. (2010). Focusing on active entrepreneurs, they tested the hypothesis of whether persons with low or high risk attitudes have a higher probability of exiting entrepreneurship than persons with medium range risk attitudes. Using yearly outcomes of active entrepreneurs and assuming stability of risk attitudes over time (Caliendo et al. 2009, 2010, 2014), they found that the relationship between risk and survival does indeed follow an inverse u-shaped curve. In addition, a follow-up study by Caliendo et

al. (2014) relates the Big Five personality traits such as *extraversion*, *emotional stability*, *openness to experience*, *conscientiousness* and *agreeableness* (Zhao and Seibert, 2006; Rauch and Frese, 2007) to both attitudes to risk and entry into entrepreneurship and confirms these results. These insights are further supported by psychological research on this issue. Chell et al. (1991) argue that neither very high nor very low risk tolerance levels support entrepreneurial survival. Entrepreneurs should instead try to reduce risk related to business opportunities to the medium range (Caliendo and Kritikos, 2008).

The extent to which attitudes to risk affect survival has become the subject of further debate. Rauch and Frese (2007) argue that the effect of risk taking on entrepreneurial success, if positive at all, is fairly slight. Furthermore, they make explicit the point that they cannot rule out reverse causality, as starting a business may lead to changes in individual personality traits and thus one's willingness to take risks. This view is shared by Caliendo and Kritikos (2008), who argue that they cannot exclude the possibility that personality traits as well as attitudes to risk are influenced by working experience in an entrepreneurial context. Caliendo et al. (2014) tackle this question by showing that correlation coefficients for personality characteristics and risk attitudes remain at the level of 0.50 to 0.60 for the years 2005 and 2009. This leads them to conclude that deviations represent (random) noise in survey responses and that traits as well as attitudes to risk are stable, at least in the short term (Caliendo et al. 2014). Based upon this assumption, Caliendo et al. (2014) find that risk tolerance has a strong partial effect on exit from self-employment, which is almost as high as the cumulated value of the Big Five personality traits.

On the other hand, using the same data set, Brachert and Hyll (2014) present evidence that entry into entrepreneurship entails an endogenous adaption of attitudes to risk. What differentiates their approach from the studies by Caliendo et al. (2009, 2010, 2014) is the design used to measure the pre-entry values of willingness to take risk among future entrepreneurs. That is, they explicitly discuss attitudes to risk in the context of the decision to become an entrepreneur. This is important because the pre-entry and entry phases are likely to be associated with entrepreneurial learning as (potential) founders make errors and overcome a number of obstacles (Frese, 2009). They act first in a "would-be entrepreneur" situation that may contribute to the development of the idea of how to be an entrepreneur (Gollwitzer, 1999; Dimov, 2007). Secondly, creating successful ventures

involves learning and organizing new ventures (Aldrich and Yang, 2014), which is likely to affect individual risk-taking behavior. Because of pre-entry adaptation, this can distort the measures of willingness to take risk as well as other covariates (Ashenfelter 1978). This is why this paper adopts this perspective. While Caliendo et al. (2010, 2014) analyze the extent to which individual attitudes to risk have an impact on survival rates among entrepreneurs (under the assumption of stable attitudes that “allow” them to measure risk attitudes when entrepreneurs have already failed or survived), we analyze whether the change in risk attitudes is related to survival. Thus the paper addresses the crucial point that the experience of individuals when entering entrepreneurship has an impact on risk attitudes and survival. Consequently, we propose two hypotheses that will drive our paper:

Hypothesis 1: *The indicator for the endogenous adaptation of risk attitudes during entry has predictive power for entrepreneurial survival.*

Hypothesis 2: *The inverse u-shaped relationship between the individual willingness to take risk and entrepreneurial survival is endogenously determined.*

3. Data

3.1 Information from the German Socio-Economic Panel (SOEP)

For the purposes of the empirical analysis we exploit data from the German Socio-Economic Panel (SOEP). The SOEP is a representative panel survey of the German population, started in 1984. It contains detailed individual level information on more than 10,000 households (Wagner et al. 2007). We make use of the spells from the years 2004 to 2012. The primary indicator for measuring individual transition to entrepreneurship is included in the question on the main occupational status of an individual. Measures of individual willingness to take risk were added to the SOEP in the 2004 spell and in the 2009 spell. We rely on occupational risk attitudes, which we consider most relevant in the context of self-employment (Caliendo et al. 2009, 2010, 2014).

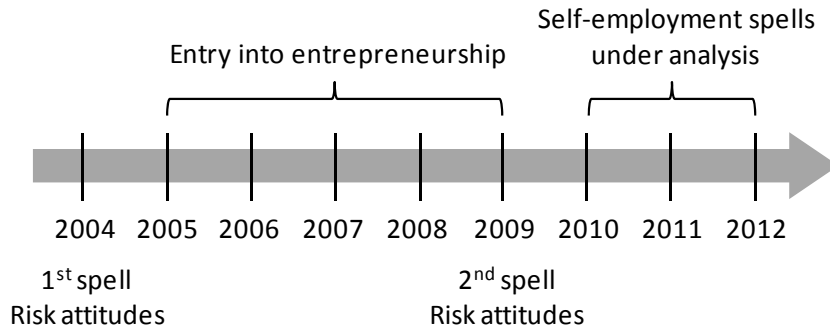
In line with Caliendo et al. (2014), we restrict our sample to individuals between the ages of 19 and 59 in 2004. That is, we try to avoid the potentially confounding effects of transition into retirement on our results (see also Haan and Prowse, 2010). We take account only of transitions into entrepreneurship in people who were regularly employed or unemployed in 2004. This includes the exclusion of individuals in vocational training, military

or civil service from the analysis as well individuals doing internships. We also exclude individuals with missing information on any of the variables used to perform the analysis. Regarding the choice of occupational profiles, robustness checks show that the exclusion of certain groups does not affect the significance or direction of the results. The final sample of analysis consists of at most 286 individuals who underwent the transition to entrepreneurship between 2005 and 2009.

3.2 Adaption in the willingness to take risk between 2004 and 2009 for surviving and non-surviving entrepreneurs from year 2010 onwards

The main focus of the analysis is on individual time trends in occupational risk attitudes. The exact question used to derive this is as follows: “People can behave differently in different situations. How would you rate your willingness to take risks in your occupation?” Individuals are asked to respond to an 11-point scale, where values of 0 indicate high risk aversion and values of 10 indicate high willingness to take risk. In order to identify changes, we first use individuals’ risk information (*riskocc04*) at a time when they were not self-employed (future entrepreneurs given the year 2004). Secondly, we include information about the willingness to take risk at an additional point in time (2009), after the individuals have become self-employed (*riskocc09*). Subtracting these values gives us an indicator of the adaption of attitudes to risk during entry into entrepreneurship (*risk_occ0409*). This variable can reach values of between –10 to +10. Consequently, we related this measure to an indicator of entrepreneurial survival. That is, we use annual outcomes for years 2010 to 2012 (*selfemp2010*, *selfemp2011*, *selfemp2012*) of individuals entering entrepreneurship between 2005 and 2009 to measure entrepreneurial survival. The outcome is defined in the way that individuals who maintain self-employment as their main occupational status are classified as surviving entrepreneurs (see Caliendo et al 2009, 2010, 2014; Brachert and Hyll, 2014). Figure 1 depicts the research design of the dataset employed.

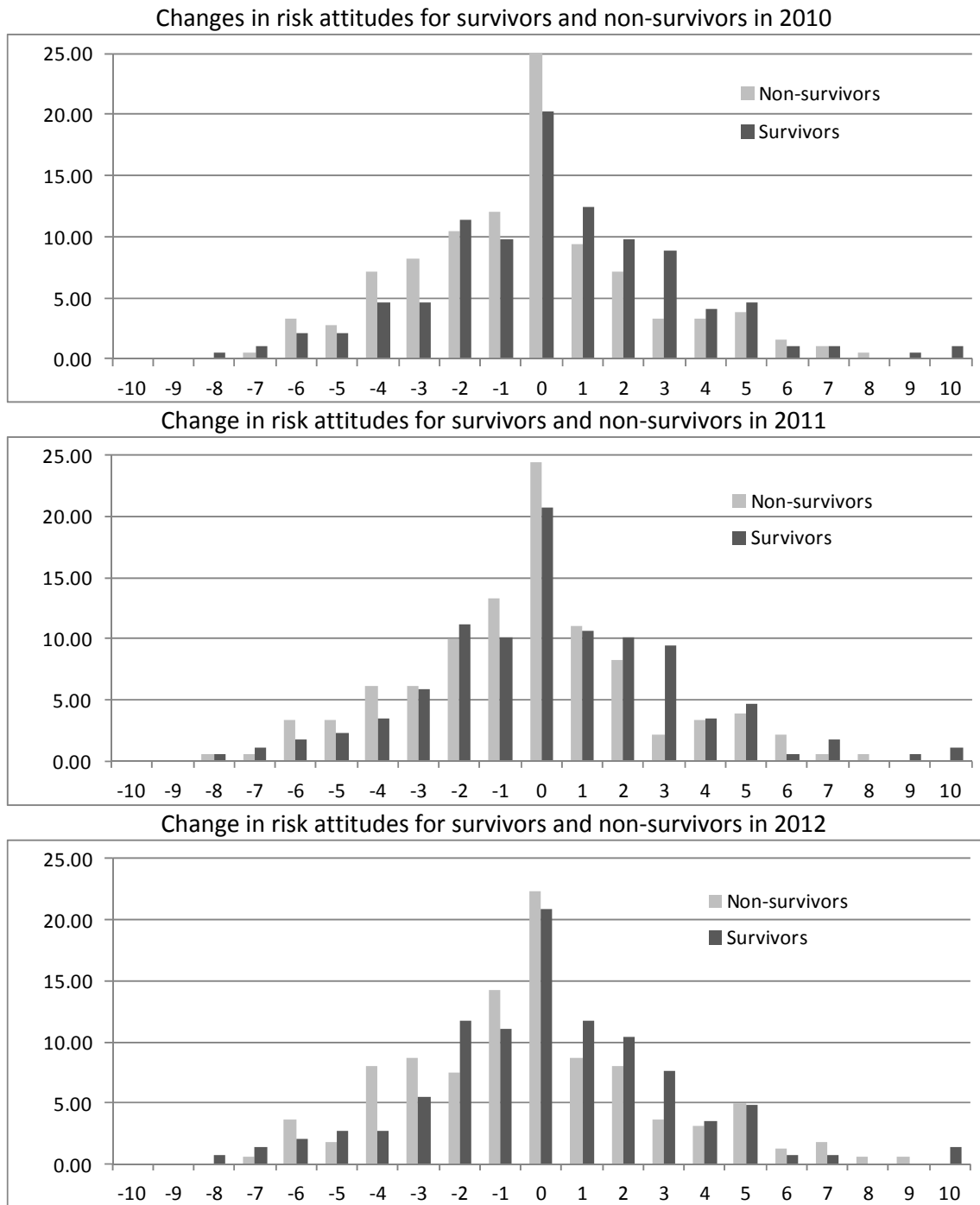
Figure 1. Research design



Source: Authors' own illustration.

Figure 2 explores the distribution of the change in risk attitudes (*risk_occ0409*) for survivors and individuals who failed after entry for the years 2010 to 2012. While all the distributions are centered around zero, the distributions for survivors clearly have more weight on the right hand side of the distributions.

Figure 2. Changes in risk attitudes for survivors and non-survivors 2010–2012



Source: Authors' own illustrations from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

This point is also apparent in the descriptive statistics of changes in average risk attitudes for survivors and non-survivors in these years (see Table 1). While on average non-surviving entrepreneurs experienced a decrease in their risk attitudes, survivors show an increase in their willingness to take risk. Table 1 also makes it clear that, compared to non-

survivors, a higher share of survivors increased their willingness to take risk. The converse holds for reducing risk tolerance: relative to survivors, non-survivors more often reduced their willingness to take risk.

Table 1. Descriptive statistics in risk attitudes for survivors and non-survivors

	2010		2011		2012	
	<i>Non-survivors</i>	<i>survivors</i>	<i>Non-survivors</i>	<i>survivors</i>	<i>Non-survivors</i>	<i>survivors</i>
Average risk attitude 2004	4.63	4.81	4.69	4.86	4.50	5.22
Average risk attitude 2009	4.27	5.09	4.37	5.17	4.31	5.34
Average change in risk attitude	-0.35	0.27	-0.32	0.30	-0.19	0.12
% change with decrease in risk attitude	44.51	36.27	43.33	36.69	44.72	38.19
% change with increase in risk attitude	30.22	43.52	32.22	42.60	32.92	40.97
N	182	193	180	169	161	144

Source: Authors' own calculations from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

3.3 Additional Control Variables

The study adds several socio-economic control variables to the analysis that exert potential effects on entrepreneurial survival. Given their relevance in prior studies, we control for effects of age and age squared (*age2009*, *age_sq2009*) and gender (*female*) (Caliendo et al., 2010). In order to account for structural differences between East and West Germany regarding entry and survival (Fritsch, 2004; Falck, 2007), we include a dummy for location of entry (*east2009*). Human capital theory finds that individual characteristics of entrepreneurs matter for survival (Brüderl et al. 1992, Robinson and Sexton, 1994). That is why we have included level of education based upon the ISCED classification (*educ2009*), prior employment (*workexp2009*) as well as unemployment experience (*unempexp2009*) in the analysis. Small businesses might face financial constraints that affect their survival (Schäfer and Talavera, 2009). Thus, holding higher private assets relaxes these constraints, making it important to control for income from finance at the individual level for nascent entrepreneurs (*inc_finance2009*). Having a self-employed father has also been found to be associated with entry into entrepreneurship and survival (Dunn and Holtz-Eakin 2000, Caliendo et al. 2009, 2010, 2014). The SOEP allows for the integration of information on this issue by asking whether the father of the individual was an entrepreneur when the

respective individual was aged 15 (*father_selfemp*). Fairlie and Robb (2008) report disparities in business performance between Asian-owned, white-owned and black-owned firms in the USA. We use the nationality of the founder to control for differences between German and non-German founders (*german2009*). Furthermore, Caliendo and Uhlenborff (2008) highlight the importance of controlling for state dependence in self-employment. The model in the next section takes this fact into account by controlling for tenure in the respective spell in the year 2009. We follow Caliendo et al. (2010, 2014) and use linear, quadratic and cubic terms of *duration_selfemp* to explain survival probability. In addition to this we consider marital status (*married2009*), degree of disability (*disable2009*) as well as individual height (*height*). Table 2 summarizes some basic descriptive statistics for the underlying sample of individuals.

Table 2. Descriptive statistics for the underlying sample

Variable	Obs	Mean	Std. Dev.	Min	Max
selfemp2010	286	0.559	0.497	0	1
selfemp2011	268	0.522	0.500	0	1
selfemp2012	240	0.500	0.501	0	1
risk_occ0409	286	0.150	2.955	-7	10
risk_occ2004	286	4.822	2.629	0	10
female	286	0.531	0.500	0	1
east2009	286	0.262	0.441	0	1
educ2009	286	4.213	1.444	1	6
age2009	286	41.584	10.215	24	63
workexp2009	286	12.527	10.304	0	45.7
unempexp2009	286	1.164	1.881	0	11.1
disable2009	286	0.056	0.230	0	1
german2009	286	0.969	0.175	0	1
married2009	286	0.552	0.498	0	1
inc_fin~2009	286	3113.993	11111.740	0	127000
height	286	173.741	9.329	150	196
duration_s~p	286	2.126	1.332	0	5
duration_s~q	286	6.287	7.084	0	25
duration_s~u	286	22.224	36.528	0	125
father_sel~p	286	0.178	0.383	0	1

Source: Authors' own calculations from Socio-Economic Panel (SOEP) data for years 1984-2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

4. Empirical strategy and results

4.1. Empirical approach

In order to test the two hypotheses proposed in section 2, we relate the change in individual willingness to take risk between 2004 and 2009 for individuals starting a business between 2005 and 2009 to their survival rates from 2010 onwards. Since Brachert and Hyll (2014) are

able to show that entry itself has a considerable and significant positive effect on risk attitudes, this approach allows at least a partial capturing of the endogenous adaption of risk attitudes and thus a testing of whether this indicator has predictive power to explain entrepreneurial survival. The SOEP data allows us to identify exit probabilities for different time periods. That is, in the analysis that follows we use probit regressions to explain the survival probability of an individual who became an entrepreneur. We first present a pooled version of the model, combining the different spells of the SOEP data under analysis (2010-2012) (see Caliendo et al. 2009, 2010, 2014 for a similar approach). As a robustness check, we calculate the survival probability separately on a yearly basis. Controls are taken from year 2009. The measure of willingness to take risk relies on values from 2004 and 2009. In order to test hypothesis two, which assumes that the inverse u-shaped relationship between the individual's willingness to take risk and entrepreneurial survival is endogenously determined, we build several sub-groups based on the base level of risk attitudes in 2004. Using interaction terms with the direction of change in willingness to take risk, we finally present a probit framework that allows the testing of this hypothesis.

4.2 Baseline scenario

We start at the base line scenario with pooled regressions for the period 2010 to 2012 (see table 3, specification 1). This allows us to rely upon 794 person-year observations. Tables 3 to 7 report only coefficients related to risk attitudes. Full estimation results are available in tables A1 to A5 in the appendix. In table 3, the dependent variable is a dummy variable that takes the value of one if an individual was self-employed in 2010, 2011 or 2012. The baseline scenario is divided into four different specifications, where two specifications (2.1 and 2.2 in table 3) present estimations for the group of entries, starting with a low willingness to take risk in 2004 (values ranging from 0–4) and another two (3.1 and 3.2 in table 3) allowing insights for entries with a higher willingness to take risk in 2004 (values ranging from 5–10).

Table 3. Survival probability for self-employment: pooled probit estimation results – marginal effects

Dependent variable Selfemp 2010-2012	Basic specification (1)	Group low risk base level (2.1)	Group high risk base level (2.2)	Group high risk base level (3.1)	Group high risk base level (3.2)	interaction terms (4)
Change in risk	0.023*** (0.008)	0.041*** (0.011)		-0.013 (0.010)		
Risk base level	0.011 (0.009)					
Change in risk: <i>decrease</i>						
<i>constant</i>			0.227** (0.104)		-0.128** (0.062)	0.193** (0.096)
<i>increase</i>			0.418*** (0.075)		-0.066 (0.066)	0.367*** (0.073)
Risk dummy base level: <i>low</i>						
<i>high</i>						0.229*** (0.077)
Change in risk <i>constant</i> *						
Risk dummy base level <i>high</i>						-0.295*** (0.101)
Change in risk <i>increase</i> *						
Risk dummy base level <i>high</i>						-0.390*** (0.078)
Results of chi2 test Ho: Change in risk <i>constant</i> = 0 & Change in risk <i>constant</i> * Risk d.b.l. <i>high</i> = 0						
<i>chi2</i>						6.98
<i>Prob > chi2</i>						0.030
Results of chi2 test Ho: Change in risk <i>constant</i> + Change in risk <i>constant</i> * Risk d.b.l. <i>high</i> = 0						
<i>chi2</i>						3.29
<i>Prob > chi2</i>						0.069
Results of chi2 test Ho: Change in risk <i>increase</i> = 0 & Change in risk <i>increase</i> * Risk d.b.l. <i>high</i> = 0						
<i>chi2</i>						21.72
<i>Prob > chi2</i>						0.000
Results of chi2 test Ho: Change in risk <i>increase</i> + Change in risk <i>increase</i> * Risk d.b.l. <i>high</i> = 0						
<i>chi2</i>						0.52
<i>Prob > chi2</i>						0.470
Pseudo R2	0.190	0.242	0.267	0.213	0.217	0.208
Observations	794	308	308	486	486	794

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, marginal effects are reported. Risk d.b.l. means risk dummy base level.

Source: Authors' own illustration from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

In the case of the control variables, we find a highly significant age effect (*age2009* and *age_sq2009*) that follows a u-shaped curve (see table A1 in the appendix). The effect holds true for all specifications in the pooled approach (cf. Caliendo et al., 2010). The duration of self-employment also exerts an effect on survival. Controlling for state-

dependence is of importance as we allow time-varying entries between 2005 and 2009. As proposed by Caliendo et al. (2010), this is done by using linear, quadratic and cubic terms of duration in self-employment (*duration_selfemp*, *duration_selfemp_sq*, *duration_selfemp_cu*). The coefficients are again in line with Caliendo et al. (2010): a longer duration in the state of self-employment until 2009 increases the survival probability for the consecutive years 2010 to 2012. With the exception of the restricted sample of individuals with a high base risk level, prior work experience (*workexp2009*) is found to be associated with survival, indicating a positive relationship between individual human capital and entrepreneurial survival. In addition, fewer financial constraints indicated by individual income from finance (*inc_finance2009*) are found to be positively correlated with survival probability in three out of six specifications. In keeping with the literature on this issue, we also find that having a father who is or was an entrepreneur (*father_selfemp*) increases the probability of survival. Again, we find no impact of *father_selfemp* in specifications 3.1 and 3.2.

With regard to the main variables of interest, in specification 1 in table 3 we regress the survival probability on the base level willingness to take risk in 2004 (*risk_occ2004*) and changes in risk attitudes between 2004 and 2009 (*risk_occ0409*). In this case, we do not find a significant linear base level risk effect but we can show that an increase in an individual's willingness to take risk in occupation between 2004 and 2009 is related to an increase in the probability of survival for the pooled period 2010–2012. The respective marginal effect is highly significant and positive. In order to take account of heterogeneous effects, we divide the sample into two subgroups representing low and high base risk levels, as mentioned above.

The results in specification 2.1 in table 3 indicate that changes in risk attitudes for individuals with lower risk levels are positively related to survival. Because actual changes can take positive, zero or negative values, next we introduce dummy variables that indicate the direction of change (model 2.2). The reference group (*decrease*) consists of individuals who reduced their willingness to take risk. The second group (*constant*) comprises individuals whose willingness to take risk remained constant. The third group represents individuals who experienced an increase in their willingness to take risk. The inclusion of these dummy variables reveals that, in comparison to individuals with a decreasing

willingness to take risk, both zero values and an increasing willingness to take risk indicate considerable positive effects on entrepreneur survival, *given* the low base risk level of the individual. In so doing, and especially with respect to the interpretation of the group of constant risk attitudes, we have to keep in mind that the average individual in the SOEP, irrespective of entry into entrepreneurship, experienced a decrease in willingness to take risk in occupation by 0.6 points between the years 2004 and 2009 (Brachert and Hyll, 2014). Thus, with regard to the pooled specification, the survival probability of individuals who experience no increase or an increase risk attitudes during entry is about 22.7 to 41.8 percentage points higher than the group showing a decreasing willingness to take risk.

Specifications 3.1 and 3.2 present the corresponding results for individuals starting with high levels of risk attitudes in 2004. In this group, a simple change in risk attitudes (specification 3.1) has no direct effect on entrepreneurial survival. However, when we introduce information about the direction of change in willingness to take risk, we find that individuals who maintain stable risk attitudes, have a 12.8 percentage points higher probability of failing compared to those individuals who experience decreasing values in the willingness to take risks. Albeit the coefficient for increasing values is not significant, the sign of the coefficient is negative.

The final specification for the pooled probit estimation combines both groups in one regression framework. We make use of the dummy for the base level of risk attitudes in 2004, where 1 indicates a high base level in risk attitudes and 0 a low base level in risk attitudes. As a result, we produce interaction terms based on the two risk groups and the three different directions of change in the willingness to take risk between 2004 and 2009. The results show that an increase in risk attitudes or the keeping constant of risk attitudes is associated with an increased probability of entrepreneurial survival. However, for individuals with a high base level of risk attitudes results are the direct opposite. Here we observe negative interaction effects. The total effect is negative and significant for individuals showing high risk attitudes in 2004 who did not change their risk attitudes, as indicated by the chi-square test in the lower part of table 3. The effect is still negative for individuals with a high base level attitude to risk and increasing willingness to take risks. However, the chi-square test is no more significant in this case. To sum up, our pooled regressions suggest that individuals with low risk attitudes in 2004 who experienced an increased willingness to

take risk, as well as those individuals with high risk tolerance levels in 2004 and experiencing a decreased willingness to take risks have a higher probability of entrepreneurial survival compared to their references group counterparts.

4.3 Robustness checks

In order to delve deeper into the relationship between risk attitudes and survival we employ estimation specifications that consider self-employment spells separately for the years 2010, 2011 and 2012. In keeping with the baseline scenario in section 4.2, we start with three different models in table 4. Here, the survival probability is a function of the change in the willingness to take risks between 2004 and 2009 and the base level of risk attitudes in 2004. In column (1) we depict the probability that an individual is an entrepreneur in 2010, column (2) represents the corresponding values for 2011, and column (3) for 2012. We find that an increase in the willingness to take risk is positively correlated to survival only in 2010.

**Table 4. Survival probability for self-employment: probit estimation results
—marginal effects**

VARIABLES	(1) Selfemp2010	(2) Selfemp2011	(3) Selfemp2012
Change in risk	0.027** (0.013)	0.022 (0.013)	0.020 (0.014)
Risk base level	0.013 (0.015)	0.005 (0.016)	0.021 (0.017)
Pseudo R2	0.209	0.191	0.225
Observations	286	268	240

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

Source: Authors' own illustration from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

Analogous to the pooled version, we next split the full sample into two subgroups: individuals with low risk attitudes and those with high risk attitudes in 2004. In this way, we allow for heterogeneous effects of changes in risk attitudes on the probability of survival. Table 5 corresponds with the specifications 2.1 and 2.2 in the pooled version of table 3 – it presents the yearly results for entrepreneurs entering with a low base level risk. Specifications 1 and 2 for the years 2010 and 2011 indicate that an increase in tolerance of risk (*Change in risk*) is positively correlated to entrepreneurial survival. The respective value for 2012 is insignificant (specification 3). As in the baseline scenario, we consider in addition three different groups of changes in risk attitudes (decrease, constant, increase). Models 4

to 6 reveal that – in comparison to individuals who experienced a decrease in their willingness to take risk – an increase in risk attitudes (*Change in risk*) has a significant and considerably positive effect on entrepreneurial survival. The marginal effects for survival range from 41.4 percentage points in 2011 to 48.9 percentage points in 2012. In summary, the yearly results support our findings from the baseline scenario.

Table 5. Low risk attitudes – survival probability for self-employment: probit estimation results – marginal effects

VARIABLES	(1) Selfemp 2010	(2) Selfemp 2011	(3) Selfemp 2012	(4) Selfemp 2010	(5) Selfemp 2011	(6) Selfemp 2012
Change in risk	0.053*** (0.019)	0.045** (0.018)	0.022 (0.024)			
Change in risk:						
<i>decrease</i>						
<i>constant</i>				0.149 (0.177)	0.177 (0.174)	0.458** (0.216)
<i>increase</i>				0.434*** (0.119)	0.414*** (0.126)	0.489*** (0.184)
Pseudo R2	0.266	0.237	0.359	0.287	0.260	0.403
Observations	112	102	87	112	102	87

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

Source: Authors' own illustration from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

Table 6 presents the corresponding estimation results for individuals with a high base level risk attitude. With regard to changes in the willingness to take risk, we do not identify significant linear effects on a yearly basis. The specification that includes the different groups with their respective direction of change finds a negative relationship between risk and survival only for the year 2012. However, all the coefficients are negative, which points to the direction of the results of the pooled version.

Table 6. High risk attitudes – survival probability for self-employment: probit estimation results – marginal effects

VARIABLES	(1) Selfemp 2010	(2) Selfemp 2011	(3) Selfemp 2012	(4) Selfemp 2010	(5) Selfemp 2011	(6) Selfemp 2012
Change in risk	-0.014 (0.018)	-0.016 (0.018)	-0.020 (0.019)			
Change in risk:						
<i>decrease</i>						
<i>constant</i>				-0.084 (0.109)	-0.157 (0.102)	-0.249** (0.107)
<i>increase</i>				-0.068 (0.112)	-0.164 (0.107)	-0.052 (0.121)
Pseudo R2	0.226	0.252	0.249	0.227	0.262	0.264
Observations	174	162	146	174	162	146

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

Source: Authors' own illustration from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

Finally, we combine the two subsamples and estimate the yearly specifications, taking into consideration interaction terms. We find evidence that individuals with low risk attitudes experience a lower exit probability if they show an increasing willingness to take risk. The respective marginal effect is highly significant and positive. Table 7 also reproduces the highly significant negative interaction effects for individuals showing high risk tolerance in 2004 and who experience an increase in risk attitudes. Since the single effect of risk attitudes is significantly positive, we check whether the overall effect differs significantly from 0: the respective chi-square tests are not significant.

Table 7. Interaction of change in risk attitudes with base level risk attitudes – survival probability for self-employment: probit estimation results – marginal effects

VARIABLES	(1) Selfemp2010	(2) Selfemp2011	(3) Selfemp2012
Change in risk:			
<i>decrease</i>			
<i>constant</i>	0.117 (0.160)	0.099 (0.176)	0.383** (0.163)
<i>increase</i>	0.390*** (0.111)	0.334*** (0.126)	0.384** (0.151)
Risk dummy base level:			
<i>low</i>			
<i>high</i>	0.248** (0.123)	0.191 (0.131)	0.271* (0.152)
Change in risk <i>constant</i> * Risk d.b.l. <i>high</i>	-0.202 (0.191)	-0.212 (0.187)	-0.455*** (0.121)
Change in risk <i>increase</i> * Risk d.b.l. <i>high</i>	-0.418*** (0.130)	-0.410*** (0.120)	-0.350*** (0.152)
Results of chi2 test Ho: Change in risk <i>constant</i> = 0 & Change in risk <i>constant</i> * Risk d.b.l. <i>high</i> = 0			
<i>chi2</i>	1.13	1.60	5.94
<i>Prob > chi2</i>	0.568	0.448	0.051
Results of chi2 test Ho: Change in risk <i>constant</i> + Change in risk <i>constant</i> * Risk d.b.l. <i>high</i> = 0			
<i>chi2</i>	0.62	1.28	1.91
<i>Prob > chi2</i>	0.431	0.257	0.167
Results of chi2 test Ho: Change in risk <i>increase</i> = 0 & Change in risk <i>increase</i> * Risk d.b.l. <i>high</i> = 0			
<i>chi2</i>	9.99	7.38	5.45
<i>Prob > chi2</i>	0.006	0.025	0.065
Results of chi2 test Ho: Change in risk <i>increase</i> + Change in risk <i>increase</i> * Risk d.b.l. <i>high</i> = 0			
<i>chi2</i>	0.11	1.27	0.00
<i>Prob > chi2</i>	0.735	0.259	0.956
Pseudo R2	0.229	0.211	0.247
Observations	286	268	240

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, marginal effects are reported. Risk d.b.l. means risk dummy base level.

Source: Authors' own illustration from Socio-Economic Panel (SOEP) data for years 1984 – 2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

5. Conclusion and implications

In this paper we have tested the hypothesis that changes in risk attitudes during entry into entrepreneurship affect the probability of entrepreneurial survival. That is, our paper goes beyond the assumption of the stability of risk attitudes over time (Caliendo et al. 2010) and allows us to take into account the initial repercussions of entry into entrepreneurship on risk attitudes and thus survival (Brachert and Hyll 2014). This allows us to extend the work by Caliendo et al. (2010). They propose an inverted u-shaped pattern for the relationship between the individual's willingness to take risks and survival, meaning that there is an optimum "medium level" of risk attitudes that corresponds with low exit probability.

We take up this aspect and confirm their results. However, in our study the mechanism behind this relationship is different. Our results suggest that the effect of risk attitudes on entrepreneurial survival is determined not only by the initial base level. In particular, we have found evidence that entrepreneurs with initially low willingness to take risk can reduce their exit probability by increasing their willingness to take risk during entry. In contrast, individuals who enter entrepreneurship with high risk tolerance can reduce their exit probability by decreasing their willingness to take risk.

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Appendix

Table A1

Survival probability for self-employment: pooled probit estimation results – marginal effects

Dependent variable	Basic specification	Group low risk base level		Group high risk base level		interaction terms
Selfemp 2010-2012	(1)	(2.1)	(2.2)	(3.1)	(3.2)	(4)
Change in risk	0.023*** (0.008)	0.041*** (0.011)		-0.013 (0.010)		
Risk base level	0.011 (0.009)					
Change in risk:						
<i>decrease</i>						
<i>constant</i>			0.227** (0.104)		-0.128** (0.062)	0.193** (0.096)
<i>increase</i>			0.418*** (0.075)		-0.066 (0.066)	0.367*** (0.073)
Risk dummy base l.:						
<i>low</i>						
<i>high</i>						0.229*** (0.077)
Change in risk <i>constant</i> *						
Risk d.b.l. <i>high</i>						-0.295*** (0.101)
Change in risk <i>increase</i> *						
Risk d.b.l. <i>high</i>						-0.390*** (0.078)
female	0.018 (0.059)	0.147 (0.101)	0.173* (0.104)	-0.041 (0.073)	-0.034 (0.073)	0.041 (0.060)
east2009	0.093* (0.049)	0.152* (0.084)	0.159* (0.083)	0.102 (0.065)	0.096 (0.066)	0.125** (0.049)
educ2009	0.004 (0.014)	-0.003 (0.025)	0.004 (0.027)	0.029 (0.018)	0.030* (0.018)	0.011 (0.014)
age2009	0.056*** (0.016)	0.081*** (0.026)	0.089*** (0.026)	0.057*** (0.022)	0.052** (0.022)	0.064*** (0.016)
age_sq2009	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001** (0.000)	-0.001*** (0.000)
workexp2009	0.008** (0.003)	0.013** (0.005)	0.012** (0.005)	0.006 (0.005)	0.005 (0.005)	0.008** (0.003)
unempexp2009	-0.010 (0.012)	-0.006 (0.017)	0.005 (0.019)	-0.012 (0.018)	-0.007 (0.019)	-0.002 (0.013)
disable2009	-0.059 (0.094)	0.100 (0.206)	0.222 (0.172)	-0.047 (0.117)	-0.043 (0.118)	-0.036 (0.098)
german2009	-0.111 (0.120)	-0.021 (0.162)	-0.080 (0.164)	-0.268 (0.178)	-0.271 (0.186)	-0.143 (0.115)
married2009	-0.055 (0.046)	-0.001 (0.082)	0.006 (0.083)	-0.108* (0.058)	-0.108* (0.058)	-0.066 (0.046)
inc_finance2009	0.000 (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)	0.000* (0.000)
height	0.009*** (0.003)	0.011** (0.005)	0.015*** (0.005)	0.011*** (0.004)	0.010*** (0.004)	0.012*** (0.003)
duration_selfemp	1.360*** (0.140)	1.198*** (0.193)	1.290*** (0.187)	1.408*** (0.198)	1.447*** (0.201)	1.384*** (0.141)
duration_selfemp_sq	-0.570*** (0.064)	-0.450*** (0.096)	-0.496*** (0.093)	-0.626*** (0.087)	-0.643*** (0.089)	-0.584*** (0.065)
duration_selfemp_cu	0.065*** (0.008)	0.048*** (0.012)	0.054*** (0.012)	0.074*** (0.011)	0.076*** (0.011)	0.067*** (0.008)

father_selfemp	0.095*	0.286***	0.341***	0.000	0.015	0.121**
	(0.055)	(0.088)	(0.087)	(0.071)	(0.071)	(0.055)
Year 2011	-0.055	-0.023	-0.022	-0.081	-0.080	-0.056
	(0.047)	(0.078)	(0.079)	(0.060)	(0.060)	(0.047)
Year 2012	-0.074	-0.095	-0.090	-0.070	-0.069	-0.077
	(0.048)	(0.077)	(0.078)	(0.062)	(0.062)	(0.048)
Observations	794	308	308	486	486	794

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, marginal effects are reported. Risk d.b.l. means risk dummy base level.

Source: Authors' own illustration from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

Table A2

Survival probability for self-employment: probit estimation results – marginal effects

VARIABLES	(1) Selfemp2010	(2) Selfemp2011	(3) Selfemp2012
Change in risk	0.027** (0.013)	0.022 (0.013)	0.020 (0.014)
Risk base level	0.013 (0.015)	0.005 (0.016)	0.021 (0.017)
female	0.099 (0.097)	0.035 (0.100)	-0.092 (0.110)
east2009	0.089 (0.083)	0.070 (0.085)	0.108 (0.089)
educ2009	-0.010 (0.023)	0.019 (0.025)	0.007 (0.027)
age2009	0.066** (0.027)	0.045* (0.027)	0.052* (0.029)
age_sq2009	-0.001** (0.000)	-0.001* (0.000)	-0.001** (0.000)
workexp2009	0.008 (0.006)	0.005 (0.006)	0.012* (0.006)
unempexp2009	0.002 (0.021)	-0.005 (0.021)	-0.031 (0.021)
disable2009	-0.185 (0.137)	0.107 (0.164)	-0.093 (0.175)
german2009	-0.036 (0.176)	-0.454*** (0.118)	0.257* (0.143)
married2009	-0.031 (0.079)	-0.056 (0.079)	-0.070 (0.084)
inc_finance2009	0.000** (0.000)	0.000 (0.000)	0.000 (0.000)
height	0.012** (0.005)	0.011** (0.005)	0.006 (0.006)
duration_selfemp	1.499*** (0.206)	1.408*** (0.208)	1.394*** (0.266)
duration_selfemp_sq	-0.642*** (0.099)	-0.577*** (0.099)	-0.581*** (0.120)
duration_selfemp_cu	0.074*** (0.013)	0.065*** (0.013)	0.066*** (0.015)
father_selfemp	0.106 (0.090)	0.064 (0.092)	0.081 (0.105)
Observations	286	268	240

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

Source: Authors' own illustration from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

Table A3

Low risk attitudes – survival probability for self-employment: probit estimation results – marginal effects

VARIABLES	(1) Selfemp 2010	(2) Selfemp 2011	(3) Selfemp 2012	(4) Selfemp 2010	(5) Selfemp 2011	(6) Selfemp 2012
Change in risk	0.053*** (0.019)	0.045** (0.018)	0.022 (0.024)			
Change in risk:						
<i>decrease</i>						
<i>constant</i>				0.149 (0.177)	0.177 (0.174)	0.458** (0.216)
<i>increase</i>				0.434*** (0.119)	0.414*** (0.126)	0.489*** (0.184)
female	0.219 (0.171)	0.184 (0.172)	-0.012 (0.201)	0.232 (0.176)	0.187 (0.177)	0.116 (0.218)
east2009	0.170 (0.145)	0.095 (0.147)	0.205 (0.161)	0.194 (0.141)	0.109 (0.145)	0.177 (0.166)
educ2009	-0.003 (0.043)	-0.013 (0.044)	-0.006 (0.053)	0.000 (0.044)	-0.006 (0.046)	0.020 (0.060)
age2009	0.082* (0.045)	0.081 (0.050)	0.073 (0.052)	0.092** (0.046)	0.087* (0.049)	0.085 (0.053)
age_sq2009	-0.001** (0.001)	-0.001* (0.001)	-0.001* (0.001)	-0.001** (0.001)	-0.001* (0.001)	-0.001** (0.001)
workexp2009	0.016* (0.009)	0.004 (0.009)	0.029** (0.011)	0.015* (0.009)	0.003 (0.009)	0.028** (0.011)
unempexp2009	0.006 (0.031)	0.014 (0.031)	-0.068** (0.034)	0.015 (0.033)	0.026 (0.033)	-0.054 (0.036)
disable2009	0.015 (0.307)		-0.359** (0.176)	0.066 (0.273)		-0.118 (0.335)
german2009	-0.081 (0.240)	-0.362* (0.190)		-0.135 (0.239)	-0.384** (0.176)	
married2009	-0.030 (0.143)	0.004 (0.145)	0.145 (0.155)	-0.030 (0.145)	0.005 (0.145)	0.199 (0.149)
inc_finance2009	0.000 (0.000)	0.000*** (0.000)	0.000* (0.000)	0.000* (0.000)	0.000*** (0.000)	0.000* (0.000)
height	0.011 (0.009)	0.018** (0.009)	0.004 (0.010)	0.013 (0.009)	0.020** (0.009)	0.013 (0.011)
duration_selfemp	1.488*** (0.321)	1.025*** (0.293)	1.544*** (0.414)	1.611*** (0.309)	1.129*** (0.288)	1.521*** (0.408)
duration_selfemp_sq	-0.578*** (0.159)	-0.369** (0.152)	-0.562*** (0.202)	-0.636*** (0.153)	-0.419*** (0.149)	-0.553*** (0.198)
duration_selfemp_cu	0.063*** (0.021)	0.037* (0.020)	0.058** (0.026)	0.070*** (0.020)	0.043** (0.020)	0.057** (0.025)
father_selfemp	0.242 (0.147)	0.312** (0.137)	0.403** (0.164)	0.296** (0.143)	0.367*** (0.134)	0.482*** (0.129)
Observations	112	102	87	112	102	87

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

Source: Authors' own illustration from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

Table A4

High risk attitudes – survival probability for self-employment: probit estimation results – marginal effects

VARIABLES	(1) Selfemp 2010	(2) Selfemp 2011	(3) Selfemp 2012	(4) Selfemp 2010	(5) Selfemp 2011	(6) Selfemp 2012
Change in risk	-0.014 (0.018)	-0.016 (0.018)	-0.020 (0.019)			
Change in risk:						
<i>decrease</i>						
<i>constant</i>				-0.084 (0.109)	-0.157 (0.102)	-0.249** (0.107)
<i>increase</i>				-0.068 (0.112)	-0.164 (0.107)	-0.052 (0.121)
female	0.066 (0.120)	-0.022 (0.124)	-0.169 (0.134)	0.070 (0.120)	-0.016 (0.125)	-0.149 (0.133)
east2009	0.099 (0.112)	0.107 (0.117)	0.069 (0.118)	0.091 (0.114)	0.122 (0.118)	0.050 (0.120)
educ2009	-0.000 (0.029)	0.066** (0.032)	0.037 (0.034)	0.000 (0.030)	0.069** (0.032)	0.039 (0.034)
age2009	0.069* (0.037)	0.039 (0.039)	0.050 (0.041)	0.066* (0.036)	0.034 (0.039)	0.039 (0.041)
age_sq2009	-0.001* (0.000)	-0.000 (0.000)	-0.001 (0.000)	-0.001* (0.000)	-0.000 (0.000)	-0.001 (0.000)
workexp2009	0.004 (0.007)	0.004 (0.008)	0.012 (0.009)	0.004 (0.008)	0.003 (0.008)	0.012 (0.009)
unempexp2009	-0.008 (0.032)	-0.022 (0.032)	0.000 (0.033)	-0.005 (0.033)	-0.016 (0.033)	0.009 (0.035)
disable2009	-0.275* (0.167)	0.004 (0.230)	0.097 (0.224)	-0.271 (0.167)	-0.010 (0.234)	0.128 (0.223)
german2009	-0.002 (0.307)			0.010 (0.319)		
married2009	-0.045 (0.099)	-0.086 (0.104)	-0.218** (0.106)	-0.044 (0.100)	-0.080 (0.105)	-0.213** (0.104)
inc_finance2009	0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)
height	0.016** (0.006)	0.011 (0.007)	0.006 (0.007)	0.016** (0.006)	0.011* (0.007)	0.004 (0.007)
duration_selfemp	1.494*** (0.270)	2.165*** (0.552)	1.371*** (0.349)	1.520*** (0.269)	2.304*** (0.583)	1.502*** (0.362)
duration_selfemp_sq	-0.681*** (0.129)	-0.914*** (0.223)	-0.605*** (0.156)	-0.693*** (0.129)	-0.975*** (0.233)	-0.657*** (0.160)
duration_selfemp_cu	0.081*** (0.017)	0.107*** (0.026)	0.071*** (0.019)	0.083*** (0.017)	0.114*** (0.027)	0.076*** (0.020)
father_selfemp	0.011 (0.118)	-0.091 (0.110)	0.045 (0.132)	0.015 (0.118)	-0.075 (0.110)	0.074 (0.131)
Observations	174	162	146	174	162	146

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

Source: Authors' own illustration from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

Table A5

Interaction of change in risk attitudes with base level risk attitudes – survival probability for self-employment: probit estimation results – marginal effects

VARIABLES	(1) Selfemp2010	(2) Selfemp2011	(3) Selfemp2012
Change in risk:			
<i>decrease</i>			
<i>constant</i>	0.117 (0.160)	0.099 (0.176)	0.383** (0.163)
<i>increase</i>	0.390*** (0.111)	0.334*** (0.126)	0.384** (0.151)
Risk dummy base level:			
<i>low</i>			
<i>high</i>	0.248** (0.123)	0.191 (0.131)	0.271* (0.152)
Change in risk <i>constant</i> * Risk d.b.l. <i>high</i>	-0.202 (0.191)	-0.212 (0.187)	-0.455*** (0.121)
Change in risk <i>increase</i> * Risk d.b.l. <i>high</i>	-0.418*** (0.130)	-0.410*** (0.120)	-0.350** (0.152)
female	0.117 (0.099)	0.051 (0.101)	-0.048 (0.112)
east2009	0.117 (0.083)	0.116 (0.086)	0.138 (0.092)
educ2009	-0.006 (0.024)	0.026 (0.025)	0.015 (0.027)
age2009	0.076*** (0.028)	0.054* (0.028)	0.060** (0.029)
age_sq2009	-0.001*** (0.000)	-0.001** (0.000)	-0.001** (0.000)
workexp2009	0.008 (0.006)	0.004 (0.006)	0.012* (0.006)
unempexp2009	0.009 (0.022)	0.004 (0.022)	-0.022 (0.024)
disable2009	-0.202 (0.140)	0.141 (0.174)	-0.018 (0.184)
german2009	-0.081 (0.177)	-0.455*** (0.112)	0.207 (0.187)
married2009	-0.039 (0.080)	-0.060 (0.079)	-0.088 (0.083)
inc_finance2009	0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)
height	0.013*** (0.005)	0.013** (0.005)	0.009 (0.006)
duration_selfemp	1.537*** (0.213)	1.454*** (0.213)	1.403*** (0.259)
duration_selfemp_sq	-0.664*** (0.101)	-0.600*** (0.101)	-0.587*** (0.118)
duration_selfemp_cu	0.077*** (0.013)	0.068*** (0.013)	0.067*** (0.015)
father_selfemp	0.125 (0.090)	0.080 (0.091)	0.135 (0.104)
Observations	286	268	240

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

Source: Authors' own illustration from Socio-Economic Panel (SOEP) data for years 1984–2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.