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A Two-Stage Entrepreneurial Choice: An Empirical Investigation

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Abstract

Entrepreneurial choice can be viewed as a two-stage process. In the first stage, people select themselves into occupations that correspond to their preferences, interests, and personalities. In many cases, choosing an occupation precedes entrepreneurial choice (second stage) and may be regarded as a first step either in the direction of entrepreneurship or away from it. In the empirical part of the paper, we show that entrepreneurial choice is strongly influenced by the characteristics of an occupational environment, such as occupation-specific unemployment, job security, wage structure, and role models of self-employment. We next provide some indication that personality characteristics do matter at both stages of the entrepreneurial choice process, which offers new insights into the relationship between personality and entrepreneurship.

1. Introduction

Economic approaches to entrepreneurship often analyze the decision to start a business in the framework of an occupational choice model. Such a model encompasses two states: becoming an entrepreneur or remaining in dependent employment or non-employment. This paper argues and provides some evidence that entrepreneurial choice can be regarded as a two-stage occupational choice: in the first stage, people choose an occupation;[1] in the second stage, they decide whether or not to start their own business. We show that the conditions that may be regarded as relevant in a decision to become self-employed vary considerably across occupations. People are often aware of these conditions before they choose an occupation. Therefore, the choice of an occupation already reflects an individual's attitudes toward entrepreneurship.

The present study contributes several novelties to the entrepreneurship literature. First, we argue that occupational environments may be either conducive to entrepreneurship or work as a barrier for entrepreneurial entry so that previous occupation-specific experience can be regarded an important determinant of entrepreneurial choice. We investigate various occupation-specific characteristics that possibly influence the decision to become self-employed, such as occupation-specific job security and unemployment, as well as occupation-specific rewards and the presence of entrepreneurial role models in occupations. Second, our study contributes to the literature on the role personality characteristics play in entrepreneurial choice. In particular, we draw on the theory of vocational behavior, which suggests that individuals make vocational choices according to personal interests, values, and talents. We provide some indication that entrepreneurial personality is not equally distributed across occupational environments.

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[1] "Occupation" should be understood here in terms of a profession.

The following section (Section 2) introduces a framework for a two-stage entrepreneurial choice process. Section 3 introduces occupation-specific characteristics that might be important in the decision to become self-employed. Section 4 introduces data and method. Section 5 presents the results of the multivariate analysis. Section 6 concludes and discusses the limitations of the study.

2. A two-stage entrepreneurial choice process

An "occupation" consists of a group of similar jobs that share a certain set of unique characteristics in terms of requirements, working conditions, and rewards that distinguish them from other occupations (Singh, 2006). These characteristics, for instance, may include task similarity of jobs within an occupation, a similar structure of rewards, or job security. An important property of these characteristics is that they are not easily, if at all, transferred between different occupations. For instance, the tasks of a medical doctor are quite different from a lawyer's tasks and the wages an engineer can demand are at a different level than those a craftsman can expect, chiefly due to returns to education in the latter case. Therefore, an occupation can be regarded as an environment that contains a relatively homogenous group of individuals with regard to certain skills. It is extremely important to distinguish between the terms *job* and *occupation*, which are often used synonymously. Job change may be an expected facet of career trajectory, often regarded as a type of occupational exploration. By changing jobs within a certain occupation, individuals learn more about their opportunities (Singh, 2006). In contrast, a change of occupation is much less frequent because it requires, as a rule, requalification and leads to sunk costs in the event that previous skills are not useful in the new occupation.[2] Kambourov and Manovskii (2008, 41) conclude that "a substantial amount of human capital may be destroyed upon switching occupation or industry."

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[2] Occupational change is not necessarily a negative event. In some cases, occupational change is the result of a promotion, for instance, being awarded a management position (see Longhi and Brynin, 2010).

Longhi and Brynin (2010) report that in Germany only 0.1 to 3.4 percent of people change their occupation (defined at a two-digit level of ISCO), whereas 7.2 percent change jobs. These numbers indicate that occupational change is a rare event. Further evidence from the literature on occupational change assumes that occupations constitute rather tight environments with relatively low probability of transition between them (Gathmann and Schönberg, 2010; Nedelkoska and Neffke, 2010; Kambourov and Manovskii, 2009).[3]

The basic idea of this paper is straightforward. We posit that the decision to become self-employed can be regarded as a two-stage selection process. In the first stage, people select themselves into occupations depending on their preferences, interests, traditions, role models, and the like. At this stage, people with entrepreneurial attitudes may choose occupations in which they are more likely to become self-employed. In the second stage, after a spell in dependent employment, they decide whether or not to become self-employed. Entrepreneurial choice in the second stage depends, therefore, on the occupation chosen in the first stage of the two-stage process.

This two-stage entrepreneurial choice process is well illustrated by those engaged in liberal professions where self-employment is a traditional form of employment. Persons in liberal professions, such as architect, artist, lawyer, physician, or craftsperson, have a high rate of self-employment and, hence, an individual probability of becoming self-employed in such occupations is also high. Moreover, the choice of a liberal profession implies that people realize that their chances of becoming self-employed in such an occupation will be rather high.

The choice of occupation also has implications as to job security. For instance, people who are risk averse will prefer occupations with high level of

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[3] Gathmann and Schönberg (2010) find that individuals are more likely to switch to occupations with similar task requirements and, therefore, current occupation has an effect on future occupational choice. Nedelkoska and Neffke (2010) similarly find that people move to occupations in which they can use their human capital efficiently and for which they will need relatively few new skills.

job security. People who generally avoid taking risks will be also less likely to bear entrepreneurial risks.[4] Therefore, each stage of a two-stage entrepreneurial choice will depend on characteristics of occupational environments, which demand different proclivity toward risk taking and, hence, can be either conducive to self-employment or act as a barrier to it. Indeed, not everyone is exposed to macroeconomic influences, such as unemployment or job insecurity, to the same extent. For instance, labor market opportunities for medical doctors appear to be independent of those for engineers. Moreover, if an engineer wishes to become a medical doctor, or vice versa, doing so will be very costly. Furthermore, macroeconomic factors will influence the labor market for medical doctors differently than they do the labor market for engineers. Hence, macroeconomic factors that have an influence on the decision to become self-employed should be considered at the occupational level.

The two-stage entrepreneurial choice process is supported by other types of evidence, too. For example, human capital theory: on the one hand, the theory assumes that higher levels of human capital, usually measured as levels of formal education or years of work experience, enable individuals to recognize or create entrepreneurial opportunities. In the Lucas (1978) model, for example, a higher level of formal education determines an individual's managerial ability and, hence, increases the probability of becoming self-employed. On the other hand, highly educated individuals have relatively many and relatively well-paid opportunities in dependent employment and, thus, are less likely to become entrepreneurs (Le, 1999). These opposite effects of education on entrepreneurial choice may explain the ambiguous empirical evidence. Studies by Evans and Leighton (1989), van Praag and van Ophem (1995), Rotefoss and Kolvereid (2005), and others fail to identify a statistically significant effect of formal education on entrepreneurial entry. Other studies, however, report statistically significant positive (Borjas, 1986; Borjas and Bronars, 1989; Davidsson and Honig, 2003) or negative effects (Evans, 1989). Studies that include a squared term of human capital

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[4] Empirical evidence suggests that people with lower risk aversion are more likely to become self-employed (see, e.g., Caliendo et al., 2009).

variables in their empirical models suggest a curvilinear impact of education: individuals with low and high levels of education are less likely to become entrepreneurs (e.g., Kim et al., 2006). Poschke (2008) finds empirical evidence for a U-shaped relationship between the propensity to start one's own firm and education: people with low and high levels of education are more likely to become entrepreneurs than are individuals with intermediate levels of education. The meta-analytical study by Van der Sluis et al. (2008) concludes that the effect of schooling on selection into entrepreneurship is insignificant.

One obvious problem of these studies is that their measures of formal education do not reflect the actual type of education acquired. Formally, education provides individuals with a necessary precondition that allows them to enter a certain occupation, that is, it allows access to an occupation-specific labor market. For instance, take two hypothetical individuals, one of whom studied natural sciences and the other business studies. Both will have the same level of formal education, namely, a university degree. However, the labor market opportunities for the natural sciences graduate will be different from those for the business studies graduate. It is not surprising, then, that by simply looking at level of formal education achieved, previous studies report ambiguous effects of it on self-employment. Simply put, certain types of education open entry to labor markets that are more conducive to self-employment than others. The choice of a study program, therefore, can be viewed as the first step toward self-employment.

To the best of our knowledge, no previous study has attempted to investigate the effects of occupational environment on entrepreneurial choice. Some studies investigate how previous managerial experience affects self-employment entry (see, e.g., Kim et al., 2006; Boden and Nucci, 2000). These studies find that managerial experience is positively associated with attempted entrepreneurship. However, too much managerial experience (more than 19 years) tends to be negatively associated with self-employment

entry.[5] There are a handful of studies that investigate occupation-specific patterns of self-employment, that is, occupations in which people become self-employed. For instance, Evans (1989) controls for occupational status, measured as the socioeconomic status of a respondent's occupation, and finds robust positive effects of occupational status on entrepreneurship. Moreover, Le (1999) points out that studies that do not control for occupational status suffer from the omitted variable bias, since occupational status is positively correlated with both educational attainment and entrepreneurship entry. Brock and Evans (1989) find that compared to those employed as machine operators, individuals working in sales are more likely to be self-employed, possibly because it is relatively easy to start a new business in sales or repairs, whereas setting up a machine shop will require substantial investment of capital. Evans and Leighton (1989) find that individuals employed in agriculture or professional occupations have a relatively high propensity of being self-employed. Knight and McKay (2001) provide evidence from two surveys that about 50 percent of the self-employed can be found either in managerial occupations or craft and related occupations.

These studies, however, have a few drawbacks. First, the actual occupation of self-employed individuals might be ill-observed because many self-employed see themselves as managers. Second, these studies use occupations as control variables and, as a consequence, they do not distinguish between different channels through which the occupational environment might influence entrepreneurship. Third, many entrepreneurs start their new business ventures for reasons that have little or nothing to do with human capital. For example, the lack of job opportunities in an occupation-specific labor market may motivate people to start a business in occupations that do not require human capital and, therefore, are relatively easy to enter.

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[5] This finding may be explained by the fact that entrepreneurial proclivity tends to decline at a certain age.

The studies discussed above are directly or indirectly concerned with the question of which occupational environments are especially attractive for launching a new business venture. Our paper takes a different perspective by focusing on the issue of how different occupational environments influence subsequent entrepreneurial choice.

3. Investigating the role of occupational environments on entrepreneurial choice

We now (Section 3.1 below) investigate the extent to which self-selection into occupations with high job insecurity and high risk of unemployment is related to a subsequent decision to become self-employed. Section 3.2 then investigates how the relative individual wage position within the occupation-specific reward structure affects the probability of entrepreneurial entry. In Section 3.3, we explore occupation-specific role models of self-employment.

3.1 Occupation-specific unemployment, job security, and entrepreneurship

In the literature, findings as to the relationship between unemployment and self-employment are ambiguous. The absence of clear relationship in both theoretical and empirical research has its causes: unemployment may affect self-employment through either a push or a pull effects (see Parker, 2009, 143). According to the "push" hypothesis, a dearth of labor market opportunities pushes people into self-employment. Hence, higher unemployment rates are associated with higher probability of self-employment (Reynolds, Miller, and Maki, 1995; Reynolds, Storey, and Westhead, 1994; Hamilton, 1989; Highfield and Smiley, 1987, and Yamawaki, 1990; Evans and Leighton, 1989, 1990). According to the "pull" hypothesis, high levels of unemployment make self-employment less attractive because the expected utility from self-employment is lower than from paid employment. In this case, the relationship between unemployment and self-employment is expected to be negative. In an analysis of West Germany, Fritsch and Falck (2007) find that short-term unemployment (up to

one year of unemployment) does have a decreasing effect on the regional rate of self-employment entry, but that the effect of long-term unemployment is insignificant.

Previous studies of the relationship between the level of unemployment and entrepreneurial activity neglect the fact that some occupations are more susceptible to unemployment than others. Unemployment rates do, indeed, vary greatly across occupations, with relatively high unemployment rates in low-skill jobs (see Candelon et al., 2008). The two-stage entrepreneurial choice framework suggests that individuals' choice of occupation takes different risks of unemployment into consideration. Those people who prefer occupational security should tend to choose occupations characterized by low levels of unemployment, for instance, in the public sector. They will be also less likely to take entrepreneurial risks. And, in fact, Özcan and Reichstein (2009) show that non-entrepreneurial types do choose public-sector employment. A choice of an occupation having a relatively high unemployment rate implies an individual preference for occupational risk-taking. Hence, people in occupations with high levels of unemployment will be also more likely to take entrepreneurial risks.

Hypothesis 1: Occupation-specific unemployment has a positive effect on the individual probability of self-employment.

Literature suggests that entrepreneurs are not gamblers, though they do, indeed, love challenging and risky situations (see Parker, 2010, 37). Leaving paid employment for self-employment is less risky when one can "retreat" back to paid employment if a business venture turns out badly. An occupational labor market characterized by a high demand for labor will increase the chances of finding a job in paid employment in case of failure, and thus entrepreneurial entry may be more likely to occur in such an occupation, leading us to the following hypothesis:

Hypothesis 2: The level of employment opportunities in an occupation has a positive effect on the individual probability of entrepreneurial entry.

3.2 Occupation-specific reward structure and entrepreneurship

Many entrepreneurs report that improving their current financial situation was an important motivation in starting a business. Hence, in the literature, financial reward is often regarded as a primary motivator in entrepreneurship (Schumpeter, 1934; Baumol, 1990; Knight, 1987; Kuratko, Hornsby, and Naffziger, 1997).[6] The possibility of financial gain as a "pull" factor is investigated in a number of studies, such as Katz (1994), Venkataraman (1997), Douglas and Shepherd (2000), Shepherd and DeTienne (2005), among others.

The income from paid employment may play a considerable role in the decision whether to start an own business. First, the income from dependent employment is an important part of the opportunity costs. The higher the dependent employment income, the higher the opportunity costs, particularly, the greater the loss in the event the new business turns out to be unprofitable. Second, persons receiving relatively low income may believe themselves to be underpaid and they may become convinced that they could do better for themselves if self-employed. Third, and relatedly, people with an already rather high income may not expect to gain as much additional income from self employment as persons with lower income. All three lines of reasoning suggest that persons with relatively high income will have a lower propensity to engage in entrepreneurship (Hamilton and Harper, 1994; Shane, 2003, 63). Several empirical studies (e.g., Evans and Leighton, 1989; Johansson, 2000; Amit et al., 1995) provide support for this hypothesis.

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[6] "[T]he existence of attractive, potentially profitable business opportunities will attract and 'pull' alert individuals into entrepreneurial activities" (Gilad and Levine, 1986, 46).

Hypothesis 3a: The lower an individual's opportunity costs in terms of income, the more likely he or she is to become self-employed.

Financial motivation may already be a factor in the first stage of the two-stage entrepreneurial choice process. People with a strong desire to earn more money may select themselves into occupations that offer relatively high average wages. The within-occupation wage differences may influence the second stage of entrepreneurial choice, that is, the decision to become self-employed.

According to Mouw and Kalleberg (2010), differences in reward structure between occupations may have several causes. First, occupations vary in required skill structure, understood as the degree of complexity of activities to be performed. Second, between-occupation wage differences may represent differences in returns to education and other labor force characteristics, such as gender, that vary by occupation. Further, the observed within-occupation wage differences may be due to job position, the variety of skills performed within the job, years of occupation-specific experience, and so forth. In this context, a below average occupation-specific income of a person may nourish hopes of that person to overcome this income gap by starting an own business and may make self-employment particularly attractive.

Hypothesis 3b: The lower the occupation-specific income of individuals, the more likely they are to enter self-employment.

3.3   Occupation-specific role models and entrepreneurship

Entrepreneurship literature shows that the presence of and contact with role models can have a pronounced impact on an individual's decision to become self-employed. For example, it has been found that self-employed parents increase the probability of entrepreneurial entry (Chlosta et al., 2010; Dunn and Holtz-Eakin, 2000; Fairlie and Robb, 2007; Lentz and Laband, 1990; Kolvereid, 1996). This effect could not be explained by the self-employed parents' provision of physical and financial capital, but was found to be due to

the children being provided with first-hand entrepreneurial experience, that is, a role model (Aldrich et al., 1998). Falck et al.'s (2010) study incorporates the psychological concept of social identity into the analysis of entrepreneurship and finds that the presence of an entrepreneurial peer group increases entrepreneurial intentions among students. Various other types of peer effects, such as workplace peers with entrepreneurial experience or self-employed friends or neighbors, may also provide role models that increase an individual's probability of self-employment (Bosma et al., 2011; Nanda and Sørensen, 2010; Davidsson and Honig, 2003; Kim and Aldrich, 2005; Klyver et al., 2007; Koellinger et al., 2007). At the aggregated level, the presence of regional role models of self-employment may have such an effect (see, e.g., Fornahl, 2003; Fritsch and Mueller, 2005; Minniti, 2005; Mueller, 2006; Lafuente et al., 2007; Wagner, 2004, 2005). Lafuente et al.'s (2007) study of Spain found significant regional differences in the impact of entrepreneurial role models on individual entrepreneurial activity. Minniti (2005, 24) suggests that entrepreneurship is self-reinforcing and that entrepreneurial social environments can influence an individual's decision to become an entrepreneur.

The example of successful entrepreneurial role models in a certain profession may make it easier for would-be entrepreneurs to communicate their business concept to financiers and other resources. The liberal professions (e.g., medical doctors, architects, and lawyers) provide a good illustration of this effect. These occupations are characterized by high rates of self-employment and high probabilities for individuals engaged in such professions to have their own business. Individuals belonging to these professions, for instance, a medical doctor, may find it relatively easy to acquire the necessary resources for starting his own consultancy compared to those engaged in professions where self-employment is not so frequent. According to Gibson (2004), a wide variety of high-quality role models increases an individual's probability of pursuing a certain career path. We therefore expect that higher levels of self-employment in an occupation-specific environment will increase an individual's propensity to become an entrepreneur.

Hypothesis 4a: The individual likelihood of becoming self-employed is higher for individuals in occupations with high levels of self-employment.

The mere existence of entrepreneurship, however, may not suffice to stimulate self-employment. Gibson (2004, 136) describes the role model effect as drawing "on two prominent theoretical constructs: the concept of role and the tendency of individuals to identify with other people … and the concept of modeling, the psychological matching of cognitive skills and patterns of behavior between a person and an observing individual." He argues that for a role model to be positively perceived by an individual, the role model needs to be similar to the individual on a variety of dimensions, including, for example, demographics, goals, and desired organizational position. Bosma et al. (2011) find empirical indication that entrepreneurs and their role models are indeed similar in a number of ways, such as gender, economic sector, and nationality.

It is a fundamental principle of psychologically-oriented theories of occupational choice that people prefer and choose occupations that match their skills, abilities, needs, values, and talents. One of the dominate theoretical positions in this respect is Holland's (1985), who argues that "vocational choice is … the result of a person's type" (Holland, 1985, 533). He suggests six major types of occupational environment: intellectual, artistic, social, enterprising, conventional, and realistic. According to this theory, an individual's personality characteristics have a significant influence on vocational choice, and, indeed, one of the most consistent findings in studies on vocational choice is that the personality characteristics have a considerable effect on occupation chosen (Holland, 1985; Schneider, 1987; Costa and McCrae, 1992; Filer, 1986; Borghans et al., 2008; Krueger and Schkade, 2008; Cobb-Clark and Tan, 2010). Empirical evidence shows that individuals who share the same occupations tend to be rather similar with regard to certain personality traits (Barrick et al., 2003; Tokar, 1998; Moutafi et al., 2007; Winkelmann and Winkelmann, 2008; Nieken and Störmer, 2010).

For instance, Barrick et al. (2003) show that social workers score high on the personality trait "agreeableness," while persons employed in artistic and explorative occupations have high levels of "openness to experience." Nieken and Störmer (2010) provide empirical evidence that managers and service workers are more extravert than persons occupied in professions primarily requiring manual skills, but that the latter score higher on "conscientiousness." These findings remain statistically significant after controlling for sociodemographic characteristics, such as formal education, work experience, age, marital status, and income, which are also important factors in the decision to become self-employed.[7]

The personality approach receives a great deal of attention in recent entrepreneurship literature. The empirical findings show that self-employed individuals score relatively high on such dimensions of personality as openness to experience, extraversion, and conscientiousness, and that they score relatively low on agreeableness and neuroticism (Rauch and Frese, 2007; Zhao and Seibert, 2006; Schmitt-Rodermund, 2004, 2007). A recent study by Caliendo, Fossen, and Kritikos (2011) concludes that personality significantly influences entrepreneurial choice. Using the SOEP database, which also serves as the empirical basis for our study, they find that high levels of openness to experience and extraversion, and low levels of neuroticism, increase the probability of self-employment.

Previous research on entrepreneurial personality assumes the existence of a certain entrepreneurial personality profile common to all entrepreneurs, regardless of their occupational environment. However, the

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[7] However, it is unclear whether the homogeneity of occupational groups with regard to personality characteristics is the result of a selection process, as the person-environment fit theory proposes (Holland, 1985), or whether it is the occupational environment that shapes the personalities of those within it (Satterwhite et al., 2009; Cable and Parsons, 2001.) For instance, pronounced extraversion of managers or salespersons can be viewed as the result of their occupation, which requires them to be communicative. Psychologists argue that the Big Five dimensions of personality tend to remain stable over longer time periods and even across situations (Caspi et al., 2005; Borghans et al., 2008). Further, there is evidence that about 50 percent of the Big Five dimensions of personality can be explained by genes (Nicolau and Shane, 2010; Shane et al., 2010). We therefore assume that individuals select themselves into occupational environments according to their personality, rather than that their personality is shaped by their occupation.

theory of vocational behavior suggests that different occupational environments attract very different types of individuals. Since entrepreneurship is heterogeneous in terms of the environments in which it occurs, it is plausible that entrepreneurs working in different occupational environments will have different personality characteristics. In other words, there may be a "type" of entrepreneur for any particular field of endeavor, but there is no one-entrepreneur-fits-all type for entrepreneurship as a whole.

According to the current view of role models, individuals are likely to have role models who are similar to them, for instance, in terms of personal characteristics. Thus, we expect that basic personality characteristics of new business founders will be similar to the personality characteristics of established self-employed individuals in that same occupation. Hypothesis 4b states this expectation:

> **Hypothesis 4b:** The more similar the basic personality characteristics of an individual are to the basic personality characteristics of a self-employed role model, the higher the likelihood that the individual will become an entrepreneur.

4   Data and measurement

4.1   Data sources

Our empirical analysis is based on the German Socio-Economic Panel (SOEP), a nationally representative longitudinal study of private households in Germany containing information for some 21,000 individuals per annum (for details, see Haisken De-New and Frick, 2005; Wagner et al., 2007). This database contains detailed information on the sociodemographic situation of the German population, education, labor market and occupational dynamics, and income, as well as psychological personality traits. The empirical analysis in this paper covers the period between 2004 and 2009, since the data on occupation-specific characteristics as well as some key variables from SOEP were primarily available for this period.

We also use detailed data on occupation-specific characteristics derived from the Federal Employment Agency (Bundesagentur für Arbeit, BA) and the Institute for Employment Research (Institut für Arbeitsmarkt- und Berufsforschung, IAB). This data source includes the following information for different levels of the national classification of occupations (Klassifikation der Berufe 1988, KldB'88): number of registered short-term unemployed people by target occupation,[8] number of registered long-term unemployed (longer than one year), number of job openings by type of occupation, and number of employees obligated to pay social insurance, as well as median wages. Furthermore, we employ data on occupational self-employment rates at the two-digit level of the national classification of occupations. These data are from the Microcensus of the Federal Statistical Office (Statistisches Bundesamt).[9]

We restrict the analyses to individuals between 18 and 64 years old and exclude persons who were retired, unemployed, non-employed, or engaged in full-time education. We also exclude civil servants, persons in military service, and those whose main occupation is helping family members, under the assumption that occupational choices made by these groups may be based on quite different considerations than those of people working in the private sector. Additionally, we exclude those in the extreme percentiles of the wage sample distribution (the 5th and the 95th) to avoid possible distortions by calculating occupational wage deviations.

SOEP respondents report whether or not they are self-employed. The longitudinal structure of the data allows us to identify switches between paid employment and self-employment, which we use as a proxy for new venture creation. This empirical measure is widely used in the economics literature on entrepreneurship (Parker, 2009). We do not consider switches from unemployment to self-employment because information on type of occupation is not available for unemployed persons in SOEP. After deleting

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[8] Target occupation is the occupation in which an unemployed person wishes to find a job.

[9] For more details see Fritsch, Kritikos and Rusakova (2011).

all observations for which variables of interest have missing values, the sample comprises information for 244 cases of switching from paid employment to self-employment. This corresponds to 0.85 percent of the whole sample. For comparison, in the German Micro-Census,[10] the average start-up rate for the same period is 0.91 percent.

4.2 Occupation-specific determinants of entrepreneurship

To explore the relationship between entrepreneurial choice and the characteristics of occupational environments, we employ the following variables.

- The *short-term unemployment rate* measures the annual average number of registered unemployed persons who have been unemployed less than one year over the number of employees at the *Berufsordnungen*[11] level in the national classification of occupations (KldB'92). The *long-term unemployment rate* refers to individuals who have been unemployed more than one year. Unemployed individuals were assigned to target occupations, that is, those occupations in which they would like to find a job.

- The *job openings rate* was measured by the number of open job positions over the number of employees at the *Berufsordnungen* level of the KldB'92.

- The *self-employment rate* was measured by the number of self-employed individuals over the number of employees at the *Berufsabschnitte* level in the national classification of occupations.

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[10] The German Micro-Census is an annual representative survey conducted by the Statistical Office that collects information about the personal, household, and socioeconomic situation of approximately 820,000 individuals living in 380,000 households in Germany.

[11] The occupation-specific data are classified according to the following aggregation levels of the KldB'92. *Berufsabschnitte* contains 33 occupational groups and is the second level of aggregation in the KldB'92. *Berufsgruppen* contains 88 occupational groups and is the third level of aggregation. *Berufsordnungen* is the fourth level of aggregation in the KldB'92, and encompasses 369 occupational groups.

- The variable *wage deviation* was calculated as a deviation of individual monthly gross labor income from the monthly median gross labor income in occupations at the Berufsgruppen level in the national classification of occupations. We analyze median rather than mean wages to avoid distortions due to a possible skew in the occupation-specific distribution of wages.

An overview of the occupation-specific characteristics and the expected signs for their relationship with individual likelihood of becoming an entrepreneur is presented in Table 1.

Table 1: Definition of occupation-specific variables and expected signs for their relationship with entrepreneurial choice

Variable	Definition	available waves	Expected sign
Short/long-term unemployment rate	Annual average number of registered short/long-term unemployed in 'BO' over	1999 - 2009	+
Job openings rate	Number of job openings in 'BO' over the number of employees in 'BO'	2000 - 2009	+
Wage deviation	Deviation of individual wages from the monthly median wages in 'BG'	1999 - 2009	-
Self-employment rate	Number of self-employed in 'BA' over the number of employees in 'BA'	1998 - 2009	+

BO = Berufsordnung, three-digit level of KldB'92, 369 occupational groups
BG = Berufsgruppe, two-digit level of KldB'92, 88 occupational groups
BA = Berufsabschnitt, aggregated two-digit level of KldB'92, 33 occupational groups

4.3 Individual determinants of entrepreneurship

Previous research reveals that there are a great many individual characteristics that may influence the decision to become an entrepreneur. We control for possible heterogeneity by including a wide set of control variables in our analysis. The set of control variables includes standard demographic characteristics, such as age, gender, marital status, and nationality. We also include human capital variables such as years of formal education and its squared value in order to control for a possibly nonlinear relationship between education and entrepreneurship. Formal education is measured in years spent in formal education. We also control for years of experienced unemployment. Financial capital is measured as gross labor income in previous employment. Since there could be regional variation in

propensity to start an own business, we include a dummy variable that controls for whether an individual's place of residence is in East Germany. Then, we include a binary variable that controls for parental self-employment when the respondent was 15 years old. Finally, we employ a variable that measures willingness to take risks on an 11-point Likert scale.[12]

A panel of questions related to personality traits and attitudes was included in SOEP for the first time in 2005; in 2009, those questions were asked for a second time. The questions we employ in the present study refer to a psychological scale that measures the Big Five factors by asking three questions about each of these broad dimensions. The scale was implemented in SOEP questionnaires based on research conducted by Costa and McCrae (1992). A detailed description of the procedure used in the SOEP can be found in Gerlitz and Jürgen (2005). In brief, the SOEP respondents were asked to grade themselves on a seven-point Likert scale where the value 1 indicates that a given personality characteristic does not apply at all and the value 7 indicates that the characteristic applies perfectly. For each of the five dimensions we construct mean scores of the answers for each corresponding dimension. The personality of self-employed role models was calculated as the average personality profile of self-employed individuals in an occupation. In constructing the role models' personalities, we used information from only those self-employed in the appropriate occupation who had been self-employed for at least one year because successful entrepreneurs are more likely to be perceived as role models (Bandura and Walters, 1963).[13] The absolute value of a deviation of an individual's personality from the average personality of the self-employed role model

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[12] The question on general risk attitudes has been included in SOEP every two years starting in 2004 and sounds: 'How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?'. For waves when this question was not asked, we impute the values from previous years, under the assumption that willingness to take risks remains constant over short periods of time.

[13] Bosma et al. (2011) empirically tested this assumption for self-employed individuals and found that entrepreneurs' self-employed role models are more likely to be those who own larger firms. The age of a firm may be regarded as a measure of success to some extent (Parker, 2010, 385).

constitutes the measure of how similar individuals are to their occupational role model of self-employment.

5   Results

5.1 Descriptive evidence

Tables A1.1, A1.2, and A2 in the Appendix provide descriptive statistics of dependent variables and a correlation matrix. The descriptive evidence suggests differences between new business founders and those who remained in paid employment with regard to a number of individual characteristics. In particular, entrepreneurs have about 0.7 more years of education than those who decided to remain in paid employment. Founders are on average one year younger than their employed counterparts, and they are more likely to be male. The share of married among founders (59.2 percent) is significantly lower compared to employees (62.8 percent). Founders of new businesses are more likely to come from families in which at least one parent has been self-employed.

New business founders come from occupational environments that differ significantly from the occupational environments of employees. Specifically, the short-term and long-term unemployment rates for occupations in which entrepreneurs have been previously employed are on average 10 and 5.4 percent, respectively, which is significantly higher compared to the occupations of those who remained employees. Interestingly, the share of job openings in the previous occupations of entrepreneurs is significantly higher than in the occupations of their counterparts. Moreover, the wages of nascent entrepreneurs were on average significantly lower than the occupation-specific median wages compared to those who decided to remain employees. The difference in the wage deviations of the two groups is almost 200 Euros (about 37 percent of an average wage deviation in a sample). Furthermore, the average self-employment rate in the occupations held by future entrepreneurs is 10.9 percent, which is significantly higher than the average self-employment rate in occupations of their counterparts (9.4 percent).

With regard to personality characteristics, on average, entrepreneurs' personalities deviate from those of their self-employed role models less than the personalities of those who remained in paid employment. However, the descriptive results were statistically significant only for deviation from "extraversion" and "openness to experience." To test whether the personality of self-employed role models varies across occupations, we perform a one-way analysis of variance (ANOVA) for basic personality traits of individuals who have been self-employed in different occupations for at least one year. According to Bartlett's test for equal variances, we find significant (at the 1 percent level) differences in the distribution of basic personality traits among occupations. Figure 1 shows the distribution of basic personality traits separately for people who have been self-employed more than one year, people with less than one year of experience in self-employment, and employees. The differences between entrepreneurs with less than one year of self-employment and those with at least one year are not statistically significant.

5.2   Regression results

To test our first set of hypotheses about the influence of occupation-specific characteristics on the individual probability of becoming an entrepreneur, we estimate a random effects probit model (Table 2) where the dependent variable equals 1 if transition from paid employment to self-employment took place in the current wave, and equals 0 if an individual decided to remain in paid employment. The random effects estimator allows controlling for a number of time-invariant demographic characteristics found in other studies to have a significant effect on the start-up decision (for an overview, see, e.g., Parker, 2009). This is an improvement over the fixed effects estimator, which drops time-invariant covariates. Another problem with the fixed effects estimator arises when individuals in the panel do not change their status (e.g., most individuals in our sample decide to remain in paid employment).[14]

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[14] Applying a fixed effects estimator would drastically reduce the number of cases, since the non-changing status of those individuals would be perfectly explained by their fixed effects.

The first specification of the model (Column 1) includes only individual characteristics. Those with more years of education are more likely to engage in entrepreneurship. Further, the results reveal that the probability of switching from paid employment into self-employment is significantly higher for those who have had self-employed parents, have experienced more years of unemployment, and who are less risk averse.

In Models II and III of Table 2 we test for the effect of occupation-specific characteristics on the individual probability of transitioning into self-employment, continuing to control for individual characteristics. Model II includes the variable "short-term unemployment rate"; Model III uses the variable "long-term unemployment." We do this because the correlation coefficient between these two variables is 0.82 (see Table A2 in Appendix). The estimation results suggest that occupation-specific unemployment rates have a statistically significant and positive effect on the propensity of transition from paid employment to self-employment (probit coefficient varies from 1.634 to 1.818). This result supports our first hypothesis that occupational environments characterized by a high risk of unemployment are positively associated with an individual's intention to leave paid employment for self-employment.

Strong results are also obtained for the share of job openings in an occupation. The higher the share of job openings, the higher the likelihood that people in that occupation will become self-employed. Since the analysis was performed only for employed individuals, this result suggests that the presence of employment opportunities makes leaving the current employer for self-employment more attractive because in the case of failure the chances of finding a new job will be relatively high. This result suggests that entrepreneurs tend to have a certain willingness to take risk but that they prefer to take calculated risks. This means that if entrepreneurial choice is a two-stage process, would-be entrepreneurs are not as strongly deterred from choosing a certain profession by unemployment as compared to other individuals. However, high risk of unemployment in occupations won't attract would-be entrepreneurs, per se. In the second stage, i.e. being within a

certain occupational environment, they are more likely to set-up an own business if there are reasonable employment opportunities in case that self-employment does not work out as expected.

As posited by Hypothesis 3b, the higher the deviation of an individual's income from the occupational median wages, the lower the probability of entrepreneurial entry. This finding supports the opportunity cost argument, which states that higher expected gain from self-employment than from employment will motivate people to start a business. However, the estimated probit coefficient for the variable "wage deviation" was close to zero in all model specifications, albeit statistically significant at the 1 percent level.

Our results in regard to a positive effect of self-employed role models in an occupation provide only some support for Hypothesis 4a. We did not find statistically significant results for the variable 'self-employment rate in an occupation' in the multivariate analysis. We, next, introduced a proxy for occupational role-models of self-employment, which is a binary variable indicating whether a person was previously employed in a liberal profession[15], and found a positive and significant effect of this variable on the probability of becoming self-employed (Model IV of Table 2). We suppose that non-significant results for our first indicator of role models are caused by a measurement bias. Particularly, self-employment rate in an occupation was calculated based on a respondent's self-reported occupation. Consequently, this measure may be biased toward a frequent report of managerial occupations by self-employed persons.

The test of Hypothesis 4b is presented in Table 3. Since questions on personality traits were asked in only two waves (2005 and 2009), we impute values for 2006, 2007, and 2008 from those of the 2005 wave. This procedure assumes that basic personality traits do not change over relatively short periods of time, which is supported by empirical evidence on the

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[15] The variable 'liberal profession in previous employment' indicates whether an individual have been previously employed in one of a liberal professions, such as architect, artist, interpreter, musician, lawyers, physician, pharmacist, business consulter, engraver, watchmaker, and other.

stability of the Big Five (see, e.g., Caspi et al., 2005; Borghans et al., 2008).[16] We then conduct a random probit model estimation controlling for a set of individual characteristics (as in Table 2). Model I in Table 3 shows the effects of individual personality traits on the likelihood of entrepreneurship, when controlling for a wide set of variables. The results suggest that a higher score for "extraversion" and "openness to experience" increases the probability of entrepreneurial entry. Model II includes absolute values of deviations of an individual's personality traits from those of a self-employed role model. While the estimation results suggest negative signs for the relationship between absolute deviations and entrepreneurial entry for most Big Five dimensions (except neuroticism), statistically significant results are obtained only for absolute deviation from the traits of extraversion and openness to experience. This finding suggests that the similarity of an individual's personality to that of a self-employed role model is positively associated with entrepreneurial entry. However, not all basic traits need to be similar to those of the role model to make pursuit of an entrepreneurial career likely.

6 Preliminary conclusions and discussion

This study extends the literature on entrepreneurial entry by investigating the role occupational environment plays in an individual's decision to start a new business. The majority of self-employed individuals worked in paid employment directly before starting their own businesses. Therefore, it is likely that occupational environment plays a role in entrepreneurial choice. In particular, we argued that entrepreneurial choice can be regarded as a two-stage process. In the first stage, individuals select an occupation that matches their preferences, interests, role models, and the like. In the second stage, after a spell in paid employment, they decide whether or not to become self-employed.

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[16] This procedure is used in the literature (see, e.g., Caliendo et al., 2011).

People with entrepreneurial attitudes may choose occupations in which the probability of becoming self-employed is relatively high, such as physicians or lawyers. Moreover, people are often aware of the characteristics of an occupational environment, including prospects for job security or unemployment, before they make an occupational choice. Our findings suggest that the decision to become self-employed is more likely to occur in occupations with high levels of both short-term and long-term unemployment. If an occupational security is important to an individual, he or she is likely to choose an occupation characterized by relatively low unemployment rates (e.g., one of the occupations in public sector employment). People with high proclivity to take risks are more likely to engage in a riskier occupation and are also more likely to take an entrepreneurial risk.

One of our more interesting findings is that a high levels of job opportunities in an occupation, measured as a share of job openings within an occupation, provides a strong incentive for employees in those occupations to start an own business. We call this the "retreatment" effect: that is, if people feel confident that they can find a job in their occupation in the event their start-up business fails, they are more likely to leave paid employment for self-employment. This finding indicates that would-be entrepreneurs are more likely to take calculated risks, that is, they enjoy challenging environments, but they are not exaggerated risk-loving.

We also investigated the effect of an individual wage position within the occupational reward structure and found that if an individual's wages are below the occupation-specific median wages, the probability that that individual will become an entrepreneur increases. However, this effect was close to zero in all model specifications. In the first stage of the two-stage occupational choice framework, individuals who are highly motivated financially are more likely to choose occupations that offer relatively high earnings. In the second stage, if these individuals do not realize their expected wages, they are likely to become self-employed.

We also show that the presence of a self-employed role model increases an individual's likelihood of switching to self-employment assuming that self-employment within an occupational environment is reinforcing in nature. This effect might be explained by a tradition of self-employment in some occupations (artists, musicians, craftsmen). In particular, higher self-employment rates in an occupation may signal financiers that the new venture has a good chance of success.

We introduced two measures of occupational role-models of self-employment, namely self-employment rates in occupations and a binary variable which indicates whether an occupation is a liberal profession. In the case of former indicator, the descriptive evidence suggests that entrepreneurs come from occupations with higher levels of self-employment, as compared to employees. The results of a multivariate study, however, proved to be insignificant. Nevertheless, our hypothesis 4a has been partly supported when we include a proxy for role-models of self-employment, namely an indicator whether an occupation is a liberal profession. For this indicator we found statistically significant and positive results. We suppose that the insignificant results of our first indicator are caused by the measurement bias. Particularly, self-employment rate in an occupation was calculated based on a respondent's self-reported occupation. If self-employed persons tend to report their occupational status as 'manager', then the indicator might not precisely measure the level of role-models of self-employment in occupations.

This paper's second contribution is its exploration of the role an individual's personality plays in the decision to start a business. Based on extant psychological literature on vocational choices, we first hypothesized, and then found some indication in our data, that the personality of self-employed individuals varies across occupational fields. According to recent literature on the characteristics of role models, we then assumed that new business founders would have personalities similar to those of self-employed role models in the same occupation. We found that the similarity of an individual's basic personality to that of a same occupation role model

determines the probability of entrepreneurial entry. However, significant effects in the multivariate model were found only for the traits of "openness to experience" and "extraversion."

The present study has some limitations. First, the available data on occupational environment were somewhat restricted. More detailed data would be desirable. For instance, shares of temporary job contracts in occupations could be used as an additional measure of occupational insecurity. A more precise indicator for the presence of occupation-specific role-models of self-employment should be found, as well.

Second, we investigated only the recent occupational environments of entrepreneurs assuming that occupational change is a rare event. However, one could argue that every occupational environment in which an entrepreneur worked has had an influence on the decision to become an entrepreneur. Nevertheless, we believe that the strongest influence will come from the most recent occupational environment based on the assumption that distant-past occupational experience in other environments will lose some if not all of its impact if the skills it required then have rarely been used since.

Additionally, assigning self-employed individuals to an occupation is not a straightforward task, since many self-employed people report their occupation as "manager." We use information on their previous paid-employment occupation, but this procedure, of course, is not infallible. We use industrial dummies in all model specifications to control for industrial structure that may be more or less conducive for self-employment.

The role occupation plays in individual propensity for entrepreneurship has not been investigated to date. Our results suggest that choice of occupation predetermines an entrepreneurial choice. In particular, the framework of a two-stage entrepreneurial choice allows to describe the process of occupational choice, taking in account risk preferences of entrepreneurs. Entrepreneurs avoid low-risk occupational environments, but they are willing to take risk only when they have a secure "fall back" position.

Further investigation into the relationship between risk-taking behavior and entrepreneurial choice is definitely warranted.

Perhaps our most novel contribution is the finding that entrepreneurial personality appears to matter at both stages of a two-stage entrepreneurial choice process. The occurrence of different personality types in different kinds of occupations suggests that the "entrepreneurial personality" varies significantly across occupational fields.

This paper is a first step in discovering the role occupational environment plays in the entrepreneurial process. It answers some questions, but others remain to be answered. For example: How can one stimulate entrepreneurial role models in occupations? How does the willingness to take risk by entrepreneurs differ across occupational fields? Also, the role of occupation-specific environments should be studied when relevant data become available.

References

Aldrich, Howard E. and Linda A. Renzulli (1998): Passing On Privilege: resources provided by self-employed parents to their self-employed children, *Research in Social Stratification and Mobility*, 16, 291–317.

Amit, Raphael; Eitan Mueller and Iain M. Cockburn (1995): Opportunity costs and entrepreneurial activity, Journal of business venturing, 10 (2), 95-106.

Audretsch, David B. (1993): New-Firm Formation in U.S. Manufacturing, in Bengt Johannisson, Charlie Karlsson and David Storey (eds.): *Small Firm Dynamics: International, National, and Regional Perspectives*, Routledge, London, 40-53.

Barrick, Murray R.; Michael K. Mount and Rashmi Gupta (2003): Meta-Analysis of the Relationship between the Five-Factor Model of Personality and Holland's Occupational Types, *Personnel Psychology*, 56 (1), 45–74.

Baumol, William J.(1990): Entrepreneurship: productive, unproductive, and destructive, *Journal of Political Economy*, 98 (5), 893-921.

Lentz, Bernard F. and David N. Laband (1990): Entrepreneurial Success and Occupational Inheritance among Proprietors, *Canadian Journal of Economics*, 23 (3), 563–579.

Boden, Richard J. and Alfred R. Nucci (2000): On the Survival Prospects of Men's and Women's New Business Ventures, *Journal of Busioness Venturing*, 15 (4), 347–362.

Borghans, Lex; Bas ter Weel and Bruce A. Weinberg (2008): Interpersonal styles and labor market outcomes, *Journal of Human Resources*, 43 (4), 815–858.

Borjas, George J. (1986): The self-employment experience of immigrants, *Journal of Human Resources,* 21 (4), 485-506.

Borjas, George J. and Stephen G. Bronars (1989): Consumer discrimination and self-employment, *Journal of Political Economy,* 97 (3), 581-605.

Bosma, Niels; Jolanda Hessels, Veronicue Schutjens, Mirjam van Praag and Ingrid Verheul (2011): Entrepreneurship and role models, *Journal of Economic Psychology*, in press.

Brock, William A. and David S. Evans (1989): Small business economics, *Small business economics*, 1 (1), 7–20.

Cable, Daniel M. and Charles K. Parsons (2001): Socialization Tactics and Person–Organization fit, *Personnel Psychology*, 54 (1), 1–23.

Caliendo, Marco; Frank Fossen; Alexander Kritikos (2011): Risk attitudes of nascent entrepreneuris – new evidence from an experimentally validated survey. *Small Business Economics*, 32, 153-167.

Caliendo, Marco; Frank Fossen; Alexander Kritikos (2011): Personality Characteristics and the Decision to Become and Stay Self-Employed. IZA Discussion Paper No. 5566.

Campbell, Charles A. (1992): A decision theory model for entrepreneurial acts, *Entrepreneurship: Theory and Practice*, 17 (1), 21–27.

Candelon, Bertrand; Arnaud Dupuy and Luis A. Gil-Alana (2009): The nature of occupational unemployment rates in the United States. Hysteresis or structural? *Applied Economics*, 41 (19/21), 2483–2493.

Caspi, Avshalom; Brent W. Roberts and Rebecca L. Shiner (2005): Personality Development: Stability and Change, *Annual Review of Psychology*, 56, 453–484.

Chlosta, Simone; Holger Patzelt, Sabine B. Klein and Christian Dorman (2010): Parental role models and the decision to become self-employed: The moderating effect of personality, *Small Business Economics,* published online March 6[th]2010.

Cobb-Clark, Deborah A. and Michelle Tan (2011): Noncognitive skills, occupational attainment, and relative wages, *Labour Economics*, 18 (1), 1–13.

Costa, Paul T.; McCrae Robert R. (1992): Revised NEO personality inventory (NEO PI-R) and NEO five-factor inventory (NEO-FFI). Professional manual. Lutz, FL: Psychological Assessment Resources, Inc. Online verfügbar unter http://www.worldcat.org/oclc/502582606.

Davidsson, Per and Benson Honig (2003): The role of social and human capital among nascent entrepreneur, *Journal of Business Venturing*, 18 (3), 301–331.

Donald L. Sexton and John D. Kasarda (eds.) (1992): *The State of the Art of Entrepreneurship*, Boston: PWS Kent Publishing.

Douglas, Evan J. and Dean A. Shepherd (2000): Entrepreneurship as a utility maximizing response, *Journal of Business Venturing*, 15 (3), 231–251.

Dunn, Thomas and Douglas Holtz-Eakin (2000): Financial capital, human capital, and the transition to self-employment. Evidence from intergenerational links, *Journal of labor economics*, 18 (2), 282–305.

Evans, David S. (1989): Immigrant Entrepreneurship: effects of ethnic market size and isolated labor pool, *American Sociological Review*, 54 (6), 950–962.

Evans, David S. and Linda S. Leighton (1989): Some empirical aspects of entrepreneurship, *American Economic Review*, 79 (3) , 519-535.

Evans, David S. and Linda S. Leighton (1990): Small business formation by unemployed and employed workers, *Small Business Economics*, 2 (4), 319-330.

Fairlie, Robert W. and Alicia M. Robb (2007): Why are black-owned business less successful than white-owned business? The role of families, inheritances, and business human capital, *Journal of Labor Economics*, 25 (2), 289–323.

Falck, Oliver; Stephan Heblich and Elke Luedemann (2010): Identity and entrepreneurship: do school peers shape entrepreneurial intentions? *Small Business Economics,* published online July 10th 2010.

Filer, Randall K. (1986): The role of personality and tastes in determining occupational structure, *Industrial & Labor Relations Review*, 39 (3), 412-424.

Fornahl, Dirk (2003): Entrepreneurial activities in a regional context, in Dirk Fornahl and Thomas Brenner (eds.): *Cooperation, networks and institutions in regional innovation systems*, Cheltenham: Elgar, 38–57.

Fritsch, Michael and Oliver Falck (2007): New business formation by industry over space and time. A multidimensional analysis, *Regional Studies,* 41 (2), 157–172.

Fritsch, Michael and Pamela Mueller (2005): How persistent are regional start-up rates? An empirical analysis, in Tsvi Vinig and Roel van der Voort (eds.): *The emergence of entrepreneurial economics*, Amsterdam: Elsevier, 71–82.

Gathmann, Christina and Uta Schönberg (2010): How general is human capital? A task-based approach, *Journal of Labor Economics*, 28 (1), 1–49.

Gerlitz, Jean-Yves and Jürgen Schupp (2005): *Zur Erhebung der Big-Five-basierten Persönlichkeitsmerkmale im SOEP*, Berlin, DIW Berlin.

Gibson, DonaldE (2004): Role models in career development: New directions for theory and research, *Journal of Vocational Behavior*, 65 (1), 134–156.

Gilad, Benjamin and Philip Levine (1986): A behavioral model entrepreneurial supply, *Journal of Small Business Management*, 24 (4), 45–53.

Haisken De-New, John P. and Joachim R. Frick (2005): *Desktop Companion to the German Socio-Economic Panel (SOEP)*, Berlin: DIW Berlin.

Hamilton, Robert T. (1989): Unemployment and Business Formation Rates: Reconciling Time Series and Cross Section Evidence, *Environment and Planning*, 21 (2), 249–255.

Hamilton, Robert T. and David A. Harper (1994): The entrepreneur in theory and practice *Journal of Economic Studies*, 21 (6), 3-18.

Highfield, Richard A. and Robert H. Smiley (1987): New business starts and economic activity. An empirical investigation, *International Journal of Industrial Organization*, 5 (1), 51-66.

Holland, John L. (1973): *Making vocational choices. A theory of careers*, Englewood Cliffs: Prentice-Hall.

Greenhaus, Jeffrey H. and Gerard A. Calanan (eds.) (2006): *Encyclopedia of Career Development*, Thousand Oaks: Sage Publications.

Johansson, Edvard (2000): Self-employment and liquidity constraints. Evidence from Finland, *Scandinavian Journal of Economics*, 102 (1), 123–134.

Kambourov, Gueorgui and Iourii Manovskii (2008): Rising Occupational and Industry Mobility in the United States: 1968 – 1997, *International Economic Review*, 49 (1), 41-79.

Kambourov, Gueorgui and Iourii Manovskii (2009): Occupational Mobility and Wage Inequality, *Review of Economic Studies*, 76 (2), 731–759.

Katz, Jerome A (1994): Modelling entrepreneurial career progressions: concepts and considerations, *Entrepreneurship Theory and Practice*, 19 (2), 23–39.

Kim, Philip H. and Howard E. Aldrich (2005): Social capital and entrepreneurship, *Foundations and Trends in Entrepreneurship*, 1 (2), 55–104.

Kim, Phillip H.; Howard E. Aldrich and Lisa A. Keister (2006): Access (Not) Denied: The Impact of Financial, Human, and Cultural Capital on Entrepreneurial Entryin the United States, *Small Business Economics*, 27 (1), 5–22.

Klyver, Kim; Kevin Hindle and Thmas Schøtt (2007): Who will be an entrepreneur? How cultural mechanisms and social network structure together influence entrepreneurial participation, *Frontiers of Entrepreneurship Research, 27* (7), 305–320.

Knight, Genevieve and Stephen McKay (2000): Lifetime experiences of self-employment, *Labour Market Trends*, 108, 470–472.

Knight, Russell M. (1987): Can business schools produce entrepreneurs? *Frontiers of Entrepreneurship Research*, 1987, 603–604.

Koellinger, Philipp; Maria Minniti and Christian Schade (2007): "I think i can, i think i can". Overconfidence and entrepreneurial behavior, *Journal of Economic Psychology*, 28 (4), 502–527.

Kolvereid, Lars (1996): *Prediction of employment status choice intentions,* Henley-on-Thames: Henley Management College.

Krueger, Alan B. and David Schkade (2008): Sorting in the labor market. Do gregarious workers flock to interactive jobs? *Journal of Human Resources*, 43 (4), 859–883.

Kuratko, Donald; Jeffrey S. Hornsby and Douglas W. Naffziger (1997): An examination of owners goals in sustaining entrepreneurship, *Journal of Small Business Management, 35* (1), 24–33.

Lafuente, Esteban; Yancy Vaillant and Josep Rialp (2007): Regional differences in the influence of role models. Comparing the entrepreneurial process of rural Catalonia, *Regional Studies*, 41 (6), 779–795.

Le, Anh T. (1999): Empirical studies of self-employment, *Journal of Economic Surveys*, 13 (4), 381–416.

Longhi, Simonetta and Malcolm Brynin (2010): Occupational Change in Britain and Germany, *Labour Economics*, 17, 655-666.

Lucas jr., Robert E. (1978): On the size distribution of business firms, *Bell Journal of Economics*, 9 (2), 508–523.

Messenger, Jon C.; Andrew Stettner (2000): The Quality of Self-Employment Jobs in the United States. Contribution to the ILO Action Programme on 'Entreprise Creation by the Unemployed - the Role of Microfinance in Industrialized Countries'.

Minniti, Maria (2005): Entrepreneurship and network externalities, *Journal of Economic Behavior & Organization*, 57 (1), 1–27.

Moutafi, Joanna, Adrian Furnham and John Crump (2007): Is Managerial Level Related to Personality? *British Journal of Management*, 18 (3), 272–280.

Mouw, Ted and Arne L. Kalleberg (2010): Occupations and the Structure of Wage Inequality in the United States, 1980s to 2000s, *American Sociological Review*, 75 (3), 402–431.

Mueller, Pamela (2006): Entrepreneurship in the Region: Breeding Ground for Nascent Entrepreneurs? *Small Business Economics*, 27 (1), 41–58.

Nanda, Ramana and Jesper B. Sorensen (2010): Workplace Peers and Entrepreneurship, *Management Science*, 56 (7), 1116–1126.

Nedelkoska, Ljubica and Frank Neffke (2010): Human Capital Mismatches along the career path, *Jena Economic Research Papers,* 51-2010.

Nicolaou, Nicos and Scott Shane (2010): Entrepreneurship and occupational choice: Genetic and environmental influences, *Journal of Economic Behavior & Organization*, 76 (1), 3–14.

Nieken, Petra and Susi Störmer (2010): Personality as Predictor of Occupational Choice: Empirical Evidence from Germany, *Diskussionspapiere des Schwerpunktes Unternehmensführung am Fachbereich BWL, 8 (2010*).

Özcan, Serden and Toke Reichstein (2009): Transition to Entrepreneurship from the Public Sector: Predispositional and Contextual Effects, *Management Science*, 55 (4), 604-618.

Parker, Simon C. (2009): *The economics of self-employment and entrepreneurship,* Cambridge: Cambridge University Press.

Poschke, Markus (2008): *Who Becomes an Entrepreneur? Labor Market Prospects and Occupational Choice, IZA Working Paper.*

Probst, Tahira M. (2006): Job Security, in Jeffrey H. Greenhaus and Gerard A. Calanan (eds.): *Encyclopedia of Career Development*, Thousand Oaks: Sage Publications, 442-446.

Greenhaus, Jeffrey H. and Gerard A. Calanan (eds.) (2006): *Encyclopedia of Career Development*, Thousand Oaks: Sage Publications.

Silbereisen, Rainer K. and Richard M. Lerner (eds.) (2007): *Approaches to Positive Youth Development,* Thousand Oaks: Sage Publications.

Rauch, Andreas and Michael Frese (2007): Let's put the person back into entrepreneurship research. A meta-analysis on the relationship between business owners' personality traits, business creation, and success, *European Journal of Work and Organizational Psychology*, 16 (4), 353–385.

Reynolds, Paul D. (1992): Predicting New-Firm Births: Interaction of Organizational and Human Populations, in Donald L. Sexton und John D. Kasarda (eds): *The State of the Art of Entrepreneurship*, Boston: PWS Kent Publishing.

Reynolds, Paul D. (1993): Regional Characteristics Affecting Autonomous Branch Establishment Foundings in the U.S., 1976-1986, in Bengt Johannisson, Charlie Karlsson und David Storey (eds.): *Small Firm Dynamics: International, National, and Regional Perspectives*, Routledge, London.

Reynolds, Paul D.; Brenda Miller and Wilbur R. Maki (1995): Explaining regional variation in business births and deaths. US 1976 – 88, *Small Business Economics*, 7, 389-407.

Reynolds, Paul; David Storey and Paul Westhead (1994): Cross-national Comparisons of the Variation in New Firm Formation Rates, *Regional Studies*, 28 (4), 443–456.

Rosen, Sherwin (1986): Theory of equalizing differences, in Orley Aschenfelter and Peter R. Layard (eds.): *Handbook of Labor Economics*, 1st edition, Amsterdam: Elsevier, 641-692.

Rotefoss, Beate and Lars Kolvereid (2005): Aspiring, nascent and fledgling entrepreneurs. An investigation of the business start-up process, *Entrepreneurship and Regional Development*, 17 (2), 109–127.

Satterwhite, Robert C.; John W. Fleenor, Phillip W. Braddy, Jack Feldman and Linda Hoopes (2009): A case for homogeneity of personality at the occupational level, *International Journal of Selection and Assessment*, 17 (2), 154–164.

Schmitt-Rodermund, Eva (2004): Pathways to Successful Entrepreneurship. Personality, Parenting, Entrepreneurial Competence, and Interests, *Journal of Vocational Behavior*, 65 (3), 498–518.

Schmitt-Rodermund, Eva (2007): The Long Way to Entrepreneurship. Personality, Parenting, Early Interests and Competencies for Entrepreneurial Activity Among the Termites, in Rainer K. Silbereisen and Richard M. Ierner (eds.): *Approaches to Positive Youth Development*, Thousand Oaks: Sage Publication, 205-224.

Schneider, Benjamin (1987): The people make the place, *Personnel Psychology,* 40 (3), 437–453.

Schumpeter, Joseph Alois (1934): *The Theory of Economic Development.* Cambridge, Mass.: Harvard University Press.

Shane, Scott A. (2003): *A general theory of entrepreneurship. The individual-opportunity nexus*, Cheltenham: Elgar.

Shane, Scott; Nicos Nicolaou, Lynn Cherkas and Tim D. Spector (2010): Genetics, the Big Five, and the tendency to be self-employed, *Journal of Applied Psychology*, 95 (6), 1154–1162.

Shepherd, Dean A. and Dawn R. DeTienne (2005): Prior Knowledge, Potential Financial Reward, and Opportunity Identification, *Entrepreneurship Theory and Practice*, 29 (1), 91–112.

Singh, Romila (2006): Environment-awareness, in Jeffrey H. Greenhaus and Gerard A. Callanan (eds.): *Encyclopedia of Career Development*, Thousand Oaks: Sage Publications, Thousand Oaks.

Tokar, David M; Ann R. Fischer and Linda Mezydlo Subish (1998): Personality and Vocational Behavior: A Selective Review of the Literature, 1993–1997, *Journal of Vocational Behavior*, 53 (2), 115–153.

van der Sluis, Justin; Mirjam van Praag and Wim Vijverberg (2008): Education and Entrepreneurship Selection and Performance: A Review of the Empirical Literature, *Journal of Economic Surveys*, 22 (5), 795–841.

van Praag, Mirjam and Hans Ophem (1995): Determinants of Willigness and Opportunity to Start as an Entrepreneur, *KYKLOS*, 48 (4), 513–540.

Venkataraman, S. (1997): The distinctive domain of entrepreneurship research, *Advances in Entrepreneurship, Firm Emergence, and Growth*, 3, 119-138.

Wagner, Gert G.; Joachim R. Frick and Jürgen Schupp (2007): The German socio-economic panel study (SOEP). Scope, evolution and enhancements, *Schmollers Jahrbuch*, 127 (1), 139–169.

Wagner, Joachim (2004): Are young and small firms hothouses for nascent entrepreneurs? Evidence from German micro data, *Applied Economics Quarterly*, 50 (4), 379–391.

Wagner, Joachim (2008): Nascent and infant entrepreneurs in Germany. Evidence from the Regional Entrepreneurship Monitor (REM), *Neue Ansätze der Mittelstandsforschung*, LIT, Berlin, 395–411.

Winkelmann, Liliana and Rainer Winkelmann (2008): Personality, work, and satisfaction: evidence from the German Socio-Economic Panel, *The Journal of Positive Economics*, 3 (4), 266–275.

Yamawaki, Hideki (1990): The effects of business conditions on net entry. Evidence from Japan, Berlin, Discussion papers WZB, Forschungsschwerpunkt Marktprozeß und Unternehmensentwicklung.

Zhao, Hao and Scott E. Seibert (2006): The Big-Five Personality Dimensions and Entrepreneurial Status. A Meta-Analytical Review, *Journal of Applied Psychology*, 91 (2), 259–271.

Figures and Tables

Figure 1: Distribution of personality traits separately for self-employed individuals (more than 1 year in self-employment), new business founders (less than one year in self-employment), and employees
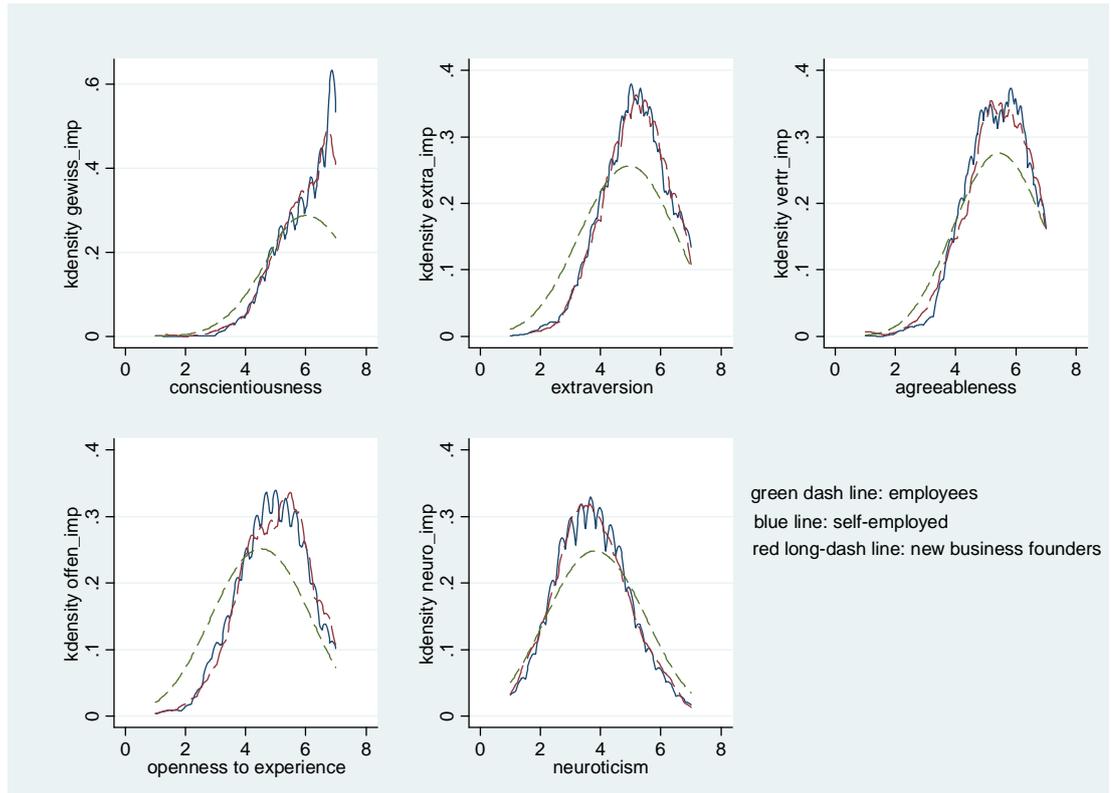

green dash line: employees
blue line: self-employed
red long-dash line: new business founders

Table 2: Regression results. Dependent variable: switch from paid- into self-employment

	Model I		Model II		Model III		Model IV	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Individual characteristics								
Years of formal education	0.327*	(0.196)	0.374**	(0.190)	0.357*	(0.191)	0.431**	(0.189)
Years of formal education, squared	-0.009	(0.007)	-0.011	(0.007)	-0.010	(0.007)	-0.013*	(0.007)
Age	0.040	(0.033)	0.068**	(0.033)	0.067**	(0.033)	0.064*	(0.032)
Age, squared	-0.001	(0.000)	-0.001**	(0.000)	-0.001**	(0.000)	-0.001**	(0.000)
Male	0.144	(0.096)	0.266***	(0.098)	0.268***	(0.099)	0.243**	(0.096)
Married	-0.045	(0.098)	-0.043	(0.095)	-0.046	(0.096)	-0.033	(0.094)
Foreigner	0.203	(0.220)	0.165	(0.213)	0.172	(0.215)	0.122	(0.211)
East Germany	-0.029	(0.102)	-0.107	(0.099)	-0.107	(0.101)	-0.105	(0.098)
Either parents self-employed	0.656***	(0.141)	0.628***	(0.133)	0.639***	(0.135)	0.641***	(0.131)
Experienced years of unemployment	0.098***	(0.030)	0.0704**	(0.029)	0.069**	(0.030)	0.063**	(0.028)
Willingness to take risks	0.108***	(0.020)	0.106***	(0.019)	0.107***	(0.019)	0.107***	(0.019)
Characteristics of occupational environments								
Short-term unemployment rate, lagged	-	-	1.634**	(0.688)	-	-	1.698**	(0.664)
Long-term unemployment rate, lagged	-	-	-	-	1.818*	(0.937)	-	-
Share of job openings, lagged	-	-	5.403***	(1.540)	5.328***	(1.557)	5.777***	(1.533)
Deviation of individual wages from an occupational median, lagged	-	-	-0.0002***	(0.000)	-0.0002***	(0.000)	-0.0002***	(0.000)
Self-employment rate, lagged	-	-	0.005	(0.006)	0.007	(0.006)	-	-
Liberal profession in previous employment	-	-	-	-	-	-	0.402**	(0.161)
Intercept	-7.286***	(1.601)	-8.689***	(1.580)	-8.563***	(1.594)	-8.830***	(1.564)
Industry dummies	YES		YES		YES		YES	
Rho	0.595	(0.067)	0.558	(0.064)	0.566	(0.065)	0.557	(0.062)
Number of observations	28,701		28,701		28,701		30,037	
LL	-1282.398		-1260.41		-1261.32		-1282.956	
Wald Chi2	86.9***		111.14***		107.18***		120.75***	

Notes: random effects probit. Standard errors in parantheses. * Statistically significant at the 10 percent level; ** statistically significant at the 5 percent level; * statistically significant at the 1 percent level.

Table 3: Regression results with imputed values for waves 2005 - 2009.

	Model I: personality characteristics		Model II: deviation of personality characteristics from a role model	
	Coefficient	Standard Error	Coefficient	Standard Error
Big Five dimensions of personality				
Conscientiousness	0.093	(0.058)	-0.105	(0.073)
Extraversion	0.079*	(0.047)	-0.139**	(0.062)
Agreeableness	-0.078	(0.049)	-0.044	(0.066)
Openness to experience	0.145***	(0.046)	-0.135**	(0.058)
Neuroticism	-0.017	(0.040)	0.012	(0.053)
Individual characteristics				
Years of formal education	0.306	(0.204)	0.274	(0.199)
Years of formal education, square	-0.009	(0.007)	-0.008	(0.007)
Age	0.023	(0.034)	0.013	(0.034)
Age, squared	0.000	(0.000)	-0.0002	(0.000)
Male	0.202**	(0.101)	0.153	(0.093)
Married	-0.040	(0.102)	-0.037	(0.101)
Foreigner	0.042	(0.247)	0.085	(0.239)
East Germany	0.041	(0.106)	0.050	(0.103)
Either parents self-employed	0.666***	(0.146)	0.655***	(0.141)
Experienced years of unemploym	0.095***	(0.033)	0.081**	(0.031)
Willingness to take risks	0.082***	(0.021)	0.101***	(0.021)
Intercept	-7.962***	(1.733)	-5.913***	(1.565)
Rho	0.567	(0.075)	0.533	(0.076)
Number of observations	20284		20284	
LL	-1062.53		-1017.86	
Wald Chi2	59.19***		62.76***	

Notes: random effects probit. Standard errors in parantheses. * Statistically significant at the 10 percent level; ** statistically significant at the 5 percent level; * statistically significant at the 1 percent level.

Appendix

Table A1.1 Descriptive statistics of variables for the group of new business founders

Variable	Mean	Median	Minimum	Maximum	Variance	Std. Deviation	Skewness	Kurtosis
Short-term unemployment rate, lagged	0.100***	0.083	0.003	0.379	0.004	0.064	1.234	4.585
Long-term unemployment rate, lagged	0.054***	0.046	0.002	0.305	0.002	0.043	2.397	11.637
Share of job openings, lagged	0.017***	0.011	0.001	0.245	0.001	0.024	5.857	46.740
Deviation of individual wages from an occupational median, lagged	-747***	-820	-4,117	3,307	1,827,628	1,352	0.220	2.834
Self-employment rate, lagged	10.918***	7.700	1.200	44.500	72.082	8.490	2.221	7.787
Years of formal education	13.243***	12.000	7.000	18.000	7.449	2.729	0.547	2.129
Age	41.052**	40	21	64	106	10	0.188	2.217
Male	0.586**	1.000	0.000	1.000	0.243	0.493	-0.350	1.123
Married	0.592**	1.000	0.000	1.000	0.242	0.492	-0.374	1.140
Foreigner	0.073	0.000	0.000	1.000	0.068	0.260	3.289	11.815
East Germany	0.224	0.000	0.000	1.000	0.174	0.417	1.323	2.750
Either parents self-employed	0.159***	0.000	0.000	1.000	0.134	0.366	1.865	4.478
Experienced years of unemployment	0.599***	0.000	0.000	15.000	1.786	1.337	4.353	33.112
Individual gross labor income, lagged	2091***	1,919	317	5,500	1,766,414	1,329	0.612	2.545
Willingness to take risks	5.615***	6.000	0.000	10.000	5.645	2.376	-0.362	2.525
Deviation_conscientiousness	0.735	0.651	0.000	4.815	0.344	0.587	2.641	15.260
Deviation_extraversion	0.8523***	0.722	0.000	3.294	0.434	0.659	0.789	3.258
Deviation_agreeableness	0.881	0.708	0.000	4.317	0.481	0.694	1.361	5.887
Deviation_openness	0.877***	0.778	0.000	3.333	0.424	0.651	1.111	4.287
Deviation_neuroticism	1.131	0.995	0.000	3.533	0.684	0.827	0.767	2.886

Notes: t-test of equal means, as compared to the reference group of employees. *** p<0.01; ** p<0.05; * p<0.1

Table A1.2 Descriptive statistics of variables for the reference group of dependently employed

Variable	Mean	Median	Minimum	Maximum	Variance	Std. Deviation	Skewness	Kurtosis
Short-term unemployment rate, lagged	0.083	0.068	0.003	0.379	0.003	0.057	1.464	5.468
Long-term unemployment rate, lagged	0.048	0.039	0.001	0.305	0.002	0.040	2.435	11.606
Share of job openings, lagged	0.013	0.009	0.000	0.245	0.000	0.016	6.382	71.253
Deviation of individual wages from an occupational median, lagged	-535	-525	-4,573	3,754	1,121,130	1,059	0	3
Self-employment rate, lagged	9.408	7.600	1.200	44.500	38.464	6.202	2.820	13.464
Years of formal education	12.644	11.500	7.000	18.000	6.930	2.633	0.883	2.751
Age	42	42	18	64	115	11	0	2
Male	0.510	1.000	0.000	1.000	0.250	0.500	-0.040	1.002
Married	0.628	1.000	0.000	1.000	0.234	0.483	-0.530	1.281
Foreigner	0.044	0.000	0.000	1.000	0.042	0.205	4.442	20.730
East Germany	0.240	0.000	0.000	1.000	0.182	0.427	1.221	2.490
Either parents self-employed	0.080	0.000	0.000	1.000	0.073	0.271	3.104	10.633
Experienced years of unemployment	0.381	0.000	0.000	24.000	1.218	1.103	6.633	76.035
Individual gross labor income, lagged	2,259	2,147	312	5,500	1,410,216	1,188	0	3
Willingness to take risks	4.596	5.000	0.000	10.000	4.573	2.138	-0.081	2.506
Deviation_conscientiousness	0.792	0.667	0.000	4.815	0.424	0.651	1.346	5.151
Deviation_extraversion	1.029	0.889	0.000	6.000	0.622	0.789	1.059	4.153
Deviation_agreeableness	0.898	0.722	0.000	5.167	0.468	0.684	1.043	4.347
Deviation_openness	1.105	0.963	0.000	6.000	0.743	0.862	1.065	4.092
Deviation_neuroticism	1.115	0.995	0.000	5.667	0.725	0.851	1.024	3.934

Table A2. Correlation matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	#
1 New business founder (dep. var.)	1																				
2 Short-term unemployment rate, lagged	0.0267*	1																			
3 Long-term unemployment rate, lagged	0.0143*	0.8243*	1																		
4 Share of job openings, lagged	0.0222*	0.1985*	0.1637*	1																	
5 Deviation of individual wages from an occupational median, lagged	-0.0187*	0.1240*	0.1097*	0.0585*	1																
6 Self-employment rate, lagged	0.0226*	0.1876*	0.1123*	0.0659*	0.0038	1															
7 Years of formal education	0.0212*	-0.2458*	-0.2776*	-0.0895*	0.0555*	0.0761*	1														
8 Age	-0.0061	-0.0775*	-0.0126*	-0.0926*	0.2398*	-0.0168*	0.0821*	1													
9 Male	0.0142*	0.0830*	0.0284*	0.1311*	0.3248*	-0.0222*	-0.0259*	-0.0101*	1												
10 Married	-0.007	-0.0294*	-0.0071	-0.0462*	0.1129*	-0.0103*	0.0180*	0.4171*	0.0319*	1											
11 Foreigner	0.0130*	0.0664*	0.0694*	0.0370*	0.0140*	-0.0196*	-0.1038*	-0.1008*	0.0365*	0.0118*	1										
12 East Germany	-0.0034	0.0393*	0.0330*	0.0285*	-0.1179*	0.0186*	0.0901*	0.0199*	-0.0193*	-0.0021	-0.1147*	1									
13 Either parents self-employed	0.0272*	-0.0107*	-0.0292*	-0.0140*	-0.0115*	0.0266*	0.0791*	0.0078	-0.0233*	-0.0147*	-0.0158*	-0.0651*	1								
14 Experienced years of unemployment	0.0185*	0.0971*	0.1349*	0.0426*	-0.0884*	-0.0006	-0.0991*	0.0427*	-0.0441*	-0.0214*	0.0535*	0.0677*	-0.0235*	1							
15 Individual gross labor income, lagged	-0.0132*	-0.2144*	-0.2368*	-0.0518*	0.7530*	0.0109*	0.3886*	0.2823*	0.3858*	0.1348*	-0.0413*	-0.1259*	0.0192*	-0.1568*	1						
16 Willingness to take risks	0.0437*	0.0338*	0.0099	0.0374*	0.0662*	0.0092	0.0274*	-0.1038*	0.1727*	-0.0771*	-0.004	0.0138*	0.0198*	-0.0125*	0.0854*	1					
17 Deviation_conscientiousness	-0.0089	-0.0517*	-0.0503*	-0.0469*	-0.0169*	-0.0356*	0.0937*	-0.0170*	0.0102	-0.0210*	-0.0045	-0.0414*	0.0318*	-0.0083	0.0328*	-0.008	1				
18 Deviation_extraversion	-0.0226*	-0.0642*	-0.0524*	-0.0108	0.0276*	-0.0165*	0.0258*	0.0222*	0.0106	0.007	-0.0015	-0.0222*	0.0035	0.0249*	0.0381*	-0.0727*	0.0818*	1			
19 Deviation_agreeableness	-0.0026	0.0150*	0.0342*	-0.0119	0.0387*	-0.0461*	-0.0838*	0.0062	0.0294*	0.0075	-0.0057	-0.0117	-0.0094	0.0001	-0.0161*	-0.013	0.0426*	0.0729*	1		
20 Deviation_openness	-0.0267*	-0.0179*	-0.0077	-0.0326*	-0.0022	-0.0037	-0.0279*	0.0316*	-0.0632*	0.0288*	0.0074	-0.0124*	-0.0246*	0.01	-0.0517*	-0.0880	0.0569*	0.1903*	0.0698*	1	
21 Deviation_neuroticism	0.002	-0.0064	-0.0138*	-0.0294*	-0.0151*	0.0044	0.0318*	0.0160*	-0.0769*	-0.001	-0.0019	-0.0346*	0.0163*	0.0155*	-0.0259*	-0.0740	0.0889*	0.0973*	0.0733*	0.0528*	1

Note: * denotes significance at the 5 percent level