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Marco Caliendo • Frank Fossen • Alexander Kritikos

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DIW Berlin
German Institute for Economic Research
Mohrenstr. 58
10117 Berlin

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

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# Trust, Positive Reciprocity, and Negative Reciprocity: Do these Traits Impact Entrepreneurial Dynamics?

Marco Caliendo[1] Frank Fossen[2] Alexander Kritikos[3]

IZA Bonn DIW Berlin DIW Berlin

**December 7, 2010**

*Abstract:*

Experimental evidence reveals that there is a strong willingness to trust and to act in both positively and negatively reciprocal ways. So far it is rarely analyzed whether these variables of social cognition influence everyday decision making behavior. We focus on entrepreneurs who are permanently facing exchange processes in the interplay with investors, sellers, and buyers, as well as needing to trust others and reciprocate with their network. We base our analysis on the German Socio-Economic Panel and recently introduced questions about trust, positive reciprocity, and negative reciprocity to examine the extent that these variables influence the entrepreneurial decision processes. More specifically, we analyze whether i) the willingness to trust other people influences the probability of starting a business; ii) trust, positive reciprocity, and negative reciprocity influence the exit probability of entrepreneurs; and iii) willingness to trust and to act reciprocally influences the probability of being an entrepreneur versus an employee or a manager. Our findings reveal that, in particular, trust impacts entrepreneurial development. Interestingly, entrepreneurs are more trustful than employees, but much less trustful than managers.

**JEL classification:** D81, J23, M13, L26
**Keywords:** Entrepreneurship, trust, reciprocity

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[1] Marco Caliendo is Director of Research at the Institute for the Study of Labor (IZA) in Bonn, Research Affiliate of the DIW Berlin and Research Fellow of the IAB, Nuremberg, e-mail: caliendo@iza.org.

[2] Corresponding author: Frank Fossen is Senior Research Associate at the German Institute for Economic Research (DIW Berlin), 10108 Berlin, Germany, e-mail: ffossen@diw.de, Phone: +49 30 89789-271, and Research Fellow of the IZA, Bonn.

[3] Alexander Kritikos is Head of the Department Innovation, Manufacturing, Service at the German Institute for Economic Research (DIW Berlin), Professor of Economics at the University of Potsdam, and Research Fellow of the IZA, Bonn and of the IAB, Nuremberg, e-mail: akritikos@diw.de.

# I. Introduction

A large number of economic experiments reveal that the majority of participants in these experiments show willingness for trust, positive and negative reciprocity despite the fact that these decisions are both risky and costly. Such behavior is observed in controlled experimental settings, for instance in the Trust Game (see Berg, Dickhaut and Mc Cabe, 1995, Bolle, 1998), in the Gift Exchange Game (see e.g. Fehr, Gächter, Kirchsteiger, 1997) or in the Ultimatum Game (see e.g. Güth, 1995, Kritikos and Bolle, 2001). Consequently experimental economists state that the self-interested individual utility function of payoff maximization is not accurate for describing human behavior (Fehr and Gächter, 2002).

Thus, trust and reciprocity are important personality traits that influence participant behavior. However, there are only few empirical tests evaluating the extent that willingness for trust and reciprocity influences real world economic outcomes. Therefore, in this paper we examine the question whether individuals who have such specific personality traits as a willingness to trust others and to positively or negatively reciprocate toward others are more likely to become entrepreneurs, be entrepreneurs, and stay in entrepreneurship.

We focus on entrepreneurs because entrepreneurs are considered, in economics, as the egoistic actors. At the same time, entrepreneurs are constantly facing exchange processes in the interplay with investors, sellers, and buyers. Unlike employees, who find themselves part of comparatively stable organizational structures, entrepreneurial activities take place among a huge variety of frequently changing relationships. Entrepreneurs must make choices between many social action alternatives where these three variables of social cognition may influence their decision making processes. Consequently, it is important to find out how entrepreneurs score in these parameter characteristics and whether the specific scores influence entrepreneurial decisions?

From a more general point of view, there is increasing interest in the relationship between personality characteristics and economic outcomes of entrepreneurs. For instance Zhao and Seibert (2006) made use of the “Big Five” personality construct indicating that entrepreneurs scored higher than managers on four different personality dimensions which make them conclude that the personality structure may be considered as one important component in explaining new venture creation and entrepreneurial success. In addition, there are several approaches focusing on the impact of special personality traits on entrepreneurial development. For instance, Oosterbeek, van Praag and Ijsselstein (2010) show that Locus of Control positively influences entrepreneurial survival and Caliendo, Fossen and Kritikos (2010) find an inverse u-shaped impact of risk attitudes on entrepreneurial survival. The present approach adds in a complementary way to the existing analysis of the influence of personality characteristics on entrepreneurial decisions as it focuses on new variables of social cognition the impact of which has not been analyzed so far.

In our analysis, we use a large, representative data set, the German Socio-Economic Panel (SOEP). The 2003, 2005, and 2008 waves contain several questions with respect to these variables of social cognition. Trust is measured as the willingness to be trustful to others and as the assessment of the same individual on the trustworthiness of others. Fehr et al. (2002) tested the survey measures of trust using a large-scale field experiment where subjects took part in a paid trust game and answered the survey questions on trust. The results indicate that the survey measures predict actual trust behavior reliably. Furthermore, the 2005 SOEP wave contains questions about, *positive reciprocity*, the willingness to return favors, and *negative reciprocity*, the willingness to harm those who previously harmed the surveyed individual. Based on these data, we examine the influence of these variables on entrepreneurial entry and exit decisions. To consistently answer the questions, we control for previous labor market states of all entrepreneurs in the sample, and for other variables which have proven to be important in previous analysis (see e.g. Caliendo et al., 2009, 2010).

The rest of the paper is organized as follows: In Section 2, we discuss the relationship between social cognition and entrepreneurial entry and survival. We describe the data in Section 3 with a special focus on the various measures of social cognition used in our analysis. Section 4 presents the results of our analysis, before Section 5 concludes. Our empirical results provide first evidence that entrepreneurs trust more and that trust significantly influences the probability to enter self-employment. The influence of reciprocity is below the expectations raised by experimental economists. The empirical analysis makes also clear that we need differentiated concepts of trust as used here to facilitate a clear picture of this complex personality characteristic on entrepreneurial development.

## II. Theoretical and Empirical Background

The ability to create social networks is widely believed to be a crucial prerequisite for becoming a successful entrepreneur. Entrepreneurs need to delegate tasks to trustworthy people, to negotiate with suppliers, employees, and customers about prices, quantities, and qualities of inputs, products, and services while maintaining cooperative relationships with all business partners and clients. One way to approach the ability to interact in networks is to analyze the willingness to trust others and to act reciprocally toward others.

In the entrepreneurial context *trust* as a personality characteristic relates to questions about the extent entrepreneurs believe that they can trust and rely on others. Being able to trust other people is an important prerequisite for realizing exchange processes in a business, especially when it is newly created and when the legal environment of the business, for instance in terms of complete contracts, is not (fully) established. Trust starts with selecting and delegating tasks to trustworthy people (Logan, 2009) and turns over to the willingness of the entrepreneur to trust (potential) business partners, such as suppliers, investors, and clients.

It is important to note that mutual trust between trading partners allows for profitable transactions in particular when business relationships cannot be secured by fully enforceable contracts. Therefore we suggest that people who are unwilling to rely on others will be less able to start and run their own business, while having some level of willingness to trust may ease to take on the risks of entrepreneurship. Earlier evidence in this direction is provided by La Porta et al. (1997) showing that trusting entrepreneurs are better able to grow firms larger.

On the other hand, trust also contains a risk factor (see e.g. Eckel and Wilson, 2004). Excessively trusting other people includes the possibility that a trustful person is more likely to be exploited if the trustee is an opportunistic individual. In case of exploitation, entrepreneurs may also suffer serious consequences when they lose business ideas or profit opportunities and are confronted with financial losses. This means we should expect that entrepreneurs unboundedly trusting others face an increasing probability of exploitation leading with higher probability to losses when compared to less trustful persons. A similar argument by Butler et al. (2009), using European Social Survey data, shows an inverse-U shaped relationship between the willingness to trust and the ability to create higher incomes. Thus, unlimited trust tends to be exploited by the trustees.

(H1: Trust) Therefore, we hypothesize with respect to the trust variable that:

(a) the more trustful an individual is, the higher the entry probability as an entrepreneur,

(b) trustful persons have a higher probability to be an entrepreneur,

(c) entrepreneurs with either low or high willingness to trust others will have a lower probability to successfully develop their businesses than entrepreneurs whose willingness to trust others falls in a middle range.

In our empirical analysis, we will make further comparisons between different subgroups of people, such as between entrepreneurs and managers, or within the entrepreneurs between those with and without employees. However, we will not provide any further hypothesis for the comparison of these subgroups. By doing so, we rather aim to explore and further understand what kind of influence different parameter values of the trust variable has on entrepreneurial decisions.

*Reciprocity* is the intrinsic motivation to respond to the behavior of a related person. The concept of *reciprocity* is divided in two opposing aspects, namely positive reciprocity and negative reciprocity: positive (negative) reciprocity is the intention of rewarding (punishing) those who have been kind (mean) to us. Both decisions i.e. reward and punishment may reduce a person’s payoff, while the payoff of the rewarded (punished) person will increase

(decrease). Reciprocal choices are, thus, based on the history of the exchange process and have direct consequences for the outcomes of the two parties.[4]

For entrepreneurs whose activities are based on exchanges of factors, knowledge, and products, it is one of the essential prerequisites to develop networks and social interactions. Having willingness for *positive reciprocity* could be helpful for entrepreneurial activities as all exchange processes between entrepreneurs and their networks implicitly contain reciprocal actions (Baron and Markman, 2000). Cooperation based on positive reciprocity might, therefore, be of importance in maintaining and developing business relationships when contracts are not or only partially enforceable. Moreover, Cable and Shane (1997) propose that cooperation in terms of positive reciprocity might be a key factor in the entrepreneur's ability to get access to venture capital or develop alliances with larger companies.[5]

*Negative reciprocity* is the opposite of having a forgiving nature. In the context of bargaining, it might be important to support one's own bargaining position by offending people in response to their previous offence (McClelland and Boyatzis, 1982). Therefore, as the realization of financial margins by hard bargaining might be a crucial prerequisite for entrepreneurial success (in terms of higher income) and as weak bargaining positions might have serious consequences for entrepreneurs, negative reciprocity could be beneficial.

At the same time, high levels of positive and negative reciprocity may inhibit entrepreneurial success. A high willingness for positive reciprocity, where one is willing to undergo high personal costs in order to help somebody in return for his or her help, might substantially reduce own profits. A high willingness for negative reciprocity, i.e. one is ready to take revenge, no matter what it costs, might not only reduce own profits but also lead to situations where others perceive such behavior as non-cooperative. Other market agents may conclude that it is not worth doing business with such entrepreneurs. Putting the pieces together, we should expect that, up to a certain level, both positive reciprocity and negative reciprocity will help to maintain and further develop entrepreneurial activities. With respect to the entry decision of entrepreneurs we should, however, expect no influence.

(H2: Reciprocity) Therefore, we hypothesize with respect to reciprocity that

(a) among all entrepreneurs, people with very low or very high willingness for positive or negative reciprocity have a higher exit probability from their entrepreneurial activities than people who have a medium score on positive or negative reciprocity.

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[4] Research by Dohmen et al. (2008, p. 85) reveals that both types of reciprocal behavior are observed in the population and that "positive and negative reciprocity turn out to be only weakly correlated for individuals, which suggests that these are distinct traits rather than two sides of the same coin."

[5] Positive reciprocity may also contain another aspect, namely correlations to a related personality trait, i.e. interpersonal reactivity, which is also of relevance for entrepreneurial activities. 'Interpersonal reactivity' describes the ability to put oneself in the place of others. In the context of entrepreneurship, it expresses the ability to approach other people and develop rewarding relationships with them (see, e.g., Müller and Gappisch, 2005). A sufficient level of 'interpersonal reactivity' should better enable the entrepreneur to produce client-oriented products (see Caliendo and Kritikos, 2008).

(b) positive and negative reciprocity do not influence the entry decision of entrepreneurs.

Again, we will make comparisons between subgroups for both reciprocity variables to further explore the influence of reciprocity on entrepreneurial development.

# III. Data

## III.1. Representative Household Panel Data

We base our analysis on the German Socio-Economic Panel (SOEP), an established, representative panel survey containing detailed information about the personal, household and socio-economic situation of approximately 22,000 individuals living in 12,000 households in Germany.[6] Our analysis draws on 9 waves of the SOEP, starting with 2000, when the sample was substantially enlarged, through the 2008 wave, the most recently available data at the time of this analysis.

As in many empirical studies on entrepreneurial choice, we employ self-employment as a measurable proxy for the concept of entrepreneurship.[7] The classification of individuals as self-employed is based on a survey question about the occupational status of the respondents. If respondents are employed or self-employed in more than one position, they are asked to report their status in their primary activity. We restrict the sample to individuals between 18 and 59 years of age and exclude farmers, civil servants, and those currently in education, vocational training, or military service. We also exclude family members working for a self-employed relative from the data set because these individuals are not entrepreneurs in the sense of running their own business. In the present analysis, we are interested in both the transition into and out of self-employment.[8] Therefore, we identify in the data, when a person is observed in different employment states in two consecutive years, $t$ and $t$+1. The observations of 2008 do not enter the estimations of entries and exits, but serve to identify transitions in 2007. In the estimation of the probability of being self-employed, the 2008 observations can be fully included.

[6] The SOEP began in 1984 as a longitudinal survey of private households and persons in West Germany and was expanded to include the former East German areas in June 1990. The central aim of this panel study is to collect representative micro-data about individuals, households, and families. It is similar to the BHPS (British Household Panel Survey) in the United Kingdom and the PSID (Panel Study of Income Dynamics) in the United States. A stable set of core questions appears every year, covering the most essential areas, such as population and demography; education, training, and qualification; labor market and occupational dynamics; earnings, income and social security; housing; health; household production; and basic orientation. For a more detailed data description, see Wagner, Frick, and Schupp (2007).

[7] This broad definition of entrepreneurship is frequently used in economics and psychology; see *inter alia* Stewart and Roth (2001) or Rauch and Frese (2007).

[8] We thus employ only one success measure, namely survival in self-employment according to which individuals continue to remain self-employed. Moreover, we consider exits from entrepreneurship to be the sum of entrepreneurial failures and closures. For a discussion on business failure and closure, see Headd (2003).

Key to our analysis are measures of trust, positive reciprocity, and negative reciprocity that were included in specific waves of the SOEP survey. In the 2003 and 2008 survey waves the questionnaire included various measures of trust attitudes, which were elicited identically in both years. Respondents were asked i) to what extent "one can trust other people in general" (short reference: *trustpeople*), ii) whether "nowadays one cannot rely on anyone" (*canttrust*); and c) whether "it is better to be careful when dealing with strangers" (*cautionstrangers*). Respondents indicated their agreement with the statements on a 4-point scale ranging from 1 (strongly agree) to 4 (strongly disagree). From these three main items on trust, we calculate an aggregate trust score as *trust* = [(5-*trustpeople*) + *canttrust* + *cautionstrangers*] / 3.[9] Thus, the trust scores range between 1 and 4, with a higher score indicating greater levels of trust.[10]

The data provide further items on trust. Respondents indicated on a 5-point scale from 1 (very often) to 5 (never) how often they lent i) money, or ii) personal belongings to their friends; and iii) how often they leave the door of their home unlocked. Moreover, additional items were introduced as "yes or no" questions. In particular, respondents were asked if they believe i) that most people attempt to be fair, and ii) if people attempt to be helpful most of the time. The respondents also answered a question concerning whether or not they had ever benefited from the generosity of a stranger. Furthermore, the questionnaire asked the respondent to indicate how many close friends they think they have.

In the 2005 survey wave, the SOEP included a special personality questionnaire containing measures of reciprocity. The respondents were asked how much they agreed with different statements about themselves, answering on 7-point Likert scales ranging from 1 ("does not apply to me at all") to 7 ("applies to me perfectly"). Three items each assessed the willingness for positive and negative reciprocity. The three statements assessing positive reciprocity were i) "If someone does me a favor, I am prepared to return it"; ii) "I go out of my way to help somebody who has been kind to me before"; and iii) "I am ready to undergo personal costs to help somebody who helped me before". The statements for negative reciprocity were i) "If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the cost"; ii) "If somebody puts me in a difficult position, I will do the same to him/her"; and iii) "If somebody offends me, I will offend him/her back". We calculate scores for positive and negative reciprocity as the average scores from the three respective items.

In the previous section, we show that decisions for trust and reciprocity also contain a risk component. For instance, trusting somebody always involves the risk that the trusting

[9] Results from a factor analysis are available Table SA1 in the supplementary appendix and show i) that the trust items as well as the positive and negative reciprocity items load on three distinct factors, and ii) have an internal consistency (Cronbach's Alpha) over 0.62 each. Hence, we use the constructed indices for the further analysis.

[10] Naef and Schupp (2009) emphasize that the dimension of this scale is distinct from trust in institutions and trust in known others. They show that the new scale of the SOEP is a valid and reliable measure of trust in strangers. The scale is valid in the sense that it correlates with trusting behaviour in the experiment.

person may be exploited. Therefore, we must take into account that these variables are correlated with risk attitudes. If we do not control for risk attitude, any measured effect of trust on entrepreneurial outcomes could be spurious as it could really capture the effect of risk tolerance. To be able to analyze, *ceteris paribus*, effects of trust and reciprocity, we control for the self-reported willingness to take risks. The survey waves of 2004, 2006, and 2008 include a question addressing the respondent's general willingness to take risks on an 11-point scale ranging from 0 ("fully unwilling to take risks") to 10 ("fully willing to take risks"), using identical wording all three waves. Table A1 in the Appendix summarizes the items on trust, reciprocity, and risk employed in this study and also provides the short names for each item that we use herein for reference.

Since we observe the variables of social cognition only in specific survey waves, we impute a respondent's scores in these variables into the observations of the same respondent in the other survey years. Personality traits are commonly regarded as being stable at least within a few years. If, in contrast, these variables change with time, it is possible that they may change in response to entrepreneurial developments, which would raise questions of reverse causality. For example, entrepreneurs might be more likely to report to trust because their interaction with people like suppliers, customers, lenders, and tax authorities forces them to trust to certain extent. Likewise, entrepreneurs might have more opportunities to lend money or personal belongings or to make friends.[11]

To avoid potential reverse causality, as much as possible, we impute historic values for risk attitudes and trust, which are elicited in more than one survey wave, where possible. For example, for 2004 through 2007, we use the trust variable from the year of 2003 and not from the year of 2008. In Section IV.3, we conduct several tests with respect to the stability of the variables of social cognition. In one specification, we limit the sample to the period 2005-2008 and only use entries into and exits from self-employment observed after the measurement of trust, risk attitude, and reciprocity.

In the econometric models, we include additional socio-demographic control variables (available in all waves) in order to derive, *ceteris paribus*, the effects of the social cognition variables. We control for education, age, work (in decades) and lifetime unemployment experience (in years) cumulated in life prior to the observation year, gender, marital status, number of children, German nationality, disability, whether the respondent's father was self-employed when the respondent was 15 years old, and real income from interests, dividends, and renting out (in €1000 in prices of 2005). Descriptions of these variables are presented in Table A4 in the Appendix.

[11] Dohmen et al. (2008) study determinants of trust, positive, and negative reciprocity and find that women and older people tend to trust more and to be less negatively reciprocal, and more positively reciprocal (the effect of gender on positive reciprocity is not consistent across specifications, though). This highlights the importance of controlling for gender and age in our estimations.

### III.2. Group Means and Correlations

Table 1 shows the weighted means of the variables, based on the pooled sample of the 2000-2008 waves. We divide the sample into three groups according to their employment state: Self-employed, employees and people not in paid work. Additionally we consider managers, which we define as the sub-group of employees with highly qualified duties or managerial functions (examples include department heads and managing directors). We conduct *t*-tests of equal means between the self-employed against those not self-employed (stars in column 1) and the three other sub-samples respectively (stars in columns 2-4). On average, the self-employed have significantly higher trust scores than those not self-employed. We also observe that entrepreneurs report significantly more close friends and that a significantly higher share of entrepreneurs have profited from the generosity of a stranger at some point. Moreover, entrepreneurs more often lend belongings and money to their friends or leave their door unlocked (note that high scores indicate a low frequency, see Table A1). Entrepreneurs exhibit a significantly higher score in positive reciprocity, while there is no significant difference in the negative reciprocity score. Furthermore, the self-employed are more risk-tolerant than the others (as shown in Caliendo, Fossen, and Kritikos, 2009). When compared to managers, the self-employed are *less* willing to trust others while showing greater negative reciprocity toward others.

INSERT TABLE 1 ABOUT HERE

Correlation coefficients between the aggregate scores of trust and reciprocity and the risk attitude appear in Table 2. All correlation coefficients are significant at the 1%-level. Trust is positively correlated with positive reciprocity (but, with a very low correlation coefficient of 0.01) as found by Dohmen et al. (2008) and Altmann et al. (2009); and negatively correlated with negative reciprocity (with a remarkably larger correlation coefficient, in absolute terms, of -0.12). Positive reciprocity and negative reciprocity are positively correlated. Here again, we emphasize that the correlation coefficient is relatively low at 0.057 (similar to the analysis of Dohmen et al., 2008). Last, but not least, there is a positive correlation between risk tolerance and each of the scores on trust, positive reciprocity, and negative reciprocity, but, again, correlation coefficients are low.[12] Table A2 in the Appendix shows the correlation coefficients between all single items on trust, reciprocity, and risk. The correlation coefficients generally confirm the internal consistency of the trust items as well as the internal consistency of positive and negative reciprocity.

INSERT TABLE 2 ABOUT HERE

[12] We also calculated correlation matrices for sub-samples by employment state (self-employed persons, employees, etc.). In contrast to the full sample, for the self-employed we observed a small, but now significant *negative* correlation between trust and positive reciprocity. This finding may indicate a self-selection of characters who exhibit an unusual combination of traits into entrepreneurship.

These observations allow three initial conclusions: (1) Entrepreneurs are – as we expect – more trustful than other people and have more often profited from strangers, but show, at the same time, a lower willingness to trust others than managers. (2) We are confident that, based on internal validity checks, there are no systematic inconsistencies in the answers to the questions behind the items presented in this paper. (3) The positive correlations between risk attitudes and all three variables of social cognition reveal that risk attitudes should be taken into account when analyzing trust and reciprocity.

## IV. Empirical Results

We model the probabilities of entry into, and exit from, self-employment as discrete time hazard rate models. The probability of entry into self-employment is estimated conditional on the tenure in dependent employment or the duration of non-employment, based on the sample of those in dependent employment and those not working. The probability of exit from self-employment is estimated conditional on the duration of the current spell in self-employment, based on the sample of the self-employed. Applying discrete time hazard rate models allows consistently taking into account state dependence and avoids survivorship bias. Caliendo, Fossen, and Kritikos (2010) formally derive the estimation equation from a general notation of a survivor model. The final estimation equation is specified as a logit model of the yearly transition probability conditional on the duration of the current state, which can be estimated based on the data in person-year format (cf. Jenkins, 1995).

The baseline hazard, which captures duration dependence, is specified flexibly as a third degree polynomial of the duration in the current state. For example, in the model of exit from self-employment, we expect the probability of exit to be high in the first years of self-employment and to decline with longer duration, once the initial hurdles are passed. The model of entry into self-employment allows the baseline hazards to differ between those in dependent employment and those not working. This is achieved by an interaction of the variables capturing the spell duration with a dummy variable indicating the current state. In addition to estimating the entry and exit rates, we also directly estimate the probability of being self-employed. Specifically, we estimate a logit model of the probability of being self-employed, based on the full sample of the self-employed, those in dependent employment and those not working.

### IV.1. Main Specifications

Tables 3 and 4 present the results of the main estimations. We use a twofold strategy where we examine the impact of the aggregated trust and reciprocity items in Table 3, before focusing on single items in Table 4. Both tables contain the estimated marginal effects on the

probability of being self-employed and on the yearly transition probabilities into and out of self-employment, evaluated at the mean values of the other explanatory variables. For each of these outcome variables we include a large set of controls that are proven to be important, including e.g. risk attitudes and parental self-employment. We standardize all variables referring to trust and reciprocity, except for the dummy variables. Therefore, the marginal effects of these variables displayed in the tables indicate the change in the probability induced if their value increases by one standard deviation. The means of the outcome variables, i.e. the average probabilities, are shown at the bottom of the tables.

INSERT TABLES 3 AND 4 ABOUT HERE

Before we examine the impact of trust and reciprocity, we note that the estimated effects of the socio-economic control variables on entrepreneurial development are consistent with prior research: Male persons, individuals with a self-employed father (when the respondent was 15 years old), and higher educated individuals are not only more likely to start-up an own business, they are also more likely to remain self-employed. Moreover, we can confirm an interesting wealth effect: yearly real capital income (in 1000€), which we use as an indicator for wealth, has a positive impact on the probability of business creation (see, e.g., Blanchflower and Oswald, 1998). However, wealth has no significant influence on the probability to remain self-employed. Also consistent with previous research are the findings with respect to the crucial variable of risk attitudes. Less risk averse persons have a higher probability to start a business and there is an inverse U-shaped relationship between risk attitudes and the survival rates of entrepreneurs (Caliendo, Fossen, and Kritikos 2009, 2010). It is important to emphasize that the influences of these variables on entrepreneurial development can still be observed when we control for variables of trust and positive and negative reciprocity, which all have positive correlations with risk attitudes.

The results in Table 3 indicate that the aggregated trust and reciprocity indices have only a limited influence on the probability of being self-employed and on the transition probabilities. While people who trust more do have a significantly higher probability to enter self-employment, we do not find significant effects of the trust variable on the probability to be in or to exit self-employment. The marginal effect on the entry decision is reasonable, as an increase in the trust variable by one standard deviation increases the entry probability by 0.08 percentage points, which translates into a relative effect of about 7% given the yearly entry probability into self-employment of 1.2% (as indicated at the bottom of Table 3). The effect is large enough to be economically considerable even if it is smaller than the effect of the strongest, well-known determinants of self-employment. For example, having a university degree or having had a self-employed father when the respondent was 15 years old, have marginal effects of 0.28 and 0.27 percentage points, or 24% and 23% in relative terms.

For positive and negative reciprocity, where we expect only an influence of these variables on exit from self-employment, we cannot establish a significant relationship. The

limited support for the above derived hypotheses might be due to the fact that the cumulated indices are too broadly defined to measure the influence of these personality traits on entrepreneurial development. To be more specific: we are particularly hypothesizing that there are limits to the positive relationships between trust and entrepreneurial survival and between positive reciprocity and negative reciprocity and entrepreneurial survival. Therefore, we cannot exclude that the effects of weaker and stronger single items among these variables may cancel each other out.

Accordingly, we estimate the influence of these single items, presented in Table 4. We first focus on the effects of the personality dimensions on the probability to be self-employed. Here it is obvious that people who are more trustful are more likely to be entrepreneurs. Entrepreneurs are less careful when dealing with strangers (*cautionstrangers*, note that high scores indicate disagreement with the statement, see Table A1), are particularly willing to lend money to their friends, and to leave their front door unlocked (again note the scale). An interesting point is that they also profited more often from strangers (*dprofitfromstranger*). On the other hand, we observe that entrepreneurs expect to be exploited if given the opportunity (*dfair*). Thus, entrepreneurs are aware that they cannot blindly trust others to be fair. Table 4 also presents the marginal effects of these variables, which can be straightforwardly interpreted: The largest effect is observable among people who have profited from the generosity of a person (*dprofitfromstranger*). It increases the probability to be self-employed by 1.38 percentage points. Considering that the self-employment rate in the sample is 8.52%, this corresponds to a relative effect of 16.2%. On the other hand, people who think that others would exploit them if given the opportunity (*dfair*) have a higher probability to be in self-employment by 1.0 percentage points, corresponding to a relative effect of 11.7%. Also further trust variables have an effect: People who lend money to their friends have a higher probability to be self-employed with a one standard deviation increase in the subjective frequency of lending money leading to a 0.61 percentage higher probability, or a relative effect of 7.2%. A higher probability of self-employment is also observed for people leaving their door unlocked more often. Again for comparison, a university degree increases the probability of being self-employed by 1.35 percentage points and a self-employed father by 4.49 percentage points, which correspond to relative effects of 15.8% and 52.7%.

An interesting point is that almost none of these variables have a significant impact on entry or exit decisions. Entry decisions are positively influenced if the entrepreneurs profited from people they never met before. Thus, it is the “passive” trust variable that drives this result: a measure of how much other people trusted the entrepreneur. The effect is again substantial, as this dummy variable increases the entry probability by 0.17 percentage points or 14.6%. With respect to the end of the entrepreneurial activities, there is one variable influencing the exit decision: the number of close friends negatively affecting the exit rate. That is, people with more friends have a lower probability to exit self-employment. A one standard deviation increase in the number of friends decreases the exit probability by a

substantial 9%, given that the exit rate is about 10%. A self-employed father decreases the exit probability by 18.5%.

Therefore, in accordance with hypothesis H1, we find that persons more trustful to other people from an active point of view, and those who received more benefits in return to or as a consequence of their trustful activities, have a higher probability of being entrepreneurs. With respect to entry into self-employment we also observe the expected positive influences of trust on the decision to become an entrepreneur, although the effect is weaker than one could expect from the effects on the stock of entrepreneurs. Moreover, the significant difference in the variable "*dfair*", according to which people will be exploitive if given the opportunity, indicates that entrepreneurs are aware that they should not be blindly trustful toward others.

Going further to the single items related to positive and negative reciprocity, we detect weaker influences for these variables. The three positive reciprocity items neither influence the entry decision, as expected, nor the exit decision. Consistently, positive reciprocity does not significantly influence the probability of being an entrepreneur.

This leaves us with negative reciprocity. While the aggregated variable shows no influence on entrepreneurship, the single variables do, as shown in Table 4. First, we must emphasize that the three negative reciprocity variables have a ranking in intensity, with "*returndisadvantage*" being the weakest form of negative reciprocity followed by "*offendback*". The variable *revenge,* "If I suffer a serious wrong, I will take revenge as soon as possible, no matter what it costs," is the strongest form of negative reciprocity. With respect to these variables we find that entrepreneurs are less willing to return offense. More specifically, one standard deviation more willingness to offend others in return to their offense decreases the probability of being self-employed by 0.5 percentage points, a relative effect of 5.9%. Moreover, *revenge* has a negative influence on entrepreneurial survival: entrepreneurs who want to take revenge no matter what, have a greater exit probability to the magnitude of about 9%. Thus, we find a first indicator that strong negative reciprocity has a negative impact on entrepreneurial survival.

### IV.2. Comparison with Managers

To shed more light on the influence of trust, positive reciprocity, and negative reciprocity on entrepreneurial decision making, we additionally estimate – as noted in section 2 – two supplementary models where we make comparisons between specific subgroups of employed and self-employed individuals. In Table 5 we focus on a comparison between self-employed individuals and managers; again the table shows marginal effects. The self-employed may be viewed as more comparable to the narrowly defined control group of managers than to other occupational groups. Contrasting entrepreneurs with managers is the common approach in the psychological literature (see, for example, Zhao and Seibert, 2006). In column 1, we include

the aggregated trust and reciprocity items as explanatory variables, while in column 2 we examine the influence of the single items. As the sample includes only the self-employed (coded as 1) and managers (coded as 0), the estimations are based on substantially fewer observations than in the preceding analysis.

INSERT TABLE 5 ABOUT HERE

The results indicate that higher trust decreases the likelihood of being self-employed as opposed to a manager. This differs from the effect of trust on the probability of entry into self-employment (in comparison to wage work and non-employment), where we find the opposite. The marginal effect of an increase in trust by one standard deviation on the probability of being self-employed versus a manager is -2.1 percentage points corresponding to a relative effect of -5.8% (the share of the self-employed in this pooled sample of self-employed persons and managers is 36.1%). Thus, a greater willingness to trust others decreases the probability of being self-employed when compared with managers, but increases the likelihood of entry into self-employment versus the complete population.

We repeat this estimation, but instead of contrasting all self-employed against the managers, we only include the sub-group of the self-employed who have at least one employee in the estimation sample.[13] The results are very similar. All variables significant in Table 5 keep their signs and (except for *canttrust*) remain significant, and no additional variables of those shown in Table 5 become significant. The effect of the aggregated trust measure becomes even stronger: A one standard deviation increase in the amount of trust leads to a 3 percentage points lower probability of being self-employed with employees instead of being a manager, corresponding to a relative effect of -13.7%.[14]

### IV.3. Further Robustness Checks

So far we assume that trust and reciprocity traits are constant over time, at least over the observation period of nine years. If these characteristics change non-randomly within shorter time intervals, and the changes are correlated with self-employment status or transitions, issues of reverse causality may arise. A unique feature of our data is that the same respondents are asked the same questions assessing trust both in 2003 and 2008. This allows us to directly

[13] Full results are available in Table SA2 in the supplementary appendix.

[14] Finally we estimate a probability model of having employees, conditional on being self-employed. Estimating this conditional probability is based on the sub-sample of the self-employed. As self-selection into self-employment is non-random, we estimate a probability model with selection (cp. Heckman, 1979), specifically, the probit sample selection model for binary dependent variables suggested by van de Ven and van Praag (1981). The results, which are available in Table SA3 in the supplementary appendix, show that the aggregated measure of trust has a significant and negative effect on the probability of having employees, conditional on being self-employed. This is similar to the results from the comparison of self-employed with managers. The single item analysis reveals that the negative effect of the trust score is driven by disagreement with the statement “on the whole one can trust people”, which increases the probability of having employees.

test if transitions into or out of self-employment between the repeated interviews induced changes in trust (see Caliendo et al., 2010, for similar tests which showed the stability of risk attitudes). Unfortunately, the data do not yet permit such an analysis for positive and negative reciprocity, as these characteristics have, so far, only been elicited in the 2005 wave. For trust, we estimate OLS regressions of the change in the aggregate trust score between the two times of measurement 2003 and 2008 on a dummy variable indicating entry into or exit out of self-employment at any time within this time span, with and without the control variables used before. The results in Table A3 in the Appendix indicate that the coefficients of both entry and exit are insignificant, which shows that entry and exit do not affect the observed change in trust. Considering the positive effect of trust on entry (Table 3), we conclude that trust is a determinant of entry into self-employment and not vice versa.

To further assess if reverse causality influences the results, we re-estimate the models of the probabilities of self-employment, entry, and exit, based on the limited sample spanning 2005-2008 only. We exclusively use the measure of trust in 2003 and of risk in 2004. As positive and negative reciprocity are elicited in 2005, and as the entry and exit indicators are coded as 1 in $t$ if a transition occurs between the interviews in $t$ and $t$+1, all personality variables are measured before the outcomes in the transition models. The estimated coefficients of the personality characteristics (available in Table SA4 in the supplementary appendix) are similar to the results in Table 3. The effect of trust is positive in the entry model at the 1% level again; the point estimate of the marginal effect is 0.0011 and thus somewhat larger than in Table 3, but the 95% confidence intervals clearly overlap (the robust standard error is 0.0004). In the models of self-employment exit and state, trust remains insignificant. Positive and negative reciprocity remain insignificant in all models, except for positive reciprocity in the exit model: It is significantly negative at the 10% level now with a point estimate of -0.0072 and a robust standard error of 0.0039.

As another robustness check, we assess if the results change if the various single measures of trust, positive, and negative reciprocity are not included in one, but in separate regressions. For each of the models of self-employment state, entry, and exit, we estimate 10 additional specifications with different subsets of the single items listed in Table 4.[15] The results turn out to be very robust: All the significant variables in Table 4 stay significant and keep the same sign any time they are included, and all the insignificant variables stay insignificant. There is only one exception: In the entry model, the item *returnhelp* (which is used to construct positive reciprocity), which is insignificant in Table 4, keeps its negative sign, but becomes significant at the 10% level if no trust items are included. This may be explained by multicollinearity with some of the trust variables.

[15] These subsets of items are chosen (cf. Table A1): 1) positive reciprocity items, 2) negative reciprocity items, 3) both, 4) main trust items, 5) trust dummy variables, 6) trust measures of the type "How often does it occur…", 7) number of friends, 8) 5 and 7 combined, 9) 6 and 7 combined, 10), 5, 6, and 7 combined. Full results appear in Tables SA5-SA7 in the supplementary appendix.

## V. Conclusions

In this explorative study we investigate, for the first time, the predictive power of three variables of social cognition on entrepreneurial development. The three variables trust, positive reciprocity and negative reciprocity are highly prominent in experimental economics. As entrepreneurs are confronted on a daily basis with the exchange process and interactions with others, they might particularly depend on these characteristics. Therefore, we aim to determine whether entrepreneurs are different from other people in the economy with respect to trust and reciprocity and whether the variables influence the decision making processes of entrepreneurs in terms of entry and survival in self-employment. We use the German Socio-Economic Panel (SOEP), an experimentally validated survey, which contained, in the 2003, 2005 and 2008 waves, questions addressing the three needed variables.

In our analysis, we find, to some extent, support for our two hypotheses and at the same time some surprising results. A higher level of trust, aggregately measured, significantly increases the probability of entry into self-employment. In the further analysis of various trust items, we also find that being aware of the negative consequences of unconditional trust increases the probability of being self-employed.

What is surprising, though, is the reversed effect of the aggregated trust variable when comparing entrepreneurs to employed managers. A higher general willingness to trust increases the probability of being an entrepreneur and, even more, an entrepreneur with employees, as opposed to a manager. There are two possible explanations for these outcomes. On the one hand managers might need to rely on others more than entrepreneurs. In particular when managers have general tasks, they might need to be trustful to others. Entrepreneurs rarely run businesses so large that they are unable to have an overview and basic knowledge of each part of their business. Therefore, entrepreneurs might have less need for unconditional trust. On the other hand, managers only have limited liabilities for their decisions. They may have a greater willingness to unconditionally rely on their staff's decisions. As their personal payoffs might not be affected, they face lower personal risk if exploited. The liabilities of entrepreneurs tend to be almost unlimited. Being exploited will affect their payoffs more directly when compared to managers. Thus, entrepreneurs might tend to avoid too much trust. The awareness of exploitation seems to be one major factor separating entrepreneurs from managers clearly indicating a contrasting result to La Porta et al. (1997).

Positive reciprocity neither influences entry nor exit decisions into and from self-employment in the preferred specifications, nor does it increase the probability of being self-employed. An interesting result is the fact that a high willingness for revenge – the strongest form of negative reciprocity – increases the probability of exiting entrepreneurship. Therefore, with respect to entrepreneurs we do not find support for previous expectations that negatively reciprocal people might have a "strategic advantage in bargaining, at the workplace and social

interactions in general" as they "can threaten to retaliate … unfair or uncooperative treatments" (as suggested by Dohmen et al., 2008, p. 90).

Our analysis finds that the influence of the variables of social cognition is below the expectations raised by experimental economics. The most interesting results are revealed with respect to trust variables. With respect to positive reciprocity and to negative reciprocity, we must ask to what extent these variables are crucial for entrepreneurial development. An avenue toward a final answer determining the relevance of these three variables of social cognition could be employing more general concepts to personality traits such as the Big Five approach where the social cognition variables could be additionally taken into account and where all partial effects on economic outcomes could then be examined jointly.

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# Tables

**Table 1: Descriptive Statistics by Employment State (Weighted Means)**

| | Self-Employed | Employees | Not working | Managers |
|---|---|---|---|---|
| trust | 2.375 *** | 2.304 *** | 2.198 *** | 2.481 *** |
| positive reciprocity | 5.945 *** | 5.895 ** | 5.862 *** | 5.906 ** |
| negative reciprocity | 3.178 | 3.185 | 3.205 | 3.000 *** |
| returnfavor | 6.458 ** | 6.510 ** | 6.503 ** | 6.429 |
| returnhelp | 5.930 | 5.921 | 5.948 | 5.808 *** |
| returncostlyhelp | 5.438 *** | 5.258 *** | 5.160 *** | 5.472 |
| revenge | 3.340 | 3.300 | 3.252 ** | 3.174 *** |
| returndisadvantage | 2.990 | 2.942 | 2.941 | 2.839 *** |
| offendback | 3.187 *** | 3.305 *** | 3.387 *** | 3.005 *** |
| trustpeople | 2.392 ** | 2.398 | 2.500 *** | 2.261 *** |
| canttrust | 2.630 *** | 2.606 | 2.464 *** | 2.787 *** |
| cautionstrangers | 1.889 *** | 1.707 *** | 1.619 *** | 1.928 ** |
| dfair | 0.481 | 0.504 ** | 0.429 *** | 0.585 *** |
| dhelpful | 0.307 | 0.308 | 0.292 | 0.332 ** |
| dprofitfromstranger | 0.264 *** | 0.192 *** | 0.176 *** | 0.305 *** |
| numberfriends | 4.473 ** | 4.418 | 4.034 *** | 4.632 ** |
| lendbelongings | 3.143 *** | 3.200 ** | 3.327 *** | 3.055 *** |
| lendmoney | 4.114 *** | 4.244 *** | 4.315 *** | 4.175 ** |
| doorunlocked | 3.871 *** | 4.113 *** | 4.166 *** | 4.043 *** |
| will_risk | 5.618 *** | 4.707 *** | 4.315 *** | 5.177 *** |
| female | 0.320 *** | 0.477 *** | 0.731 *** | 0.301 * |
| highschool | 0.429 *** | 0.246 *** | 0.158 *** | 0.651 *** |
| apprenticeship | 0.412 *** | 0.533 *** | 0.485 *** | 0.310 *** |
| highertechncol | 0.291 *** | 0.252 *** | 0.224 *** | 0.238 *** |
| university | 0.340 *** | 0.176 *** | 0.104 *** | 0.642 *** |
| age | 43.353 *** | 40.732 *** | 40.516 *** | 41.875 *** |
| prworkexp10 | 1.717 *** | 1.582 *** | 1.130 *** | 1.545 *** |
| prunempexp | 0.556 *** | 0.535 | 1.721 *** | 0.243 *** |
| disabled | 0.028 *** | 0.063 *** | 0.074 *** | 0.045 *** |
| german | 0.941 ** | 0.938 | 0.885 *** | 0.963 *** |
| fatherse | 0.133 *** | 0.072 *** | 0.069 *** | 0.110 ** |
| nchild | 0.650 | 0.599 ** | 0.945 *** | 0.635 |
| married | 0.593 | 0.579 | 0.641 *** | 0.560 ** |
| divorced | 0.118 ** | 0.098 *** | 0.119 | 0.082 *** |
| capincr1000 | 4.546 *** | 1.081 *** | 0.926 *** | 1.820 *** |
| Entry into self-empl. | | 0.007 | 0.017 | 0.013 |
| Exit from self-empl. | 0.093 | | | |
| Person-years[1] | 6326 | 54173 | 13607 | 11185 |

*Notes*: The weighted means of the variables of social cognition are calculated before standardization. We conducted *t*-tests of mean equality in the variables. Stars (***/**/*) in the first column indicate that the mean for the self-employed is statistically different from the mean for those not self-employed (i.e. employees and those not working) at the 0.1%/5%/10% level. The stars in columns 2 and 3 refer to tests between the self-employed and employees and between the self-employed and those not working, and in column 4 between the self-employed and managers. See Tables A1 and A4 for a detailed description of the variables.

[1] For trust, positive reciprocity, and negative reciprocity, N is 6435 for the self-employed, 55107 for employees, 13860 for those not working, and 11385 for managers.

*Source*: Authors' calculations based on the SOEP 2000-08.

**Table 2: Correlation Table for Aggregated Trust and Reciprocity Variables**

| | trust | positive reciprocity | negative reciprocity | will_risk |
|---|---|---|---|---|
| trust | 1.0000 | | | |
| positive reciprocity | 0.0094* | 1.0000 | | |
| negative reciprocity | -0.1203* | 0.0567* | 1.0000 | |
| will_risk | 0.0723* | 0.0572* | 0.0659* | 1.0000 |
| Person-years | 75692 | | | |

*Notes*: Only correlation coefficients significant at the 10% level or better are listed, those significant at the 1% level are marked with a star. Correlation coefficients with larger significance levels are left blank in the matrix. See Table A1 for variable descriptions. *Source*: Authors' calculations based on the SOEP 2000-08.

**Table 3: Main Regression Results (Aggregated Index) – Marginal Effects**

| | Stock | Entry | Exit |
|---|---|---|---|
| trust | 0.0011 | 0.0008*** | 0.0010 |
| | (0.0020) | (0.0003) | (0.0035) |
| positive reciprocity | 0.0009 | 0.0000 | 0.0017 |
| | (0.0021) | (0.0003) | (0.0034) |
| negative reciprocity | -0.0023 | 0.0001 | 0.0026 |
| | (0.0020) | (0.0003) | (0.0037) |
| will_risk | 0.0007 | -0.0006 | -0.0141** |
| | (0.0029) | (0.0004) | (0.0058) |
| will_risk_sq | 0.0010*** | 0.0002*** | 0.0014*** |
| | (0.0003) | (0.0000) | (0.0005) |
| female | -0.0358*** | -0.0037*** | 0.0323*** |
| | (0.0046) | (0.0006) | (0.0086) |
| highschool | 0.0347*** | 0.0031*** | -0.0219** |
| | (0.0066) | (0.0009) | (0.0098) |
| apprenticeship | -0.0177*** | -0.0011 | 0.0017 |
| | (0.0052) | (0.0007) | (0.0110) |
| highertechncol | 0.0083 | 0.0000 | -0.0021 |
| | (0.0057) | (0.0007) | (0.0107) |
| university | 0.0142** | 0.0028*** | -0.0089 |
| | (0.0063) | (0.0010) | (0.0104) |
| age | 0.0121*** | 0.0014*** | -0.0064* |
| | (0.0017) | (0.0002) | (0.0036) |
| agesq | -0.0001*** | -0.0000*** | 0.0001** |
| | (0.0000) | (0.0000) | (0.0000) |
| prworkexp10 | 0.0046 | 0.0004 | -0.0205** |
| | (0.0038) | (0.0006) | (0.0084) |
| prunempexp | -0.0062*** | -0.0006*** | 0.0048** |
| | (0.0015) | (0.0002) | (0.0023) |
| disabled | -0.0332*** | -0.0010 | 0.0140 |
| | (0.0052) | (0.0011) | (0.0211) |
| german | 0.0006 | 0.0007 | -0.0068 |
| | (0.0086) | (0.0010) | (0.0150) |
| fatherse | 0.0473*** | 0.0027** | -0.0165* |
| | (0.0096) | (0.0012) | (0.0094) |
| nchild | 0.0021 | 0.0000 | 0.0037 |
| | (0.0020) | (0.0003) | (0.0044) |
| married | -0.0097* | -0.0004 | 0.0024 |
| | (0.0054) | (0.0007) | (0.0107) |
| divorced | 0.0083 | -0.0006 | 0.0017 |
| | (0.0078) | (0.0010) | (0.0151) |
| capincr1000 | 0.0006*** | 0.0000*** | -0.0002 |
| | (0.0002) | (0.0000) | (0.0002) |
| duration | | -0.0030*** | -0.0260*** |
| | | (0.0003) | (0.0050) |
| dur_sq | | 0.0002*** | 0.0014*** |
| | | (0.0000) | (0.0005) |

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| | | | |
|---|---|---|---|
| dur_cu | | -0.0000*** | -0.0000* |
| | | (0.0000) | (0.0000) |
| notempl | | 0.0020 | |
| | | (0.0016) | |
| duration_ne | | 0.0017* | |
| | | (0.0009) | |
| dur_sq_ne | | -0.0002 | |
| | | (0.0001) | |
| dur_cu_ne | | 0.0000 | |
| | | (0.0000) | |
| Year dummies | yes | yes | yes |
| Wald $\chi 2$ | 914.657 | 784.294 | 296.169 |
| Log likelihood | -19711.023 | -3519.194 | -1703.583 |
| Mean outcome | 0.085187 | 0.011666 | 0.099844 |
| Person-years | 75692 | 62491 | 5759 |

*Notes*: Marginal effects after logit estimation, evaluated at the means of the explanatory variables. For dummy variables, the effects of a discrete change from 0 to 1 are shown. Cluster and heteroscedasticity robust standard errors in parentheses. Stars (***/**/*) indicate significance at the 1%/5%/10% levels. See Tables A1 and A4 for a detailed description of the variables. *Source*: Authors' calculations based on the SOEP 2000-08.

**Table 4: Main Regression Results (Single Personality Items) – Marginal Effects**

| | Stock | Entry | Exit |
|---|---|---|---|
| returnfavor | -0.0002 | 0.0003 | 0.0035 |
| | (0.0023) | (0.0003) | (0.0039) |
| returnhelp | -0.0015 | -0.0005 | 0.0005 |
| | (0.0024) | (0.0003) | (0.0043) |
| returncostlyhelp | 0.0020 | 0.0002 | -0.0015 |
| | (0.0025) | (0.0003) | (0.0041) |
| revenge | 0.0024 | 0.0003 | 0.0090* |
| | (0.0030) | (0.0004) | (0.0049) |
| returndisadvantage | -0.0006 | -0.0000 | -0.0042 |
| | (0.0030) | (0.0004) | (0.0055) |
| offendback | -0.0050** | -0.0000 | -0.0014 |
| | (0.0025) | (0.0003) | (0.0049) |
| trustpeople | 0.0004 | -0.0002 | -0.0005 |
| | (0.0023) | (0.0003) | (0.0042) |
| canttrust | -0.0025 | 0.0003 | 0.0046 |
| | (0.0023) | (0.0003) | (0.0044) |
| cautionstrangers | 0.0052*** | 0.0005 | -0.0058 |
| | (0.0020) | (0.0003) | (0.0038) |
| dfair | -0.0100** | -0.0009 | 0.0037 |
| | (0.0043) | (0.0006) | (0.0087) |
| dhelpful | 0.0005 | 0.0003 | 0.0091 |
| | (0.0044) | (0.0006) | (0.0089) |
| dprofitfromstranger | 0.0138*** | 0.0017** | 0.0100 |
| | (0.0051) | (0.0007) | (0.0088) |
| numberfriends | 0.0005 | -0.0002 | -0.0090** |
| | (0.0019) | (0.0002) | (0.0041) |
| lendbelongings | 0.0035 | -0.0004 | 0.0027 |
| | (0.0022) | (0.0003) | (0.0043) |
| lendmoney | -0.0061*** | -0.0003 | -0.0023 |
| | (0.0020) | (0.0003) | (0.0039) |
| doorunlocked | -0.0074*** | -0.0002 | 0.0050 |
| | (0.0018) | (0.0003) | (0.0035) |
| will_risk | 0.0006 | -0.0006 | -0.0153*** |
| | (0.0029) | (0.0004) | (0.0059) |

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| | | | |
|---|---|---|---|
| will_risk_sq | 0.0009*** | 0.0002*** | 0.0016*** |
| | (0.0003) | (0.0000) | (0.0005) |
| female | -0.0349*** | -0.0037*** | 0.0312*** |
| | (0.0046) | (0.0006) | (0.0087) |
| highschool | 0.0333*** | 0.0030*** | -0.0238** |
| | (0.0065) | (0.0009) | (0.0100) |
| apprenticeship | -0.0166*** | -0.0010 | 0.0037 |
| | (0.0052) | (0.0007) | (0.0113) |
| highertechncol | 0.0077 | 0.0000 | -0.0008 |
| | (0.0056) | (0.0007) | (0.0109) |
| university | 0.0135** | 0.0025** | -0.0064 |
| | (0.0062) | (0.0010) | (0.0106) |
| age | 0.0114*** | 0.0014*** | -0.0057 |
| | (0.0017) | (0.0002) | (0.0035) |
| agesq | -0.0001*** | -0.0000*** | 0.0001* |
| | (0.0000) | (0.0000) | (0.0000) |
| prworkexp10 | 0.0053 | 0.0006 | -0.0198** |
| | (0.0038) | (0.0006) | (0.0087) |
| prunempexp | -0.0062*** | -0.0006*** | 0.0037 |
| | (0.0015) | (0.0002) | (0.0024) |
| disabled | -0.0325*** | -0.0010 | 0.0152 |
| | (0.0050) | (0.0011) | (0.0215) |
| german | 0.0002 | 0.0006 | -0.0027 |
| | (0.0087) | (0.0010) | (0.0148) |
| fatherse | 0.0449*** | 0.0028** | -0.0185** |
| | (0.0095) | (0.0012) | (0.0093) |
| nchild | 0.0017 | -0.0000 | 0.0027 |
| | (0.0020) | (0.0003) | (0.0045) |
| married | -0.0080 | -0.0003 | 0.0018 |
| | (0.0053) | (0.0007) | (0.0107) |
| divorced | 0.0062 | -0.0008 | 0.0024 |
| | (0.0076) | (0.0009) | (0.0155) |
| capincr1000 | 0.0005*** | 0.0000** | -0.0002 |
| | (0.0002) | (0.0000) | (0.0002) |
| duration | | -0.0029*** | -0.0254*** |
| | | (0.0003) | (0.0052) |
| dur_sq | | 0.0002*** | 0.0014*** |
| | | (0.0000) | (0.0005) |
| dur_cu | | -0.0000*** | -0.0000* |
| | | (0.0000) | (0.0000) |
| notempl | | 0.0014 | |
| | | (0.0015) | |
| duration_ne | | 0.0021** | |
| | | (0.0008) | |
| dur_sq_ne | | -0.0002* | |
| | | (0.0001) | |
| dur_cu_ne | | 0.0000 | |
| | | (0.0000) | |
| Year dummies | yes | yes | yes |
| Wald $\chi 2$ | 955.221 | 797.366 | 314.425 |
| Log likelihood | -19216.098 | -3436.869 | -1666.336 |
| Mean outcome | 0.085214 | 0.011635 | 0.100071 |
| Person-years | 74389 | 61365 | 5656 |

*Notes*: Marginal effects after logit estimation, evaluated at the means of the explanatory variables. For dummy variables, the effects of a discrete change from 0 to 1 are shown. Cluster and heteroscedasticity robust standard errors in parentheses. Stars (***/**/*) indicate significance at the 1%/5%/10% levels. See Tables A1 and A4 for a detailed description of the variables.
*Source*: Authors' calculations based on the SOEP 2000-08.

**Table 5: Self-Employment versus Being a Manager – Marginal Effects on the Stock**

| | Aggregated Trust and Reciprocity Variables | Personality Items with Additional Trust Items |
|---|---|---|
| trust | -0.0209** | |
| | (0.0091) | |
| positive reciprocity | 0.0006 | |
| | (0.0098) | |
| negative reciprocity | 0.0066 | |
| | (0.0095) | |
| returnfavor | | 0.0103 |
| | | (0.0105) |
| returnhelp | | 0.0081 |
| | | (0.0114) |
| returncostlyhelp | | -0.0167 |
| | | (0.0114) |
| revenge | | -0.0008 |
| | | (0.0133) |
| returndisadvantage | | -0.0001 |
| | | (0.0140) |
| offendback | | 0.0087 |
| | | (0.0114) |
| trustpeople | | 0.0054 |
| | | (0.0114) |
| canttrust | | -0.0183* |
| | | (0.0110) |
| cautionstrangers | | 0.0036 |
| | | (0.0101) |
| dfair | | -0.0479** |
| | | (0.0219) |
| dhelpful | | 0.0341 |
| | | (0.0216) |
| dprofitfromstranger | | 0.0047 |
| | | (0.0212) |
| numberfriends | | 0.0037 |
| | | (0.0092) |
| lendbelongings | | 0.0221** |
| | | (0.0102) |
| lendmoney | | -0.0357*** |
| | | (0.0103) |
| doorunlocked | | -0.0223** |
| | | (0.0093) |
| will_risk | -0.0182 | -0.0185 |
| | (0.0154) | (0.0158) |
| will_risk_sq | 0.0040*** | 0.0039*** |
| | (0.0014) | (0.0015) |
| Control variables | yes | yes |
| Wald $\chi 2$ | 422.608 | 433.852 |
| Log likelihood | -10262.049 | -10018.735 |
| Mean outcome | 0.361091 | 0.361238 |
| Person-years | 17857 | 17548 |

*Notes:* Marginal effects after logit estimation, evaluated at the means of the explanatory variables. For dummy variables, the effects of a discrete change from 0 to 1 are shown. Cluster and heteroscedasticity robust standard errors in parentheses. Stars (***/**/*) indicate significance at the 1%/5%/10% levels. Results for the control variables appear in Table SA2 in the supplementary appendix. See Table A1 for a detailed description of the variables.
*Source:* Authors' calculations based on the SOEP 2000-08.

# Appendix

### Table A1: Questionnaire Wording

| Personality trait | Questionnaire wording | Item's short name |
|---|---|---|
| **Reciprocity** | *Scale: 1 ('does not apply to me at all') to 7 ('applies to me perfectly')* | |
| Positive reciprocity | If someone does me a favor, I am prepared to return it | returnfavor |
| Positive reciprocity | I go out of my way to help somebody who has been kind to me before | returnhelp |
| Positive reciprocity | I am ready to undergo personal costs to help somebody who helped me before | returncostlyhelp |
| Negative reciprocity | If I suffer a serious wrong, I will take revenge as soon as possible, no matter what the cost | revenge |
| Negative reciprocity | If somebody puts me in a difficult position, I will do the same to him/her | returndisadvantage |
| Negative reciprocity | If somebody offends me, I will offend him/her back | offendback |
| **Trust (main items)** | *Scale: 1 ('totally agree') to 4 ('totally disagree')* | |
| Trust (reversed) | On the whole one can trust people | trustpeople |
| Trust | Nowadays one can't rely on anyone | canttrust |
| Trust | If one is dealing with strangers, it is better to be careful before one can trust them | cautionstrangers |
| **Trust (supplementary)** | *Scale: 0 ('no') or 1 ('yes')* | |
| | Do you believe that most people would exploit you if they had the opportunity (*dfair*=0), or would attempt to be fair toward you (*dfair*=1)? | dfair |
| | Would you say that for most of the time, people attempt to be helpful (*dhelpful*=1)? Or only act in their own interests (*dhelpful*=0)? | dhelpful |
| | Have you ever profited from the generosity of a person, who you had not previously met (*dprofitfromstrainger*=1; otherwise =0)? | dprofitfromstranger |
| | *Scale: Metric* | |
| | What would you say: How many close friends do you have? | numberfriends |
| | *Scale: 1 ('very often) to 5 ('never')* | |
| | **How often does it occur that, ...** | |
| | …that you lend your friends your personal belongings (i.e. CDs, books, car, bicycle)? | lendbelongings |
| | …that you lend your friends money? | lendmoney |
| | …that you leave the door to your apartment unlocked? | doorunlocked |
| **Risk attitude** | *Scale: 0 ('fully unwilling to take risks') to 10 ('fully willing to take risks')* | |
| | Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? | will_risk |
| **Constructed indices** | trust = [(5-trustpeople) + canttrust + cautionstrangers] / 3 | |
| | positive reciprocity = (returnfavor + returnhelp + returncostlyhelp) / 3 | |
| | negative reciprocity = (revenge + returndisadvantage + offendback) / 3 | |

*Notes*: The items on reciprocity were included in the survey wave 2005 of the SOEP, those on trust in 2003 and 2008, and those on the willingness to take risks in 2004, 2006, and 2008.

**Table A2: Correlation Table for Single Personality Items**

| | trustpeople | canttrust | caution-strangers | dfair | dhelpful | dprofitfrom-stranger |
|---|---|---|---|---|---|---|
| trustpeople | 1.0000 | | | | | |
| canttrust | -0.4956* | 1.0000 | | | | |
| cautionstrangers | -0.2672* | 0.3083* | 1.0000 | | | |
| dfair | -0.4219* | 0.3792* | 0.2583* | 1.0000 | | |
| dhelpful | -0.3442* | 0.2883* | 0.1995* | 0.4136* | 1.0000 | |
| dprofitfromstranger | -0.0939* | 0.1180* | 0.1252* | 0.0953* | 0.0628* | 1.0000 |
| numberfriends | -0.1276* | 0.1180* | 0.0910* | 0.1199* | 0.1137* | 0.0524* |
| lendbelongings | 0.0815* | -0.1362* | -0.0786* | -0.0809* | -0.0343* | -0.1775* |
| lendmoney | 0.0401* | -0.0712* | -0.0952* | -0.0244* | -0.0181* | -0.1646* |
| doorunlocked | 0.0686* | -0.0694* | -0.1048* | -0.0498* | -0.0113* | -0.1475* |
| returnfavor | -0.0120* | 0.0271* | -0.0534* | 0.0071 | | 0.0266* |
| returnhelp | 0.0223* | -0.0156* | -0.0844* | -0.0359* | -0.0064 | |
| returncostlyhelp | -0.0607* | 0.0521* | 0.0364* | 0.0212* | 0.0397* | 0.0751* |
| revenge | 0.1208* | -0.0988* | -0.0548* | -0.0971* | -0.0715* | -0.0307* |
| returndisadvantage | 0.0865* | -0.0861* | -0.0359* | -0.0819* | -0.0446* | -0.0394* |
| offendback | 0.0976* | -0.0916* | -0.0415* | -0.0797* | -0.0563* | -0.0204* |
| will_risk | -0.0481* | 0.0435* | 0.0724* | 0.0296* | 0.0142* | 0.0809* |

| | number-friends | lend-belongings | lend-money | door-unlocked | returnfavor | returnhelp |
|---|---|---|---|---|---|---|
| numberfriends | 1.0000 | | | | | |
| lendbelongings | -0.1549* | 1.0000 | | | | |
| lendmoney | -0.0716* | 0.4585* | 1.0000 | | | |
| doorunlocked | -0.0377* | 0.2120* | 0.1752* | 1.0000 | | |
| returnfavor | 0.0185* | -0.0813* | -0.0225* | -0.0106* | 1.0000 | |
| returnhelp | 0.0133* | -0.0390* | -0.0202* | 0.0075 | 0.4104* | 1.0000 |
| returncostlyhelp | 0.0517* | -0.0955* | -0.1146* | -0.0423* | 0.2571* | 0.4414* |
| revenge | -0.0417* | 0.0277* | | 0.0109* | -0.0110* | 0.0745* |
| returndisadvantage | -0.0392* | 0.0541* | | 0.0161* | -0.0648* | 0.0597* |
| offendback | -0.0249* | 0.0538* | | 0.0138* | -0.0414* | 0.0500* |
| will_risk | 0.0816* | -0.1268* | -0.1384* | -0.0824* | 0.0072 | 0.0153* |

| | returncostly-help | revenge | returndis-advantage | offendback | will_risk |
|---|---|---|---|---|---|
| returncostlyhelp | 1.0000 | | | | |
| revenge | 0.0684* | 1.0000 | | | |
| returndisadvantage | 0.0656* | 0.7180* | 1.0000 | | |
| offendback | 0.0629* | 0.5478* | 0.5801* | 1.0000 | |
| will_risk | 0.0857* | 0.0776* | 0.0552* | 0.0395* | 1.0000 |
| Person-years | 74389 | | | | |

*Notes:* Only correlation coefficients significant at the 10% level or better are listed, those significant at the 1% level are marked with a star. Correlation coefficients with larger significance levels are left blank in the matrix. It is interesting to note that the variable *trustpeople* is technically speaking negatively correlated (or in substance positively correlated) with having profited from a stranger (*dprofitfromstranger*). Thus, the active willingness to trust others is in positive correlation to the passive trust variable of having received generosity from others. Moreover, the number of close friends is positively correlated with each of the three positive reciprocity items and negatively with the three negative reciprocity items. See Table A1 for a detailed description of the variables.
*Source:* Authors' calculations based on the SOEP 2000-08.

## Table A3: Is Trust Affected by Transitions into or out of Entrepreneurship?

| Dependent variable.: Change in the aggregated trust score between 2003 and 2008 | | | | |
|---|---|---|---|---|
| Sample: | Persons not self-employed in 2003 | | Persons self-employed in 2003 | |
| Entry between 2003 and 2008 | 0.0305 | 0.0254 | | |
| | (0.0303) | (0.0305) | | |
| Exit between 2003 and 2008 | | | -0.0147 | -0.0058 |
| | | | (0.0528) | (0.0549) |
| Control variables | no | yes | no | yes |
| $R^2$ | 0.000 | 0.002 | 0.000 | 0.028 |
| Mean change in trust score | 0.006 | 0.006 | 0.011 | 0.011 |
| N | 5731 | 5731 | 485 | 485 |

*Notes:* The table shows coefficients from OLS regressions of the change in the aggregated trust score (not standardized) on dummy variables indicating entry into or exit from self-employment between 2003 and 2008. Standard errors in parentheses. The results for the control variables are available from the authors on request. *Source*: Authors' calculations based on the SOEP 2003-08.

## Table A4: Detailed Description of the Control Variables

| Variable | Definition |
|---|---|
| female | Dummy for females |
| highschool | Dummy for individuals who finished higher secondary school with a university entrance qualification ("*Fachhochschulreife*" or "*Abitur*") |
| apprenticeship | Dummy for individuals who finished an apprenticeship ("*Lehre*") |
| highertechncol | Dummy for individuals who finished a higher technical college, a health care school, or civil service training ("*Berufsschule*", "*Schule Gesundheitswesen*", "*Fachschule*", "*Meister*", "*Beamtenausbildung*", or "*Sonstige Ausbildung*") |
| university | Dummy for individuals who have a university degree |
| age | Age of individual |
| agesqr | Age squared |
| prworkexp10[a] | Years of full time work experience prior to the year of observation, divided by 10 |
| prunemexp[a] | Years of unemployment experience prior to the year of observation |
| disabled | Dummy for handicapped / physically challenged individuals |
| german | Dummy for German nationality |
| fatherse | Dummy for individuals whose father was self-employed when the respondents were 15 years old |
| nchild | Number of children under 17 in the household |
| married | Dummy for married and not separated individuals. Omitted category for marital status is "single"/"widowed" |
| separated | Dummy for married, but separated individuals |
| divorced | Dummy for divorced individuals |
| capincr1000 | Real income from interests, dividends, and renting out in the year before the observation year in 1000 Euros, deflated to 2005 using the Consumer Price Index. |
| duration[a] | Tenure of current spell (self-employment, regular employment or unemployment/inactivity). For left-censored spells, the duration since the last job change is used, which may be shorter than the overall spell if somebody switched jobs. |
| dur_sq | $\text{duration}^2$ |
| dur_cu | $\text{duration}^3$ |
| motherabi | Dummy for individuals whose mother finished higher secondary school with a university entrance qualification |
| fatherabi | Dummy for individuals whose father finished higher secondary school with a university entrance qualification |

*Notes:* [a] Uses information from the lifetime employment history in the SOEP.
Dummy variables equal 1 if condition holds and 0 otherwise.

# Supplementary Appendix

**Table SA1: Factor Analysis and Cronbach's Alpha**

| | Factor1 | Factor2 | Factor3 | Uniqueness |
|---|---|---|---|---|
| trustpeople | | -0.6100 | | 0.6225 |
| canttrust | | 0.6348 | | 0.5955 |
| cautionstrangers | | 0.4359 | | 0.8087 |
| returnfavor | | | 0.5235 | 0.7245 |
| returnhelp | | | 0.6571 | 0.564 |
| returncostlyhelp | | | 0.5368 | 0.6968 |
| revenge | 0.7887 | | | 0.3686 |
| returndisadvantage | 0.8204 | | | 0.3325 |
| offendback | 0.6638 | | | 0.5547 |
| Constructed index | negative reciprocity | trust | positive reciprocity | |
| Cronbach's alpha | 0.6171 | 0.8269 | 0.6233 | |

*Notes:* The upper panel of the table shows the rotated factor loadings (pattern matrix) and unique variances (principal factors method; oblique promax rotation). Absolute factor loadings below 0.3 are left blank. The lower panel presents Cronbach's alpha (scale reliability coefficient) for the three constructed indices. See Table A1 for a detailed description of the variables.
*Source:* Authors' calculations based on the SOEP 2000-08.

**Table SA2: Full Regression Results in Comparison to Managers – Marginal Effects on the Stock**

| | Aggregated Trust and Reciprocity Variables | | Personality Items with Additional Trust Items | |
|---|---|---|---|---|
| | Self-employment versus being a manager | Self-employment with workers versus being a manager | Self-employment versus being a manager | Self-employment with workers versus being a manager |
| trust | -0.0209** | -0.0300*** | | |
| | (0.0091) | (0.0078) | | |
| positive reciprocity | 0.0006 | 0.0073 | | |
| | (0.0098) | (0.0086) | | |
| negative reciprocity | 0.0066 | 0.0026 | | |
| | (0.0095) | (0.0081) | | |
| returnfavor | | | 0.0103 | 0.0027 |
| | | | (0.0105) | (0.0090) |
| returnhelp | | | 0.0081 | 0.0046 |
| | | | (0.0114) | (0.0102) |
| returncostlyhelp | | | -0.0167 | 0.0020 |
| | | | (0.0114) | (0.0102) |
| revenge | | | -0.0008 | -0.0011 |
| | | | (0.0133) | (0.0116) |
| returndisadvantage | | | -0.0001 | 0.0101 |
| | | | (0.0140) | (0.0118) |
| offendback | | | 0.0087 | -0.0093 |
| | | | (0.0114) | (0.0096) |
| trustpeople | | | 0.0054 | 0.0074 |
| | | | (0.0114) | (0.0102) |
| canttrust | | | -0.0183* | -0.0138 |
| | | | (0.0110) | (0.0097) |
| cautionstrangers | | | 0.0036 | -0.0079 |
| | | | (0.0101) | (0.0089) |
| dfair | | | -0.0479** | -0.0426** |
| | | | (0.0219) | (0.0190) |
| dhelpful | | | 0.0341 | 0.0151 |
| | | | (0.0216) | (0.0191) |

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**Continued**

| | | | | |
|---|---|---|---|---|
| dprofitfromstranger | | | 0.0047 | -0.0009 |
| | | | (0.0212) | (0.0185) |
| numberfriends | | | 0.0037 | 0.0050 |
| | | | (0.0092) | (0.0075) |
| lendbelongings | | | 0.0221** | 0.0217** |
| | | | (0.0102) | (0.0085) |
| lendmoney | | | -0.0357*** | -0.0293*** |
| | | | (0.0103) | (0.0088) |
| doorunlocked | | | -0.0223** | -0.0146* |
| | | | (0.0093) | (0.0075) |
| will_risk | -0.0182 | -0.0064 | -0.0185 | -0.0046 |
| | (0.0154) | (0.0124) | (0.0158) | (0.0126) |
| will_risk_sq | 0.0040*** | 0.0023* | 0.0039*** | 0.0020* |
| | (0.0014) | (0.0012) | (0.0015) | (0.0012) |
| female | 0.0813*** | -0.0146 | 0.0844*** | -0.0110 |
| | (0.0207) | (0.0183) | (0.0212) | (0.0185) |
| highschool | -0.0965*** | -0.0765*** | -0.0935*** | -0.0750*** |
| | (0.0247) | (0.0214) | (0.0252) | (0.0215) |
| apprenticeship | -0.0610** | -0.0421* | -0.0614** | -0.0435* |
| | (0.0262) | (0.0224) | (0.0267) | (0.0225) |
| highertechncol | -0.0622** | -0.0392* | -0.0638** | -0.0414* |
| | (0.0281) | (0.0235) | (0.0286) | (0.0236) |
| university | -0.3019*** | -0.1829*** | -0.2970*** | -0.1815*** |
| | (0.0248) | (0.0248) | (0.0252) | (0.0251) |
| age | 0.0056 | 0.0195** | 0.0035 | 0.0174** |
| | (0.0089) | (0.0086) | (0.0090) | (0.0086) |
| agesq | 0.0001 | -0.0002 | 0.0001 | -0.0001 |
| | (0.0001) | (0.0001) | (0.0001) | (0.0001) |
| prworkexp10 | -0.1016*** | -0.0392* | -0.0961*** | -0.0349 |
| | (0.0254) | (0.0237) | (0.0258) | (0.0238) |
| prunempexp | 0.0644*** | 0.0045 | 0.0630*** | 0.0018 |
| | (0.0133) | (0.0104) | (0.0134) | (0.0105) |
| disabled | -0.1525*** | -0.0658** | -0.1484*** | -0.0635** |
| | (0.0343) | (0.0300) | (0.0347) | (0.0303) |
| german | -0.1004** | -0.0658 | -0.1067** | -0.0643 |
| | (0.0486) | (0.0463) | (0.0503) | (0.0483) |
| fatherse | 0.1062*** | 0.1265*** | 0.1023*** | 0.1210*** |
| | (0.0307) | (0.0295) | (0.0312) | (0.0296) |
| nchild | 0.0213** | 0.0192** | 0.0211** | 0.0175** |
| | (0.0098) | (0.0084) | (0.0100) | (0.0084) |
| married | -0.0049 | 0.0060 | -0.0034 | 0.0075 |
| | (0.0244) | (0.0218) | (0.0246) | (0.0218) |
| divorced | 0.0842** | 0.0779** | 0.0744* | 0.0743* |
| | (0.0387) | (0.0386) | (0.0392) | (0.0386) |
| capincr1000 | 0.0050*** | 0.0042*** | 0.0048*** | 0.0040*** |
| | (0.0010) | (0.0008) | (0.0010) | (0.0008) |
| Year dummies | yes | yes | yes | yes |
| Wald $\chi 2$ | 422.608 | 263.895 | 433.852 | 271.210 |
| Log likelihood | -10262.049 | -6835.099 | -10018.735 | -6675.153 |
| Mean outcome | 0.361091 | 0.219737 | 0.361238 | 0.220406 |
| Person-years | 17857 | 14622 | 17548 | 14378 |

*Notes:* Marginal effects after logit estimation, evaluated at the means of the explanatory variables. For dummy variables, the effects of a discrete change from 0 to 1 are shown. Cluster and heteroscedasticity robust standard errors in parentheses. Stars (***/**/*) indicate significance at the 1%/5%/10% levels. See Tables A1 and A4 for a detailed description of the variables.
*Source:* Authors' calculations based on the SOEP 2000-08.

**Table SA3: Probability of Employing Workers Conditional on Being Self-employed – Probit Coefficients (Selection Model for Binary Outcome)**

| | Aggregated Trust and Reciprocity Variables – Probit Coefficients | | Single Personality Items – Probit Coefficients | |
|---|---|---|---|---|
| | Self-employment (selection equation) | Self-employment with workers | Self-employment (selection equation) | Self-employment with workers |
| trust | 0.0030 | -0.1127*** | | |
| | (0.0176) | (0.0340) | | |
| positive reciprocity | 0.0053 | 0.0293 | | |
| | (0.0181) | (0.0340) | | |
| negative reciprocity | -0.0214 | -0.0326 | | |
| | (0.0178) | (0.0375) | | |
| returnfavor | | | -0.0029 | -0.0464 |
| | | | (0.0199) | (0.0361) |
| returnhelp | | | -0.0163 | -0.0168 |
| | | | (0.0211) | (0.0431) |
| returncostlyhelp | | | 0.0186 | 0.0872** |
| | | | (0.0215) | (0.0443) |
| revenge | | | 0.0226 | -0.0257 |
| | | | (0.0271) | (0.0539) |
| returndisadvantage | | | -0.0046 | 0.1199** |
| | | | (0.0274) | (0.0578) |
| offendback | | | -0.0494** | -0.1606*** |
| | | | (0.0224) | (0.0483) |
| trustpeople | | | 0.0110 | 0.0939** |
| | | | (0.0206) | (0.0412) |
| canttrust | | | -0.0155 | 0.0092 |
| | | | (0.0203) | (0.0414) |
| cautionstrangers | | | 0.0402** | -0.0656 |
| | | | (0.0178) | (0.0417) |
| dfair | | | -0.0966** | -0.0707 |
| | | | (0.0391) | (0.0883) |
| dhelpful | | | 0.0115 | -0.0055 |
| | | | (0.0398) | (0.0800) |
| dprofitfromstranger | | | 0.0998** | 0.0246 |
| | | | (0.0418) | (0.0868) |
| numberfriends | | | 0.0013 | 0.0206 |
| | | | (0.0176) | (0.0356) |
| lendbelongings | | | 0.0341* | 0.0590 |
| | | | (0.0200) | (0.0398) |
| lendmoney | | | -0.0459** | -0.0606 |
| | | | (0.0189) | (0.0385) |
| doorunlocked | | | -0.0706*** | -0.0131 |
| | | | (0.0164) | (0.0383) |
| will_risk | 0.0055 | 0.0354 | 0.0057 | 0.0397 |
| | (0.0248) | (0.0565) | (0.0255) | (0.0539) |
| will_risk_sq | 0.0086*** | -0.0011 | 0.0080*** | -0.0009 |
| | (0.0024) | (0.0055) | (0.0025) | (0.0055) |
| fatherabi | 0.1728*** | | 0.1490*** | |
| | (0.0552) | | (0.0553) | |
| motherabi | 0.2184*** | | 0.2116*** | |
| | (0.0719) | | (0.0732) | |
| Control variables | yes | yes | yes | yes |
| $\rho$ | 0.2297 | | 0.3004 | |
| | (0.3215) | | (0.3669) | |
| Wald $\chi 2$ | 220.029 | | 259.361 | |
| Log likelihood | -21983.989 | | -21433.148 | |
| Person-years | 70420 | | 69211 | |

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*Notes*: The table shows probit coefficients. Cluster and heteroscedasticity robust standard errors in parentheses. Stars (***/**/*) indicate significance at 1%/5%/10% levels. The left two columns refer to the model using the aggregated variables on trust, positive reciprocity, and negative reciprocity, and the right two columns to the model using the single items. For each model, the selection equation appears in the left and the equation of the probability of having employees in the right column. We use the same control variables as in the preceding analysis. For better identification, we include the secondary schooling level of the respondent's father and mother in the selection equation only. The parents' schooling is expected to influence their children's initial occupational choice, but not further entrepreneurial development once an adult has decided to be self-employed. The parents' schooling levels are measured by dummy variables indicating if the parents obtained the higher secondary school degree, *Abitur*, which qualifies for university admission in Germany. Both variables have a positive and highly significant influence on selection. After having estimated the selection models, Wald tests indicates that the hypothesis that $\rho = 0$, i.e. the selection and the outcome equations are independent, cannot be rejected; the *p*-value is 0.49 using the aggregated indices and 0.44 using the single items. See Tables A1 and A4 for a detailed description of the variables.
*Source*: Own calculations based on SOEP 2000-08.

## Table SA4: Limited Sample 2005-2008 (Aggregated Index) – Marginal Effects

| | Stock | Entry | Exit |
|---|---|---|---|
| trust03 | 0.0021 | 0.0011*** | -0.0006 |
| | (0.0027) | (0.0004) | (0.0039) |
| positive reciprocity | 0.0011 | -0.0004 | -0.0072* |
| | (0.0026) | (0.0004) | (0.0039) |
| negative reciprocity | -0.0036 | 0.0003 | -0.0008 |
| | (0.0026) | (0.0004) | (0.0044) |
| will_risk04 | -0.0023 | -0.0002 | -0.0058 |
| | (0.0038) | (0.0006) | (0.0071) |
| will_risk04_sq | 0.0014*** | 0.0001* | 0.0009 |
| | (0.0004) | (0.0001) | (0.0007) |
| female | -0.0366*** | -0.0026*** | 0.0184* |
| | (0.0060) | (0.0010) | (0.0099) |
| highschool | 0.0339*** | 0.0031** | -0.0213* |
| | (0.0083) | (0.0015) | (0.0117) |
| apprenticeship | -0.0209*** | -0.0023** | 0.0101 |
| | (0.0067) | (0.0011) | (0.0132) |
| highertechncol | 0.0084 | 0.0001 | 0.0141 |
| | (0.0073) | (0.0011) | (0.0142) |
| university | 0.0248*** | 0.0007 | -0.0027 |
| | (0.0085) | (0.0013) | (0.0121) |
| age | 0.0145*** | 0.0013*** | -0.0028 |
| | (0.0028) | (0.0004) | (0.0052) |
| agesq | -0.0001*** | -0.0000*** | 0.0000 |
| | (0.0000) | (0.0000) | (0.0001) |
| prworkexp10 | 0.0040 | 0.0013 | -0.0076 |
| | (0.0050) | (0.0009) | (0.0099) |
| prunempexp | -0.0047*** | -0.0009*** | 0.0009 |
| | (0.0017) | (0.0003) | (0.0024) |
| disabled | -0.0354*** | -0.0016 | 0.0223 |
| | (0.0070) | (0.0015) | (0.0239) |
| german | 0.0074 | 0.0023* | -0.0061 |
| | (0.0110) | (0.0012) | (0.0199) |
| fatherse | 0.0489*** | 0.0050** | -0.0061 |
| | (0.0117) | (0.0020) | (0.0131) |
| nchild | 0.0014 | 0.0001 | 0.0038 |
| | (0.0027) | (0.0004) | (0.0052) |
| married | -0.0145* | -0.0009 | -0.0138 |
| | (0.0075) | (0.0011) | (0.0132) |

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| | | | |
|---|---|---|---|
| divorced | 0.0055 | -0.0020* | -0.0068 |
| | (0.0098) | (0.0012) | (0.0147) |
| capincr1000 | 0.0008*** | 0.0000*** | -0.0001 |
| | (0.0003) | (0.0000) | (0.0002) |
| duration | | -0.0026*** | -0.0302*** |
| | | (0.0004) | (0.0047) |
| dur_sq | | 0.0001*** | 0.0017*** |
| | | (0.0000) | (0.0004) |
| dur_cu | | -0.0000** | -0.0000*** |
| | | (0.0000) | (0.0000) |
| notempl | | -0.0003 | |
| | | (0.0020) | |
| duration_ne | | 0.0023* | |
| | | (0.0013) | |
| dur_sq_ne | | -0.0003 | |
| | | (0.0002) | |
| dur_cu_ne | | 0.0000 | |
| | | (0.0000) | |
| Year dummies | yes | yes | yes |
| Wald $\chi 2$ | 632.755 | 364.009 | 179.409 |
| Log likelihood | -8433.904 | -1166.782 | -570.937 |
| Mean outcome | 0.095434 | 0.011463 | 0.088989 |
| Person-years | 29832 | 21285 | 2225 |

*Notes*: Marginal effects after logit estimation, evaluated at the means of the explanatory variables. For dummy variables, the effects of a discrete change from 0 to 1 are shown. Cluster and heteroscedasticity robust standard errors in parentheses. Stars (***/**/*) indicate significance at the 1%/5%/10% levels. In this table, only the trust measure from 2003 and the risk measure from 2004 are used. See Tables A1 and A4 for a detailed description of the variables.
*Source*: Authors' calculations based on the SOEP 2005-08.

## Table SA5: Probability of Being Self-Employed: Marginal Effects – Separate Regressions with Subsets of Trust and Reciprocity Items (SOEP 2000-2008)

| | Spec. 1 | Spec. 2 | Spec. 4 | Spec. 5 | Spec. 7 | Spec. 6 | Spec. 3 | Spec. 8 | Spec. 9 | Spec. 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| returnfavor | 0.0006 | | | | | | 0.0002 | | | |
| | (0.0030) | | | | | | (0.0030) | | | |
| returnhelp | -0.0018 | | | | | | -0.0017 | | | |
| | (0.0022) | | | | | | (0.0022) | | | |
| returncostlyhelp | 0.0021 | | | | | | 0.0023 | | | |
| | (0.0018) | | | | | | (0.0018) | | | |
| revenge | | 0.0015 | | | | | 0.0016 | | | |
| | | (0.0019) | | | | | (0.0019) | | | |
| returndisadvantage | | -0.0008 | | | | | -0.0009 | | | |
| | | (0.0020) | | | | | (0.0020) | | | |
| offendback | | -0.0030* | | | | | -0.0030** | | | |
| | | (0.0015) | | | | | (0.0015) | | | |
| trustpeople | | | 0.0017 | | | | | | | |
| | | | (0.0036) | | | | | | | |
| canttrust | | | -0.0045 | | | | | | | |
| | | | (0.0032) | | | | | | | |
| cautionstrangers | | | 0.0084*** | | | | | | | |
| | | | (0.0029) | | | | | | | |
| dfair[1] | | | | -0.0104** | | | | -0.0100** | | -0.0097** |
| | | | | (0.0043) | | | | (0.0044) | | (0.0043) |
| dhelpful[1] | | | | 0.0013 | | | | 0.0015 | | 0.0013 |
| | | | | (0.0046) | | | | (0.0046) | | (0.0046) |
| dprofitfromstranger[1] | | | | 0.0207*** | | | | 0.0201*** | | 0.0154*** |
| | | | | (0.0056) | | | | (0.0056) | | (0.0054) |
| numberfriends | | | | | 0.0002 | | | 0.0003 | 0.0002 | 0.0003 |
| | | | | | (0.0005) | | | (0.0005) | (0.0005) | (0.0005) |
| lendbelongings | | | | | | 0.0033 | | | 0.0034 | 0.0036 |
| | | | | | | (0.0023) | | | (0.0023) | (0.0023) |
| lendmoney | | | | | | -0.0089*** | | | -0.0090*** | -0.0082*** |
| | | | | | | (0.0027) | | | (0.0027) | (0.0027) |
| doorunlocked | | | | | | -0.0067*** | | | -0.0067*** | -0.0064*** |
| | | | | | | (0.0015) | | | (0.0015) | (0.0016) |
| will_risk | 0.0011 | 0.0010 | 0.0009 | 0.0014 | 0.0008 | 0.0011 | 0.0010 | 0.0011 | 0.0008 | 0.0012 |
| | (0.0031) | (0.0031) | (0.0031) | (0.0031) | (0.0031) | (0.0031) | (0.0031) | (0.0031) | (0.0031) | (0.0031) |
| will_risk_sq | 0.0009*** | 0.0010*** | 0.0010*** | 0.0009*** | 0.0010*** | 0.0009*** | 0.0009*** | 0.0009*** | 0.0009*** | 0.0008*** |
| | (0.0003) | (0.0003) | (0.0003) | (0.0003) | (0.0003) | (0.0003) | (0.0003) | (0.0003) | (0.0003) | (0.0003) |
| Control variables | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| chi2 | 854.959 | 852.714 | 860.044 | 862.109 | 840.757 | 868.289 | 858.407 | 853.409 | 858.765 | 866.025 |
| ll | -18708.527 | -18698.720 | -18687.572 | -18557.363 | -18547.442 | -18565.190 | -18693.154 | -18401.792 | -18399.711 | -18282.968 |
| ymean | 0.086728 | 0.086728 | 0.086728 | 0.086968 | 0.086478 | 0.086644 | 0.086728 | 0.086759 | 0.086373 | 0.086682 |
| N | 70865 | 70865 | 70865 | 70348 | 70353 | 70726 | 70865 | 69860 | 70230 | 69749 |

*Notes*: Marginal effects after logit estimation, evaluated at the means of the explanatory variables. For dummy variables, the effects of a discrete change from 0 to 1 are shown. Cluster and heteroscedasticity robust standard errors in parentheses. Stars (***/**/*) indicate significance at the 1%/5%/10% levels. See Table A1 for a detailed description of the variables.

*Source*: Authors' calculations based on the SOEP 2000-08.

## Table SA6: Probability of Entry: Marginal Effects – Separate Regressions with Subsets of Trust and Reciprocity Items (SOEP 2000-2008)

| | Spec. 1 | Spec. 2 | Spec. 4 | Spec. 5 | Spec. 7 | Spec. 6 | Spec. 3 | Spec. 8 | Spec. 9 | Spec. 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| returnfavor | 0.0008 | | | | | | 0.0004 | | | |
| | (0.0006) | | | | | | (0.0004) | | | |
| returnhelp | -0.0007* | | | | | | -0.0005* | | | |
| | (0.0004) | | | | | | (0.0003) | | | |
| returncostlyhelp | 0.0003 | | | | | | 0.0003 | | | |
| | (0.0003) | | | | | | (0.0002) | | | |
| revenge | 0.0002 | | | | | 0.0002 | | | | |
| | (0.0002) | | | | | (0.0002) | | | | |
| returndisadvantage | -0.0001 | | | | | -0.0001 | | | | |
| | (0.0003) | | | | | (0.0003) | | | | |
| offendback | -0.0001 | | | | | -0.0001 | | | | |
| | (0.0002) | | | | | (0.0002) | | | | |
| trustpeople | | -0.0003 | | | | | | | | |
| | | (0.0004) | | | | | | | | |
| canttrust | | 0.0003 | | | | | | | | |
| | | (0.0004) | | | | | | | | |
| cautionstrangers | | 0.0006 | | | | | | | | |
| | | (0.0004) | | | | | | | | |
| dfair[1] | | | -0.0004 | | | | -0.0004 | | -0.0004 | |
| | | | (0.0006) | | | | (0.0006) | | (0.0006) | |
| dhelpful[1] | | | 0.0004 | | | | 0.0004 | | 0.0004 | |
| | | | (0.0006) | | | | (0.0006) | | (0.0006) | |
| dprofitfromstranger[1] | | | 0.0021*** | | | | 0.0021*** | | 0.0017** | |
| | | | (0.0007) | | | | (0.0007) | | (0.0007) | |
| numberfriends | | | | -0.0000 | | | -0.0000 | -0.0000 | -0.0000 | |
| | | | | (0.0001) | | | (0.0001) | (0.0001) | (0.0001) | |
| lendbelongings | | | | | -0.0004 | | | -0.0004 | -0.0004 | |
| | | | | | (0.0003) | | | (0.0003) | (0.0003) | |
| lendmoney | | | | | -0.0004 | | | -0.0004 | -0.0003 | |
| | | | | | (0.0003) | | | (0.0003) | (0.0003) | |
| doorunlocked | | | | | -0.0003 | | | -0.0002 | -0.0002 | |
| | | | | | (0.0002) | | | (0.0002) | (0.0002) | |
| will_risk | -0.0013** | -0.0006 | -0.0006 | -0.0006 | -0.0006 | -0.0006 | -0.0006 | -0.0006 | -0.0006 | -0.0006 |
| | (0.0006) | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0004) |
| will_risk_sq | 0.0003*** | 0.0002*** | 0.0002*** | 0.0002*** | 0.0002*** | 0.0002*** | 0.0002*** | 0.0002*** | 0.0002*** | 0.0002*** |
| | (0.0001) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Control variables | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| chi2 | 388.452 | 750.705 | 757.303 | 741.544 | 751.485 | 749.098 | 756.039 | 749.869 | 754.937 | 751.752 |
| ll | -3534.961 | -3285.246 | -3281.814 | -3245.639 | -3258.080 | -3266.820 | -3282.509 | -3222.553 | -3239.836 | -3215.294 |
| ymean | 0.011556 | 0.011556 | 0.011556 | 0.011513 | 0.011555 | 0.011528 | 0.011556 | 0.011526 | 0.011525 | 0.011528 |
| N | 59019 | 59019 | 59019 | 58540 | 58587 | 58898 | 59019 | 58127 | 58482 | 58031 |

*Notes*: Marginal effects after logit estimation, evaluated at the means of the explanatory variables. For dummy variables, the effects of a discrete change from 0 to 1 are shown. Cluster and heteroscedasticity robust standard errors in parentheses. Stars (***/**/*) indicate significance at the 1%/5%/10% levels. See Table A1 for a detailed description of the variables.

*Source*: Authors' calculations based on the SOEP 2000-08.

## Table SA7: Probability of Exit: Marginal Effects – Separate Regressions with Subsets of Trust and Reciprocity Items (SOEP 2000-2008)

| | Spec. 1 | Spec. 2 | Spec. 4 | Spec. 5 | Spec. 7 | Spec. 6 | Spec. 3 | Spec. 8 | Spec. 9 | Spec. 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| returnfavor | 0.0042 | | | | | | 0.0020 | | | |
| | (0.0052) | | | | | | (0.0045) | | | |
| returnhelp | -0.0031 | | | | | | -0.0022 | | | |
| | (0.0042) | | | | | | (0.0037) | | | |
| returncostlyhelp | 0.0006 | | | | | | 0.0003 | | | |
| | (0.0033) | | | | | | (0.0027) | | | |
| revenge | | 0.0063** | | | | | 0.0063** | | | |
| | | (0.0027) | | | | | (0.0028) | | | |
| returndisadvantage | | -0.0027 | | | | | -0.0026 | | | |
| | | (0.0032) | | | | | (0.0033) | | | |
| offendback | | -0.0009 | | | | | -0.0010 | | | |
| | | (0.0028) | | | | | (0.0028) | | | |
| trustpeople | | | -0.0006 | | | | | | | |
| | | | (0.0059) | | | | | | | |
| canttrust | | | 0.0066 | | | | | | | |
| | | | (0.0056) | | | | | | | |
| cautionstrangers | | | -0.0063 | | | | | | | |
| | | | (0.0051) | | | | | | | |
| dfair[1] | | | | 0.0008 | | | | 0.0027 | | 0.0029 |
| | | | | (0.0081) | | | | (0.0081) | | (0.0081) |
| dhelpful[1] | | | | 0.0056 | | | | 0.0057 | | 0.0055 |
| | | | | (0.0086) | | | | (0.0087) | | (0.0086) |
| dprofitfromstranger[1] | | | | 0.0091 | | | | 0.0085 | | 0.0093 |
| | | | | (0.0082) | | | | (0.0083) | | (0.0086) |
| numberfriends | | | | | -0.0020* | | | -0.0020* | -0.0021** | -0.0021** |
| | | | | | (0.0010) | | | (0.0010) | (0.0010) | (0.0010) |
| lendbelongings | | | | | | 0.0003 | | | -0.0005 | 0.0004 |
| | | | | | | (0.0041) | | | (0.0041) | (0.0042) |
| lendmoney | | | | | | -0.0015 | | | -0.0014 | -0.0012 |
| | | | | | | (0.0047) | | | (0.0047) | (0.0047) |
| doorunlocked | | | | | | 0.0032 | | | 0.0036 | 0.0040 |
| | | | | | | (0.0029) | | | (0.0029) | (0.0029) |
| will_risk | -0.0178*** | -0.0152*** | -0.0144** | -0.0151*** | -0.0144** | -0.0153*** | -0.0153*** | -0.0150*** | -0.0152*** | -0.0156*** |
| | (0.0068) | (0.0057) | (0.0057) | (0.0057) | (0.0058) | (0.0057) | (0.0057) | (0.0058) | (0.0057) | (0.0058) |
| will_risk_sq | 0.0018*** | 0.0015*** | 0.0014*** | 0.0015*** | 0.0015*** | 0.0015*** | 0.0015*** | 0.0015*** | 0.0015*** | 0.0016*** |
| | (0.0006) | (0.0005) | (0.0005) | (0.0005) | (0.0005) | (0.0005) | (0.0005) | (0.0005) | (0.0005) | (0.0005) |
| Control variables | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| chi2 | 123.841 | 284.112 | 279.029 | 273.270 | 278.147 | 280.830 | 284.254 | 275.450 | 283.066 | 283.034 |
| ll | -1652.222 | -1576.333 | -1577.696 | -1569.028 | -1567.024 | -1571.034 | -1576.092 | -1557.192 | -1558.689 | -1551.447 |
| ymean | 0.095221 | 0.095221 | 0.095221 | 0.094961 | 0.095865 | 0.094987 | 0.095221 | 0.095536 | 0.095631 | 0.095615 |
| N | 5524 | 5524 | 5524 | 5497 | 5466 | 5506 | 5524 | 5443 | 5448 | 5428 |

*Notes*: Marginal effects after logit estimation, evaluated at the means of the explanatory variables. For dummy variables, the effects of a discrete change from 0 to 1 are shown. Cluster and heteroscedasticity robust standard errors in parentheses. Stars (***/**/*) indicate significance at the 1%/5%/10% levels. See Table A1 for a detailed description of the variables.

*Source*: Authors' calculations based on the SOEP 2000-08.