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Occupational choice and self-employment: Are they related?

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Occupational Choice and Self-Employment—Are They Related?

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Occupational Choice and Self-Employment—Are They Related?

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Abstract

Often, a person will become an entrepreneur only after a period of dependent employment, suggesting that occupational choices precede entrepreneurial choices. We investigate the relationship between occupational choice and self-employment. The findings suggest that the occupational choice of future entrepreneurs at the time of labor market entry is partly guided by a taste for skill variety, the prospect of high earnings, and occupational earnings risk. Entrepreneurial intentions may also emerge after gaining work experience in a chosen occupation. We find that occupations characterized by high levels of unemployment and earnings risk, relatively many job opportunities, and high self-employment rates foster the founding of an own business. Also, people who fail to achieve an occupation-specific income have a tendency for self-employment.

JEL classification: L26, J24, D01

Keywords: Entrepreneurial choice, occupation-specific determinants of entrepreneurship, risk preferences, taste for variety

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1. Introduction[1]

It is widely acknowledged that human capital is highly important for the recognition and pursuit of entrepreneurial opportunities. In particular, it is by means of previous knowledge that certain kinds of entrepreneurial opportunity are discovered (Shane, 2000). This may explain why founders tend to set up their businesses in industries in which they have experience (Fritsch and Falck, 2007). Empirical evidence suggests that the majority of transitions into self-employment in innovation-driven economies such as Germany follow paid employment (see Fritsch, Kritikos and Rusakova, 2012a; Mueller, 2010), and that the probability of self-employment entry is significantly higher the longer one has been employed (Lazear, 2005). This evidence implies that, usually, another vocational choice precedes the decision to become self-employed, thereby pointing to the important role of occupational environment in the development of entrepreneurial careers.

This paper analyzes the role played by occupational choice and by occupational environment in a person's decision to become self-employed. We argue that occupational choice and entrepreneurial choice may be related in such a way that the choice of a certain occupation can be regarded a preliminary decision for or against self-employment. We investigate whether there is a self-selection of persons with entrepreneurial mindsets into occupational environments that are conducive to starting an own business. Or, maybe it is that the characteristics of a certain occupational environment foster entrepreneurship, even in people who are not of an entrepreneurial type. We make three contributions to the entrepreneurship literature. First, we investigate entrepreneurship from the developmental science perspective (Obschonka and Silbereisen, 2012), assuming that the decision to become

[1] We are indebted to the participants of the Babson College Entrepreneurship Research Conference 2012 in Fort Worth, Texas (USA) and the DRUID Summer Conference 2011 in Copenhagen, as well as to the participants of the 10th Interdisciplinary European Conference on Entrepreneurship Research in Regensburg, for valuable comments on earlier versions of this paper.

an entrepreneur develops over time as a result of a complex interplay of personal and environmental characteristics. Second, we apply the concept of entrepreneurs as risk takers (Kihlstrom and Laffont, 1979; Caliendo, Fossen and Kritikos, 2011) with a preference for variety (Åstebro and Thompson, 2011) to vocational choices made previous to the decision to become self-employed. Third, the paper emphasizes the role played by occupational environment in the development of entrepreneurial attitude.

The paper proceeds as follows. The next section introduces the main arguments for why choice of occupation and decision to become self-employed may be related (Section 2). Section 3 deals with certain characteristics of an occupational environment—occupational unemployment risk and earnings risk, occupational skill requirements, and occupational self-employment rate—and develops hypotheses about their effect on a person's decision to become an entrepreneur. Section 4 introduces the data sets used in the empirical part. The hypotheses are empirically tested in Section 5. The results are discussed in the concluding Section 6.

2. Why occupational choice and the decision to become self-employed should be related

There is wide consensus that human capital is an essential determinant of entrepreneurial choice (Block et al., 2011); however, it is less clear as to what type of human capital is especially conducive to entrepreneurship and how people go about acquiring entrepreneurship-relevant human capital. Lazear (2004; 2005) argues that entrepreneurs are generalists who have to perform a variety of tasks, whereas paid employees can specialize in just a few skills. This "jack-of-all-trades" hypothesis finds a great deal of support in various empirical studies that show, for instance, that people with competence in a variety of skills have a higher probability of being self-employed than persons with a more limited spectrum of abilities (Wagner, 2003) and that individuals with more diverse employment histories are also more likely to become entrepreneurs (Silva, 2007; Åstebro and Thompson, 2011).

Empirical research suggests that the acquisition of entrepreneurship-relevant human capital and the development of an entrepreneurial attitude can be explained to a considerable degree by people's preferences, attitudes, and personalities (Silva, 2007). These innate factors contribute to the accumulation of a balanced skills portfolio. Accordingly, an analysis of the career histories of entrepreneurs by Åstebro and Thompson (2011) finds that entrepreneurial individuals seem to have a pronounced taste for variety, which results in them choosing a more diversified career path than their less entrepreneurial counterparts. In line with this evidence, Stuetzer, Obschonka, and Schmitt-Rodermund (2012) show that a pronounced entrepreneurial personality[2] is conducive to the acquisition of a balanced skill set. This kind of self-selection process is also evident in the vocational choices of entrepreneurial individuals, which tend to differ significantly from the vocational choices of less entrepreneurial people. Schmitt-Rodermund (2004) demonstrates that young adolescents with a pronounced entrepreneurial personality are likely to demonstrate entrepreneurial competencies (such as managerial abilities, self-confidence, leadership, invention, etc.) that, in turn, predict an interest in occupations that require and reward such competencies. Sorgner (2012) shows that people with an entrepreneurial personality tend to make vocational choices different from those of less entrepreneurial individuals, and that the occupations they choose are characterized by high levels of self-employment.

Apart from a taste for variety and an entrepreneurial personality, individual risk preferences are found to be related to both entrepreneurial choice (Kihlstrom and Laffont, 1979; Caliendo, Fossen, and Kritikos, 2009) and self-selection into working environments associated with relatively high earnings and high employment risk, such as employment in small firms (Parker, 2009a; Elfenbein, Hamilton and Zenger, 2010). Parker (2009a) concludes that small firms are less likely to be breeding grounds

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[2] Based on the Big Five approach to personality measurement (Costa and McCrae, 1992), self-employed persons are characterized by high levels of "openness to experience, "extraversion," and "conscientiousness," and low levels of "agreeableness" and "neuroticism" (Schmitt-Rodermund, 2004; 2007).

for entrepreneurs even though there are significantly more switches into self-employment out of small firms than out of large ones. Rather, there is a self-selection process at work that makes entrepreneurial individuals choose risky jobs based on their preferences.

There are at least five ways occupational environment can affect the decision to become self-employed, even among individuals not so predisposed.

- *First*, people accumulate occupation-specific human capital during their training and employment in a certain profession. It is shown that occupation-specific human capital cannot easily be transferred across occupations (Nedelkoska and Neffke, 2010), particularly if occupation-specific training and qualifications are highly institutionalized. This implies that an occupational choice once made partly predicts an individual's future career choices (Gathmann and Schönberg, 2010).3 Specifically, since career choices might be somewhat restricted due to the high costs of an occupational switch, people may become "stuck" in their occupation (Nedelkoska and Neffke, 2010). In this situation, entrepreneurial intentions may emerge as a result of poor job prospects in the occupation-specific labor market, so that people consider becoming self-employed even if they had no such intentions when making the original vocational choice.
- *Second*, certain occupational environments may be more conducive to entrepreneurial entry than others, for example, due to low barriers to entry regarding the required level of human and other resources.
- *Third*, during employment in a certain occupation, people may acquire important entrepreneurship-related skills such as managerial competencies (Kim et al., 2006; Boden and Nucci, 2000) or a balanced skill portfolio that can be conducive to a decision to become self-

[3] One aspect of such institutionalization could be that occupation-specific training results in a formal certificate that is required by most employers as a precondition for employment, which is the case in Germany. Another aspect could be that a certification of occupation-specific qualification and experience constitutes a legal precondition for self-employment in certain professions (e.g., in some liberal professions and in the craft sector).

employed (Lazear, 2004; 2005). Hence, work experience in occupations that involve a variety of tasks might be more conducive to the development of an entrepreneurship-related skill portfolio than work experience in occupations that involve fewer tasks (Fritsch et al., 2012b).

- *Fourth*, occupation-specific work experience can foster the ability to recognize entrepreneurial opportunities (Shane, 2000).
- *Fifth*, people working in occupations with high shares of self-employment, for example, the liberal professions, have relatively frequent opportunities to be in contact with entrepreneurial role models who may stimulate their own decision to become self-employed (Bosma, et al., 2012). Self-employment in such professions may also be encouraged by profession-specific norms, such as self-employed lawyer, physician, or tax consultant. Standard business models such as these can be adopted easily and resource owners, such as banks, are familiar with them, thus perhaps making it easier to obtain needed resources such as financing.

We conclude that there are a number of reasons to expect that the choice of a certain profession and entrepreneurial choice should be related.

3. Occupational environments and self-employment—Hypotheses

In this section we investigate four characteristics of an occupational environment that can induce self-selection of entrepreneurial personalities and may also have an effect on the entrepreneurial choice of individuals without entrepreneurial predisposition. These characteristics are: occupational unemployment risk (Section 3.1); occupational earning risk (Section 3.2); required skill variety (Section 3.3); and the occupation-specific self-employment rate (Section 3.4). The derived hypotheses are then tested in Section 5.

3.1 Occupational unemployment risk and entrepreneurship

The risk of becoming unemployed varies substantially across occupations, for manifold reasons. For instance, low-skill occupations tend to have persistently higher unemployment rates than high-skill occupations. A common explanation for this phenomenon is that people in low-skill occupations are more likely to be laid off because the costs of hiring and training these workers are relatively low (Candelon, Dupuy and Gil-Alana, 2009; Devereux, 2002). Another source of varying unemployment rates is that some occupations have a more diversified portfolio of employment opportunities across industries than others. For instance, a manager or an accountant can be employed in virtually all sectors, whereas an earth driller will be needed in only a handful of industries (Tristao, 2007).

Willingness to take risk influences occupational choice. For instance, it is shown that more risk-averse persons tend to value job security and therefore tend to choose occupations with low unemployment risk, such as in the public sector (Pfeifer, 2010; Özcan and Reichstein, 2009; Bellante and Link, 1981). By extension, a relatively high willingness to take risk may predict entrepreneurial choice (Caliendo, Fossen and Kritikos, 2011). Moreover, there are indications that entrepreneurial people might self-select into risky work environments, such as small-size firms (Parker, 2009a; Elfenbein, Hamilton and Zenger, 2010), which tend to offer less job security than larger firms. Hence, one can assume that entrepreneurial people are more likely to select occupations characterized by a relatively high risk of unemployment. They may be less fearful of unemployment because they already regard self-employment as a career option or because they are overoptimistic about their employment chances. Thus, we state the following hypothesis:

Hypothesis 1: Future entrepreneurs are more likely to select occupations with a relatively high employment risk than non-entrepreneurial individuals.

3.2 Occupational earnings risk and entrepreneurship

Another kind of risk involves earnings. Earning prospects differ substantially across occupations due to a number of observable as well as unobservable factors. First, wages may reflect differences in required qualifications and in the returns to education or gender (Mouw and Kalleberg, 2010). However, Bonin et al. (2007) show that between-occupational variation in earnings is only partly explained by observed differences in human capital. The variation unexplained by skill level and skill structure may be regarded as reflecting earnings risk and is highly correlated with the risk preferences of those who choose these professions. In particular, Bonin et al. (2007) show that less risk-averse individuals tend to select themselves into occupations with relatively high earnings risk. Similarly, a study by Guiso, Japelli, and Pistaferri (2002) finds that risk preferences are a strong predictor of individuals' income risk, that is, less risk-averse people tend to self-select into occupations with a higher income risk. Given that entrepreneurs are generally more willing to take risk (Caliendo, Fossen, and Kritikos, 2011), we suggest that they are more likely to choose occupations with higher earnings risk.

Hypothesis 2: Future entrepreneurs are more likely to make riskier occupational choices in terms of earnings risk than are non-entrepreneurial individuals.

Numerous studies show that the possibility of financial gain may be an important motive for becoming self-employed (Katz, 1994; Venkataraman, 1997; Douglas and Shepherd, 2000; Shepherd and DeTienne, 2005). Hence, it can be assumed that future entrepreneurs' vocational choices are financially motivated. Specifically, they may choose occupations in which they expect to earn relatively high incomes. If the expected income from a chosen occupation cannot be achieved in dependent employment, these people may then try to remedy the situation by setting up their own business. These considerations can be summarized in the following hypotheses:

Hypothesis 3: Future entrepreneurs are more likely to choose occupations that offer higher wages than are non-entrepreneurial individuals.

Hypothesis 4: Failure to achieve an expected occupation-specific income is positively associated with the probability of entrepreneurial entry.

3.3 Taste for variety and entrepreneurship

Recent studies show that non-pecuniary motives may be at least as important as financial motives in the decision to become self-employed. Hamilton (2000) shows that entrepreneurs have lower initial earnings and lower earnings growth than paid employees, and that this difference cannot be explained by the selection of people with lower abilities into self-employment. He concludes that entrepreneurs persist in their businesses to reap non-pecuniary benefits. Such non-pecuniary benefits include greater job satisfaction (Blanchflower and Oswald, 1998), more autonomy (Benz and Frey, 2008), and broader skill utilization (Benz, 2009), among others. With regard to the latter, Lazear (2005) argues that entrepreneurs are more likely to be “jacks of all trades,” meaning that they are generalists rather than specialists. In line with this argument, Astebro and Thompson (2011) empirically show that the decision to become an entrepreneur is primarily driven by a taste for variety, which is evidenced by a broad educational background and relatively frequent job switching. Hence, future entrepreneurs may be particularly attracted to occupations with relatively high levels of job opportunities. The presence of alternative job opportunities in the occupation-specific labor market should be conducive to job mobility, the exploration of career opportunities, and the acquisition of a balanced skills portfolio. Moreover, having an occupation with rich job opportunities will likely avoid becoming “stuck.” Moreover, people might be more likely to leave paid employment for self-employment if the chances are good that another paid job will be available in the event things do not work out as planned. Thus, it can be hypothesized that:

Hypothesis 5: Future entrepreneurs are more likely to choose occupations with a higher level of job opportunities than are non-entrepreneurial individuals.

Additionally, a taste for variety implies that entrepreneurs are more willing to utilize a broad skill set in their job (Benz, 2009) and that they are likely to search for jobs that require a variety of skills rather than only a few. Therefore, it can be expected that:

Hypothesis 6: Future entrepreneurs are more likely to choose occupations that require a higher level of skill variety than are non-entrepreneurial individuals.

3.4 Occupational self-employment rate

A high level of self-employment in an occupation might have a positive effect on the probability of an individual employed in that occupation becoming an entrepreneur. For instance, a high self-employment rate might indicate low educational requirements, the absence of specific entry regulation, and/or a small minimum efficient size, thus requiring a relatively small initial investment, as is the case, for example, in many service industries (e.g., street vendors, cleaners, and delivery services).

Furthermore, occupations with high self-employment rates may provide a relatively large number of entrepreneurial role models who can inspire or encourage decisions to become self-employed. This stimulating effect of entrepreneurial role models is found in several empirical studies. For example, Nanda and Sørensen (2010) show that the presence of workplace peers with entrepreneurial experience increases an individual's propensity to become self-employed. Bosma et al. (2012) find that the entrepreneurial role models most relevant to someone's decision to become self-employed are of a more personal nature, such as colleagues, peers, and professional networks, rather than those in the media. Therefore, observation of entrepreneurial careers in the occupational peer group might increase an individual's willingness to start an own business. Moreover, in many professions characterized by high self-employment, such as medicine, architecture, and law, there are established and familiar

business models, the existence of which may facilitate recognition of entrepreneurial opportunities, as well make it easier to obtain needed resources (e.g., financing from a bank because the bank will already have experience with and understand solo practice). Based on these considerations we expect:

Hypothesis 7: Choosing an occupation characterized by high self-employment increases an individual's propensity to become an entrepreneur.

4. Data

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 with about 21,000 participants per annum (for details, see Haisken De-New and Frick, 2005; Wagner, Frick and Schupp, 2007). This database contains detailed information on the respondents' socio-demographic situation, their education, their income and occupational dynamics, as well as their personality traits. The empirical analysis in this paper covers the period between 2004 and 2009.

We also have detailed data on occupation-specific characteristics provided by the Federal Employment Agency (*Bundesagentur für Arbeit, BA*). These data include the following information for different classes of occupations (*Klassifikation der Berufe 1992, KldB'92*): the number of registered short-term unemployed (less than one year) by target occupation, the number of registered long-term unemployed (longer than one year), the number of job openings by type of occupation, the number of employees subject to compulsory social insurance payments, and median wages in each occupation. Furthermore, we employ data from a survey of 20,000 employees in Germany conducted in 2006 by the German Federal Institute for Vocational Education and Training (*Bundesinstitut für Berufsbildung*) in cooperation with the German Federal Institute for Occupational Safety and Health (*Bundesanstalt für*

Arbeitsschutz und Arbeitsmedizin). These data contain detailed information on occupational skill requirements. We also employ data on occupational self-employment rates at the two-digit level of the national classification of occupations. These data are from the German Micro-Census of the Federal Statistical Office (*Statistisches Bundesamt*; see Statistisches Bundesamt, 2009).

We restrict the analysis to individuals between 18 and 64 years of age 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 in alternative civilian service, as well as persons 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. Furthermore, we exclude persons in the extreme percentiles of the wage distribution (the 5th and the 95th percentile) when calculating occupational wage deviations in order to avoid possible distortions caused by outliers.

The longitudinal structure of the data allows us to identify switches from paid employment into self-employment, which we use as a proxy for new venture creation. This empirical measure is used frequently in the economics literature on entrepreneurship (Parker, 2009b). After deleting all observations for which variables of interest have missing values, the sample comprises information for 322 persons who switched from paid employment to self-employment. This corresponds to 0.89 percent of the whole sample. For comparison, the average start-up rate for the same period according to the German Micro-Census[4] is 0.91 percent.

[4] 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. For more details about self-employment statistics based on the German Micro-Census, see Fritsch, Kritikos, and Rusakova (2012).

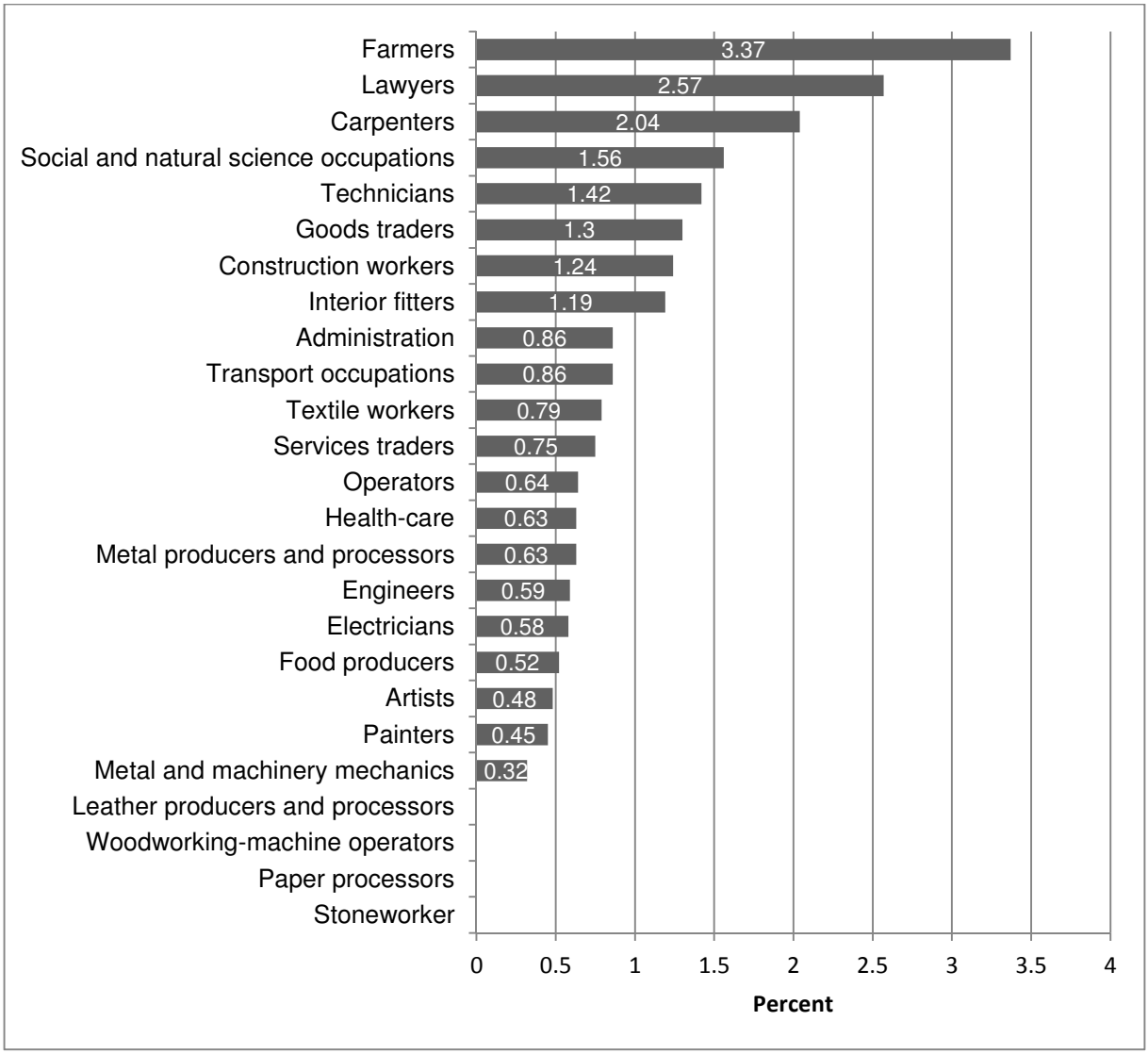

Figure 1: Yearly start-up rate by previous occupation in paid employment (Source: SOEP 2004–2009)

Start-up rates by previous occupation are shown in Figure 1. The figure reveals that some occupations, such as stoneworkers, paper processors, woodworking-machine operators, or leather processors, generate virtually no entrepreneurs. The highest start-up rates are observed among farmers (3.36 percent), lawyers (2.57 percent), carpenters (2.04 percent), and social and natural scientists (1.56 percent). Hence, there are pronounced differences in the propensity to start an own business across occupations, differences that need explanation.

4.2 Occupation-specific determinants of entrepreneurship

Occupation-specific characteristics used in our analysis of varying propensity for start-up across occupations include:

- The *short-term unemployment rate*, that is, the average annual number of registered unemployed persons who have been unemployed for less than one year over the total number of employees at the level of *Berufsordnungen*[5] in the national classification of occupations (KldB'92). The *long-term unemployment rate* refers to individuals who have been unemployed for more than one year. Unemployed individuals were assigned to target occupations, that is, those occupations in which they would like to find a job. We make a clear distinction between short-term and long-term occupational unemployment rates, since employment risk may vary both according to the level and the type of unemployment that prevails in an occupation.
- The *job openings rate* measured by the number of registered open job positions over the number of employees at the *Berufsordnungen* level of the KldB'92.
- *Average skill variety* is calculated as the average number of expert skills[6] that individuals use in their occupation at the three-digit level of the national classification of occupations (KldB'92). Although these data were available only for the year 2006, we apply them to the whole period of analysis based on the assumption that occupational skill requirements did not change significantly during this period.

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[5] 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.

[6] Information on the following skills is available: natural scientific skills, manual/craft skills, pedagogic skills, legal skills, skills in project management, medical or custodial skills, skills in layout, design, and visualizing, mathematical and statistical skills, German-language skills (writing, spelling), computer skills in application software, technical skills, commercial/managerial skills, and foreign-language skills.

- The *self-employment rate* measured by the number of self-employed individuals over the number of employees at the *Berufsabschnitte* level in the national classification of occupations.
- The variable *income deviation* was calculated as the deviation of individual monthly gross labor income from the monthly median gross labor income in the respective occupation at the *Berufsgruppen* level of the KldB'92. We use median rather than mean income so as to avoid distortions due to a possibly skewed distribution of occupation-specific income.[7]
- We follow Bonin et al. (2007) in constructing the measure of occupational *earnings risk*, which is the cross-sectional variation in monthly income that cannot be explained by observed heterogeneity of human capital. In particular, we estimate the following Mincer wage regression for a subsample of dependently employed people (Mincer, 1974):

$$\ln(monthly_income_t) = \alpha_0 + \beta_1 * yeas_edu_t + \beta_2 * experience_t + \\ + \beta_3 * \frac{experience_t^2}{100} + \beta_4 * \frac{experience_t^3}{1000} + \beta_5 * tenure_t + \beta_6 * \frac{tenure_t^2}{100} + \beta_7 * \\ east_t + \gamma * occ_dummies_t + \varepsilon_t,$$

where occupational dummies are constructed using the KldB'92 at the three-digit level. The occupation-specific variance of the residuals is our measure of earnings risk. Although this measure does not reflect all aspects of earnings risk, such as unemployment risk, it is appropriate because, conditional on being employed, it reveals the uncertainty associated with earnings variability, which is independent of an individual's own human capital investments.

[7] On average, the individual gross labor income reported by the SOEP respondents is somewhat lower than the median value of occupation-specific gross labor income from the Federal Employment Agency. Since the latter figures are based on the employers' accounting system and, therefore, have to be regarded as correct, the obvious explanation for the difference is the tendency of SOEP respondents to underreport their income. There is no significant variation in the level of these differences across industries.

4.3 Individual determinants of entrepreneurship

Previous research reveals a number of individual characteristics that may influence the decision to become an entrepreneur (for an overview, see Parker, 2009b). We control for such influences by including a wide set of control variables in our analysis. These include standard demographic characteristics such as age, gender, marital status, and nationality. We also include human capital variables such as the number of years spent in formal education and its squared value in order to control for a possibly nonlinear relationship between education and entrepreneurship (see Poschke, 2012). Other control variables are the number of years spent unemployed as well as a binary variable that controls for whether an individual's place of residence is in East Germany since there might be "cultural" differences between East and West Germans with regard to willingness to become self-employed due to 40 years of a socialist regime in East Germany (see Fritsch et al., 2012, Fritsch and Rusakova, 2012). A binary variable controls for parental self-employment when the respondent was 15 years old. Since transition from paid employment to self-employment is not necessarily voluntary, we additionally control for the self-reported probability of losing the current job in dependent employment within the next two years.[8] Finally, since both vocational and entrepreneurial choice may be associated with willingness and ability to bear risk, we employ a variable that measures general risk attitude on an 11-point Likert scale.[9]

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[8] The corresponding question is: "How likely is it that you will lose your job within the next two years?" The respondents could assess this probability on an 11-step scale ranging from 0 (definitely not) to 100 (definitely).

[9] The question for assessing a person's general risk attitudes is: "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?" This question has been included in SOEP every two years starting in 2004. For waves when this question was not asked, we impute the values from the previous year under the assumption that willingness to take risk remains constant over short periods of time.

5. Results

We first describe the differences we find between those persons who start an own business and those who remain in dependent employment or switch to another dependent employment position (Section 4.1). The multivariate analysis is conducted in two steps. In the first, we analyze how the characteristics of the occupational environment and the income attained in dependent employment influence a person's decision to transition into self-employment, remain in dependent employment, or change employers (Section 4.2). In the second step, we compare entrepreneurs and non-entrepreneurs with regard to their occupational environments at the time they first entered the labor market (Section 4.3). This analysis is expected to reveal the importance of occupational characteristics in choosing an occupation.

5.1 Descriptive evidence

Table 1 contains descriptive statistics for all independent variables and Table A1 in the Appendix provides a correlation matrix. We additionally consider a subgroup of employees who have switched jobs but remained in paid employment since this group is probably more similar to the group of entrepreneurs with regard to unobserved characteristics.

According to our hypotheses, occupational environment should have a significant impact on propensity to start an own business. And, indeed, we do find that the short- and long-term unemployment rates of the occupations in which founders were previously employed are on average significantly higher than those for the occupations of those who remained in dependent employment (8.2 and 4.9 percent, respectively; see Table 1) (Hypothesis 1). Occupations in which founders were previously employed tend to be associated with a higher earnings risk than occupations in which employees work (Hypothesis 2). Interestingly, median wages in the occupations from which the founders came are not statistically different from median wages in the occupations of those who stay in dependent employment (Hypothesis 3). However, when comparing business founders

Table 1: Descriptive statistics

Variable	Business founders		Employees		Employees with job change	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Short-term unemployment rate (t-1)	0.099	0.065	0.082***	0.059	0.088***	0.061
Long-term unemployment rate (t-1)	0.057	0.049	0.049***	0.044	0.052*	0.044
Occupational earnings risk (t-1)	0.656	0.184	0.563***	0.181	0.597***	0.187
Occupational median wages (t-1)	2,941.344	989.289	2,872.049	830.8037	2,814.25*	892.2897
Deviation of individual wages from occupational median wages (t-1)	-840.126	1,406.721	-520.805***	1,086.494	-903.772	1,131.317
Share of job openings (t-1)	0.017	0.028	0.012***	0.017	0.014**	0.021
Average skill variety (t-1)	3.171	1.314	2.962***	1.239	2.928***	1.264
Self-employment rate (t-1)	0.116	0.090	0.096***	0.061	0.101***	0.065
Years of formal education	13.354	2.748	12.744***	2.653	12.991**	2.710
Age	40.581	10.317	42.697***	10.571	35.739***	10.332
Male (1 = yes, 0 = no)	0.590	0.493	0.497***	0.500	0.496***	0.500
Married (1 = yes, 0 = no)	0.565	0.497	0.634**	0.482	0.457***	0.498
Foreigner (1 = yes, 0 = no)	0.065	0.247	0.041**	0.198	0.054	0.225
East Germany (1 = yes, 0 = no)	0.233	0.423	0.240	0.427	0.242	0.428
Either parent self-employed (1 = yes, 0 = no)	0.180	0.385	0.081***	0.272	0.100***	0.299
Experienced years of unemployment	0.667	1.500	0.394***	1.107	0.618	1.277
Probability of job loss (t-1)	27.267	31.405	21.350***	24.465	32.516***	31.128
Willingness to take risk	5.714	2.275	4.644***	2.144	5.011***	2.175
Number of observations	322		35,916		3,546	

Notes: t-test of equal means as compared to the reference group of business founders. ***: statistically significant at the 1% level; **: statistically significant at the 5% level; *: statistically significant at the 10% level.

with dependently employed job changers, we find that job changers tend to be in occupations with significantly lower median wages as compared to the occupations of founders. The income that founders earned in their previous paid employment was significantly more below the occupation-specific median wage than the income of those who remained in dependent employment (Hypothesis 4).[10] Remarkably, there is no statistically significant difference of the negative deviation from the median wage between founders and job changers. The share of job openings in the occupation in which founders were previously employed (1.7 percent) is significantly higher than in the occupations of their dependently employed counterparts (1.2 percent) (Hypothesis 5). Moreover, on average, business founders are more likely to come from occupations that require a relatively large number of skills (Hypothesis 6). Finally, the average self-employment rate in the occupations engaged in by future entrepreneurs is 11.6 percent, which is significantly higher than the average self-employment rate in the occupations of paid employees (9.6 percent) (Hypothesis 7).

With regard to individual characteristics, the differences we find between business founders and employees, as well as between business founders and job switchers, are in line with previous evidence (see Parker, 2009b). The distribution of occupation-specific determinants of entrepreneurship is shown in Table A2 in the Appendix and reveals strong differences with regard to employment risk, earnings risk, and self-employment rates across occupations.

5.2 Multivariate analysis of the effect of occupational environment on the decision to set up an own business

We test our hypotheses by estimating a random effects probit model. The dependent variable equals 1 if a transition from paid employment into self-employment took place in the current wave of the panel; it is 0 if an individual remained in paid employment. We apply a random effects

[10] The average amount of this difference is negative for all three groups, probably due to a tendency to underreport personal income in the SOEP.

estimator due to the time-invariant character of a number of control variables, such as demographic characteristics, that have been found to significantly affect the start-up decision (for an overview, see, e.g., Parker, 2009b).[11]

Table 2 shows the results of regressions for explaining the probability of becoming self-employed with the lagged values of characteristics of the occupational environments in which people worked as dependent employees the previous year. As these occupation-specific variables are highly correlated (see Table A1 in the Appendix), they enter the model separately. In line with Hypothesis 1, the results reveal a statistically significant positive coefficient for the short-term unemployment rate in dependent employment. This suggests that an occupational environment with a high level of frictional unemployment, which may indicate frequent job changes, has a positive effect on the propensity to start an own business. A statistically significant effect is also observed for the long-term unemployment rate, indicating that some of the switches into self-employment are likely due to poor job opportunities in the labor market. In accordance with Hypothesis 2, we find that business founders are more likely to come from occupations with high earnings risk. We do not find a statistically significant effect of occupation-specific median wages on the probability of switching to self-employment, as stated in the Hypothesis 3. However, those people whose income is in lower percentiles of the occupation-specific income distribution are more likely to switch from paid employment into self-employment than are those whose income is in higher percentiles of the distribution (Hypothesis 4). This result suggests that entrepreneurs might be hoping to increase their incomes by founding an own business. Furthermore, the strongly positive coefficient of the

[11] A fixed effects estimator would drop these time-invariant covariates. Another problem with the fixed effects estimator arises when individuals in the panel do not change their employment status (e.g., most individuals in our sample remain in paid employment). 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.

Table 2: Determinants of a switch from paid employment to self-employment—results for the full sample

	I	II	III	IV	V	VI	VII	VIII
Characteristics of occupational environment								
Short-term unemployment rate (t-1)	2.172***							
	(0.564)							
Long-term unemployment rate (t-1)		2.288***						
		(0.813)						
Occupational earnings risk (t-1)			1.448***					
			(0.178)					
Occupational median wages (t-1)				-0.00001				
				(0.000)				
Wage deviation (t-1)					-0.0002***			
					(0.000)			
Share of job openings (t-1)						5.470***		
						(1.522)		
Average skill variety (t-1)							0.0425	
							(0.0358)	
Self-employment rate (t-1)								1.767***
								(0.487)
Individual characteristics								
Years of education	0.438***	0.417**	0.343**	0.371**	0.322*	0.386**	0.352**	0.359**
	(0.168)	(0.175)	(0.153)	(0.176)	(0.173)	(0.177)	(0.178)	(0.171)
Years of education, squared	-0.013**	-0.013**	-0.010*	-0.011*	-0.009	-0.012*	-0.011*	-0.011*
	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Age	0.044	0.046	0.042	0.051*	0.076**	0.051*	0.052*	0.051*
	(0.028)	(0.029)	(0.026)	(0.030)	(0.031)	(0.030)	(0.030)	(0.029)
Age, squared	-0.001*	-0.001*	-0.001*	-0.001*	-0.001**	-0.001*	-0.001*	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 2 (continued)

Male (1 = yes, 0 = no)	0.176**	0.192**	0.272***	0.206**	0.316***	0.178**	0.190**	0.200**
	(0.079)	(0.084)	(0.075)	(0.086)	(0.092)	(0.085)	(0.086)	(0.083)
Married (1 = yes, 0 = no)	-0.035	-0.038	-0.025	-0.044	-0.056	-0.041	-0.049	-0.044
	(0.084)	(0.087)	(0.079)	(0.089)	(0.088)	(0.090)	(0.090)	(0.087)
Foreigner (1 = yes, 0 = no)	0.283*	0.304*	0.265*	0.332*	0.338*	0.329*	0.349**	0.328*
	(0.165)	(0.171)	(0.152)	(0.175)	(0.173)	(0.176)	(0.177)	(0.170)
East Germany (1 = yes, 0 = no)	-0.125	-0.126	-0.109	-0.111	-0.148	-0.12	-0.102	-0.109
	(0.091)	(0.095)	(0.085)	(0.097)	(0.096)	(0.097)	(0.098)	(0.094)
Either parent self-employed (1 = yes, 0 = no)	0.607***	0.631***	0.551***	0.652***	0.635***	0.662***	0.654***	0.614***
	(0.122)	(0.137)	(0.110)	(0.130)	(0.136)	(0.130)	(0.131)	(0.127)
Experienced years of unemployment	0.100***	0.101***	0.084***	0.112***	0.098***	0.107***	0.117***	0.108***
	(0.027)	(0.029)	(0.025)	(0.029)	(0.029)	(0.029)	(0.029)	(0.028)
Willingness to take risk	0.118***	0.122***	0.117***	0.126***	0.127***	0.125***	0.126***	0.123***
	(0.018)	(0.019)	(0.017)	(0.019)	(0.019)	(0.019)	(0.019)	(0.018)
Probability of job loss (t-1)	0.005***	0.005***	0.005***	0.006***	0.005***	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Intercept	-8.816***	-8.738***	-8.598***	-8.506***	-8.829***	-8.720***	-8.488***	-8.461***
	(1.422)	(1.603)	(1.284)	(1.479)	(1.590)	(1.489)	(1.496)	(1.458)
Number of observations	36,238	36,238	36,238	36,238	36,238	36,238	36,238	36,238
Log likelihood	-1,709	-1,712	-1,681	-1,716	-1,704	-1,710	-1,715	-1,709
Chi2	96.93***	68.33***	130.9***	89.62***	73.56***	93.60***	86.69***	90.78***

Notes: The results of random effects probit regression for panel data are reported. Binary dependent variable equals 1 if a switch from paid employment into self-employment occurred in the current wave, and it equals 0 if a respondent remained in paid employment. Standard errors in parentheses. ***: statistically significant at the 1% level; **: statistically significant at the 5% level; *: statistically significant at the 10% level.

share of job openings in an occupation is in accordance with Hypothesis 5, which states that entrepreneurs are more likely to choose occupations that comply with their taste for variety.

We find no statistically significant effect of average skill variety in an occupation on the probability of switching to self-employment, as proposed in Hypothesis 6. This result is surprising given that the descriptive evidence indicated such an effect. Perhaps the effect of the skill variety indicator is assigned to a person's years of formal education as a consequence of the considerable correlation with the measure for skill variety. Finally, we find that a higher self-employment rate in the previous occupation increases the probability of entrepreneurial entry, thus supporting Hypothesis 7.

Based on these results, it is not clear, however, whether the conditions in the occupation-specific labor market have a general impact on job mobility, be it into self-employment or into dependent employment, or whether they particularly induce transitions into self-employment. To shed more light on this issue, we test whether occupation-specific characteristics affect the probability of job switches within paid employment and into self-employment differently (Table 3). In this analysis, the dependent variable equals 1 if a person has switched from paid employment into self-employment and it equals 0 if a person has changed her or his job but still remained dependently employed. We find that the main results for the occupation-specific determinants of self-employment remain largely unchanged (see also the summary of results in Table 6). Interestingly, there are some differences with regard to individual determinants of entrepreneurship. The self-reported probability of losing the job within the next two years had a significant and positive effect in the full sample, but this effect vanishes in the analysis of job switchers. Moreover, a significant and positive effect of time spent unemployed also disappears in this model specification. This finding suggests that entrepreneurs and job switchers are similar with regard to their necessity motivations for changing jobs.

Table 3: Determinants of a switch from paid employment into self-employment—results for job-switchers

	I	II	III	IV	V	VI	VII	VIII
Characteristics of occupational environment								
Short-term unemployment rate (t-1)	2.981***							
	(0.761)							
Long-term unemployment rate (t-1)		2.399**						
		(1.018)						
Occupational earnings risk (t-1)			1.226***					
			(0.232)					
Occupational median wages (t-1)				0.00003				
				(0.000)				
Wage deviation (t-1)					-0.0001***			
					(0.000)			
Share of job openings (t-1)						3.536*		
						(1.806)		
Average skill variety (t-1)							0.0587	
							(0.0420)	
Self-employment rate (t-1)								1.844***
								(0.597)
Individual characteristics								
Years of education	0.389*	0.331	0.282	0.276	0.259	0.293	0.256	0.290
	(0.202)	(0.202)	(0.190)	(0.204)	(0.203)	(0.201)	(0.203)	(0.198)
Years of education, squared	-0.012*	-0.011	-0.009	-0.009	-0.009	-0.009	-0.009	-0.009
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Age	0.109***	0.111***	0.111***	0.115***	0.132***	0.112***	0.116***	0.114***
	(0.036)	(0.037)	(0.035)	(0.037)	(0.038)	(0.037)	(0.037)	(0.036)
Age, squared	-0.001**	-0.001**	-0.001**	-0.001**	-0.001**	-0.001**	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male (1 = yes, 0 = no)	0.219**	0.229**	0.295***	0.224**	0.297***	0.211**	0.208**	0.232**
	(0.098)	(0.099)	(0.096)	(0.102)	(0.106)	(0.099)	(0.101)	(0.098)

Table 3 (continued)

Married (1 = yes, 0 = no)	-0.011	-0.023	-0.013	-0.031	-0.035	-0.023	-0.041	-0.029
	(0.108)	(0.109)	(0.103)	(0.110)	(0.110)	(0.108)	(0.110)	(0.107)
Foreigner (1 = yes, 0 = no)	0.22	0.259	0.237	0.297	0.29	0.281	0.313	0.283
	(0.202)	(0.203)	(0.192)	(0.207)	(0.206)	(0.203)	(0.207)	(0.201)
East Germany (1 = yes, 0 = no)	-0.072	-0.063	-0.039	-0.035	-0.056	-0.049	-0.028	-0.038
	(0.114)	(0.115)	(0.109)	(0.117)	(0.117)	(0.115)	(0.116)	(0.113)
Either parent self-employed (1 = yes, 0 = no)	0.607***	0.619***	0.565***	0.625***	0.631***	0.623***	0.619***	0.571***
	(0.148)	(0.150)	(0.140)	(0.153)	(0.153)	(0.150)	(0.152)	(0.147)
Experienced years of unemployment	-0.031	-0.029	-0.031	-0.019	-0.032	-0.024	-0.017	-0.024
	(0.037)	(0.037)	(0.035)	(0.038)	(0.038)	(0.037)	(0.037)	(0.037)
Willingness to take risk	0.119***	0.121***	0.117***	0.125***	0.126***	0.123***	0.124***	0.124***
	(0.024)	(0.024)	(0.023)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Probability of job loss (t-1)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Intercept	-8.588***	-8.094***	-8.268***	-7.726***	-8.019***	-7.756***	-7.626***	-7.845***
	(1.689)	(1.676)	(1.589)	(1.681)	(1.703)	(1.656)	(1.672)	(1.640)
Number of observations	3,868	3,868	3,868	3,868	3,868	3,868	3,868	3,868
Log likelihood	-1,015	-1,021	-1,008	-1,023	-1,020	-1,021	-1,022	-1,019
Chi2	68.36***	64.81***	79.10***	61.23***	61.55***	64.36***	62.15***	67.11***

Notes: The results of random effects probit regression for panel data are reported. Binary dependent variable equals 1 if a switch from paid employment into self-employment occurred in the current wave, and it equals 0 if a respondent changed jobs but remained in paid employment. Standard errors in parentheses. ***: statistically significant at the 1% level; **: statistically significant at the 5% level; *: statistically significant at the 10% level.

5.3 Entrepreneurial choice and occupational characteristics at time of labor market entry

To this point we have analyzed the characteristics of the occupation a founder was working in the year before he or she reported being self-employed. This was based on the assumption that the most recent experiences have the strongest influence on current decision making. However, this approach does not allow making any inferences with regard to self-selection of persons into occupations based on their preferences because the most recent occupational choice might have been affected by previous career choices (e.g., the accumulated profession-specific human capital) and working experience. Moreover, it is plausible to assume that people make vocational choices based on current economic conditions *and* their expectation about the future. If these conditions worsen, individuals may react by becoming self-employed. If there is self-selection of entrepreneurial individuals into certain occupational environments, this selection process should be best observed at the time of labor market entry since the first vocational choice is more likely to be based on preferences, attitudes, and expectations. Moreover, the level of profession-specific human capital possessed is generally relatively low at the time of labor market entry.[12] For these reasons, we analyze whether entrepreneurs are more likely than non-entrepreneurs to choose certain occupations at the beginning of their careers, and whether the characteristics of the occupations chosen at the time of labor market entry influence future transition into self-employment.

For this purpose, we analyze a subsample of individuals for whom we have information about their occupation at the time of labor market entry. Due to data constraints, this analysis is restricted to those individuals who entered the labor market between 1999 and 2009. Thus, we can observe employment histories of respondents up to 10 years after the start of their careers. We distinguish between those persons who have experienced at least one spell in self-employment during the period of analysis and those

[12] Since people may have specialized in their education before entering the labor market, e.g., by choosing a certain subject to study at university, they can have considerable profession-specific human capital when entering the labor market for the first time.

who have not been self-employed. During the observation period, about 4.9 percent of the individuals in the sample reported being self-employed at least once. This analysis is somewhat constrained in that it covers only rather young cohorts of respondents and it is known from previous research that business founders are on average in their mid-30s or early 40s. Nevertheless, it can be assumed that early switches into self-employment are likely to be made by highly entrepreneurial individuals whose strong desire to set up an own business is mostly due to attitudes and preferences rather than based in experience.

Table 4 sets out descriptive statistics with regard to the characteristics of entry-level occupations of people with and without a spell of self-employment. In contrast to the analysis of the last occupation before transitioning into self-employment (Table 1), the first occupations of people with a spell of self-employment are characterized by, on average, significantly lower short-term and long-term unemployment rates compared to those of people who do not report self-employment during the observation period. Moreover, first occupations of the future self-employed have an on average significantly higher share of job openings, higher earnings risk, and a median wage that is about 700 Euros higher compared to the occupations of people without a spell of self-employment. Future entrepreneurs are more likely to have first occupations that are characterized by necessitating greater skill variety than non-entrepreneurs. However, there are no significant differences between the groups with regard to occupation-specific self-employment rates.

For a multivariate analysis we again apply probit regression where the dependent variable equals 1 if a respondent has at least once reported a spell of self-employment during the observation period; 0 otherwise (Table 5). As in the previous analysis (Section 5.2), the characteristics of the occupations at the time of labor market entry are included in the model

Table 4: Characteristics of first occupations of people with and without a spell of self-employment

	Without a spell of self-employment		With a spell of self-employment	
	Mean	Standard deviation	Mean	Standard deviation
Characteristics of occupational environment at time of labor market entry				
Short-term unemployment rate	0.104**	0.062	0.076	0.045
Long-term unemployment rate	0.054**	0.034	0.038	0.023
Occupational earnings risk	0.592**	0.148	0.662	0.194
Median wages	2485.625***	734.344	3,166.956	689.317
Job openings rate	0.017***	0.016	0.027	0.028
Average skill set	2.657***	1.174	3.602	0.917
Self-employment rate	0.105	0.075	0.113	0.087
Individual characteristics				
Years of formal education	12.932***	2.566	14.750	1.809
Age	27.492**	4.189	29.433	4.049
Male (1 = yes, 0 = no)	0.463*	0.499	0.300	0.466
Married (1 = yes, 0 = no)	0.292	0.455	0.400	0.498
Foreigner (1 = yes, 0 = no)	0.065	0.247	0.033	0.183
East Germany (1 = yes, 0 = no)	0.209***	0.407	0.500	0.509
Either parent self-employed (1 = yes, 0 = no)	0.178**	0.383	0.333	0.479
Experienced years of unemployment	0.497	1.060	0.230	0.759
Willingness to take risk	5.031	2.103	5.433	2.373
Number of observations	585		30	

Notes: t-test of equal means as compared to the reference group of people with a spell of self-employment. ***: statistically significant at the 1% level; **: statistically significant at the 5% level; *: statistically significant at the 10% level.

separately, whereas the individual-level control variables are included in all specifications of the model. According to this analysis, there is no significant effect of the unemployment rates (short or long term) in first occupation on the propensity to be self-employed in the future (Hypothesis 1). This suggests that it is unlikely that entrepreneurial people self-select into occupations with high unemployment risk. This result is in line with Parker (2009b), who argues that entrepreneurs are not risk lovers but do tend to take calculated risk. Hence, we have reasons to conclude that the motivation for becoming self-employed may stem from bad experiences in the occupation-specific labor market that were not necessarily foreseeable at the time of labor market entry.

Table 5: Occupational characteristics at the time of labor market entry and the probability of future self-employment

	I	II	V	VI	III	IV	VII
Characteristics of occupational environment at time of labor market entry							
Short-term unemployment rate	-0.115						
	(0.096)						
Long-term unemployment rate		-0.217					
		(0.171)					
Occupational earnings risk			0.054*				
			(0.032)				
Occupational median wages				0.00002**			
				(0.000)			
Share of job openings					0.310		
					(0.198)		
Average skill variety						0.013**	
						(0.005)	
Self-employment rate							0.019
							(0.068)
Individual characteristics							
Years of education	0.055**	0.057**	0.061***	0.058***	0.066***	0.049**	0.066***
	(0.025)	(0.024)	(0.021)	(0.020)	(0.023)	(0.021)	(0.022)
Years of education, squared	-0.002**	-0.002**	-0.002***	-0.002***	-0.002***	-0.002**	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age	0.002	0.002	0.002	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Male (1 = yes, 0 = no)	-0.014	-0.013	-0.010	-0.014*	-0.013	-0.013*	-0.014
	(0.009)	(0.009)	(0.008)	(0.008)	(0.010)	(0.008)	(0.009)
Married (1 = yes, 0 = no)	0.028	0.028	0.028*	0.021	0.029*	0.020	0.028*
	(0.017)	(0.017)	(0.017)	(0.013)	(0.017)	(0.013)	(0.017)

Table 5 (continued)

Foreigner (1 = yes, 0 = no)	-0.011	-0.010	-0.010	-0.012	-0.011	-0.009	-0.013
	(0.012)	(0.012)	(0.012)	(0.008)	(0.012)	(0.007)	(0.012)
East Germany (1 = yes, 0 = no)	0.062**	0.061**	0.054**	0.052**	0.061**	0.052**	0.061**
	(0.029)	(0.029)	(0.025)	(0.025)	(0.029)	(0.025)	(0.029)
Either parent self-employed (1 = yes, 0 = no)	0.010	0.009	0.012	0.005	0.007	0.003	0.012
	(0.012)	(0.012)	(0.012)	(0.008)	(0.012)	(0.007)	(0.014)
Experienced years of unemployment	-0.004	-0.003	-0.003	-0.003	-0.004	-0.001	-0.005
	(0.007)	(0.007)	(0.006)	(0.005)	(0.008)	(0.005)	(0.006)
Willingness to take risk	0.003	0.003	0.002	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.003)
Number of observations	615	615	615	615	615	615	615
Log likelihood	-94.77	-94.75	-93.6	-88.96	-94.24	-89.41	-95.44
Chi2	43.64***	43.94***	43.8***	59.86***	43.15***	47.05***	40.26***
Pseudo R2	0.209	0.21	0.219	0.258	0.214	0.254	0.204

Notes: The results of probit regression (marginal effects) are reported. Dependent variable equals 1 if at least one spell of self-employment observed in the first 10 years after labor market entry; 0 otherwise. Robust standard errors in parentheses. ***: statistically significant at the 1% level; **: statistically significant at the 5% level; *: statistically significant at the 10% level.

We find that those people who are become self-employed in the future prefer occupations with high median wages, which is in accordance with Hypotheses 3. This finding suggests that financial motivation plays an important role throughout the careers of entrepreneurs. Hypothesis 2 states that future entrepreneurs will tend to choose occupations with relatively high earning risk, but this idea is only weakly supported by the data. While average skill variety was not statistically significant in explaining switches into self-employment in previous analyses, we now find that the level of skill variety in the first occupation is significantly positive associated with future entrepreneurship, which supports Hypothesis 5. This result is consistent with the idea that entrepreneurs have a taste for variety (Lazear, 2005; Åstebro and Thompson, 2011). This characteristic of future entrepreneurs, however, is evident only in their first vocational choices. Finally, we do not find a significant effect of a higher share of job openings or a higher self-employment rate in the first occupation on the likelihood of becoming self-employed in the future (Hypotheses 4 and 6). Thus, it appears that entrepreneurial types are not more likely to self-select into occupations with high levels of self-employment. This result suggests, instead, that a taste for entrepreneurship emerges over time as a result of observing entrepreneurial career models in one's occupation. Moreover, it might be relatively easy to discover and pursue entrepreneurial opportunities in occupations with high self-employment rates.

6. Discussion and conclusions

That human capital plays a leading role in a person's decision to become self-employed is widely acknowledged in the literature (Lazear, 2004, 2005; Block et al., 2011). Since people tend to spend some time in paid employment before deciding to become self-employed (Fritsch, Kritikos and Rusakova, 2012a), their vocational choices and the experiences they have in dependent employment may significantly influence their future decision to start an own business. Hence, understanding the relationship between occupational environment and entrepreneurship is important

because early vocational choices may be an important determinant of lifelong career outcomes.

In line with the developmental science perspective of entrepreneurship (Obschonka and Silbereisen, 2012), this paper empirically investigated the role of occupational environment in entrepreneurial choice. Based on extant evidence suggesting that people accumulate entrepreneurship-related human capital by choosing career paths that match their preferences and personalities, we analyzed whether risk preferences and the taste for variety of future entrepreneurs also influence their choice of occupational environment. In particular, we investigated the relationship between occupation-specific unemployment risk, earnings risk, occupational skill requirements, and the level of self-employment in an occupation and the probability of switching from paid employment to self-employment. Moreover, we asked whether the specific characteristics of an occupation exert an influence on the entrepreneurial tendencies of people working in them and, if so, which occupation-specific determinants of entrepreneurial choice can be identified.

The differences in the results for the three subsamples analyzed (see Table 6) suggest that different features of the occupational environment play a role at different stages of an individual's career. We found that those who are more likely to become self-employed in the future tend to choose occupations requiring a greater variety of skills early in their careers (Hypothesis 6), which may be an indication of a taste for variety. In particular, such occupations allow the accumulation of a balanced skill portfolio that may be conducive to setting up an own business. Moreover, we find that future entrepreneurs tend to choose occupations with high median wages at the beginning of their careers in paid employment, in support of Hypothesis 3. The desire to earn more money makes entrepreneurs more willing to bear occupational earning risk, that is, the variation in occupation-specific wages that cannot be explained by observed human capital investment (Hypothesis 2), as well as risk associated with setting up an own business. In line with this finding is that

Table 6: Results of hypotheses testing in different types of samples

Hypotheses	Sample		
	Full sample	Job-switchers	Choice of profession
1: Future entrepreneurs are more likely to select occupations with a relatively high employment risk than are non-entrepreneurial individuals.	***	*** **	n.s.
2: Future entrepreneurs are more likely to make riskier occupational choices in terms of earnings risk than are non-entrepreneurial individuals.	***	***	*
3: Future entrepreneurs are more likely to choose occupations that offer higher wages than are non-entrepreneurial individuals.	n.s.	n.s.	**
4: Failure to achieve an expected occupation-specific income is positively associated with the probability of entrepreneurial entry.	***	***	—
5: Future entrepreneurs are more likely to choose occupations with a higher level of job opportunities than are non-entrepreneurial individuals.	***	*	n.s.
6: Future entrepreneurs are more likely to choose occupations that require a higher level of skill variety than are non-entrepreneurial individuals.	n.s.	n.s.	**
7: Choosing an occupation characterized by high self-employment increases an individual's propensity to become an entrepreneur.	***	***	n.s.

Notes: ***: statistically significant at the 1% level; **: statistically significant at the 5% level; *: statistically significant at the 10% level; n.s.: not statistically significant.

failure to achieve the expected occupation-specific income is positively associated with the probability of entrepreneurial entry (Hypothesis 4). However, it is by no means guaranteed that self-employment will result in higher income (cf. Fritsch, Kritikos and Rusakova, 2012a; Hamilton, 2000).

Remarkably, we found no support for the hypothesis that entrepreneurs tend to self-select into occupations with high unemployment risk.

While it appears that future entrepreneurs tend to self-select into occupational environments that require a relatively wide range of skills and promise higher incomes, both skill variety and the average wage level do not contribute to explaining a switch into self-employment later in their careers. Based on the assumption that entrepreneurial persons do not simply lose their preference for high income or their taste for variety over time, this phenomenon must be due to sample-selection effects. Most probably, the most entrepreneurial people, that is, those with the strongest preferences for high income and skill variety, transit into self-employment very early in their careers and, for this reason, are underrepresented in the full sample or the sample of job-switchers, which contains only dependently employed people in the initial year.[13] This would imply that the results for the full sample and for job-switchers pertain particularly to those people who had no strong preference for self-employment when choosing their first occupation. Hence, we can conclude that the findings for the full sample and for the sample of job-switchers mainly reflect the effect of an occupational environment on the decision to set up an own firm.

Characteristics of occupational environment that may foster self-employment of people while they are working in a once chosen occupation include unemployment (Hypothesis 1), relatively high earning risk (Hypothesis 2), failure to achieve an expected occupation-specific income (Hypothesis 4), a relatively high level of job opportunities (Hypotheses 5), and a high occupation-specific self-employment rate (Hypothesis 7). These findings suggest that intentions to become an entrepreneur might emerge if people fail to reach the occupation-specific income or from changing conditions in the occupation-specific labor market, such as increasing unemployment and earning risk. The decision to become self-

[13] An alternative explanation is that, over time, the individual skill set becomes a more important factor in the decision to become self-employed than the average skill requirements in the respective occupation. Unfortunately, our data do not provide any information about a person's individual skill set and, therefore, do not allow testing for such an effect. Moreover, the SOEP data do not provide a sufficient number of cases for investigating full employment histories.

employed in an occupation might be reinforced by high costs of occupational change, such as costs of requalification, obsolescence of human capital, and the like. High levels of occupation-specific job opportunities and self-employment seem to foster switches from paid employment into self-employment. It is remarkable that a high level of occupation-specific self-employment has no statistically significant effect on the decision to start an own business at the time of labor market entry, but only later on in the working life. This suggests that high self-employment in such professions primarily results from observing entrepreneurial career models, from the low amount of human and financial capital necessary for start-up, and/or from the presence of standardized occupation-specific business models of self-employment that are easily understood by financiers. Each of these possibilities, or combinations of them, are promising avenues for future research.

To conclude, this paper sheds some light on entrepreneurs' career choices, particularly on their preferences for certain occupational environments as well as the role that occupational environment plays in the entrepreneurial process. The findings suggest that entrepreneurship should be regarded a dynamic process that evolves, at least in part, from previous career choices. The diverse employment histories of entrepreneurs and, particularly, their choices of risky occupational environments that satisfy their taste for variety, appear to be a part of their strongly preference-based career strategy. However, the importance to entrepreneurial entry of occupation-specific experiences, opportunities, role models, and economic conditions should not be ignored. Hence, future research should focus on the development of entrepreneurial careers and, particularly, on how working environments transmit entrepreneurship-related skills, values, and attitudes to people employed in them.

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Appendix

Table A1: Correlation matrix

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Short-term unemployment rate (t-1)	1																
2	Long-term unemployment rate (t-1)	0.857*	1															
3	Share of job openings (t-1)	0.165*	0.157*	1														
4	Average skill variety (t-1)	-0.412*	-0.497*	-0.010*	1													
5	Self-employment rate (t-1)	0.153*	0.093*	0.049*	-0.377*	1												
6	Occupational earnings risk (t-1)	0.289*	0.342*	0.016*	0.655*	0.137*	1											
7	Occupational median wages (t-1)	-0.497*	-0.521*	-0.123*	-0.001	0.026*	-0.289*	1										
8	Deviation of individual wages from occupational median wages (t-1)	0.122*	0.114*	0.058*	0.117*	-0.007	-0.107*	-0.216*	1									
9	Years of formal education	-0.243*	-0.288*	-0.079*	0.489*	0.089*	-0.135*	0.494*	0.052*	1								
10	Age	-0.087*	-0.029*	-0.091*	0.041*	-0.028*	-0.052*	0.091*	0.225*	0.069*	1							
11	Male (1=yes, 0=no)	0.055*	0.026*	0.145*	0.156*	-0.026*	-0.236*	0.153*	0.323*	-0.032*	-0.015*	1						
12	Married (1=yes, 0=no)	-0.037*	-0.015*	-0.048*	0.027*	-0.018*	-0.057*	0.054*	0.097*	0.013*	0.409*	0.025*	1					
13	Foreigner (1=yes, 0=no)	0.071*	0.070*	0.032*	-0.089*	-0.020*	0.032*	-0.076*	0.014*	-0.098*	-0.0881*	0.032*	0.025*	1				
14	East Germany (1=yes, 0=no)	0.029*	0.031*	0.029*	-0.003	0.025*	0.018*	-0.026*	-0.114*	0.088*	0.024*	-0.015*	-0.01	-0.108*	1			
15	Either parent self-employed (1=yes, 0=no)	-0.008	-0.031*	-0.018*	0.046*	0.035*	0.012*	0.044*	-0.019*	0.074*	-0.007	-0.021*	-0.019*	-0.012*	-0.064*	1		
16	Experienced years of unemployment	0.102*	0.137*	0.044*	-0.151*	-0.002	0.118*	-0.129*	-0.097*	-0.107*	0.040*	-0.047*	-0.020*	0.051*	0.078*	-0.027*	1	
17	Probability of job loss	0.099*	0.082*	0.036*	-0.062*	0.017*	0.099*	-0.046*	-0.122*	-0.054*	-0.138*	-0.009	-0.071*	-0.012*	0.180*	-0.041*	0.106*	1
18	Willingness to take risk	0.041*	0.012*	0.037*	0.054*	0.019*	-0.038*	0.035*	0.054*	0.022*	-0.121*	0.177*	-0.080*	0.013*	0.013*	0.024*	-0.009	-0.0004

Note: * denotes significance at the 5% level.

Table A2: Mean values of characteristics of occupational environments of SOEP respondents 2004–2009

Occupational group	Short-term unemployment rate	Long-term unemployment rate	Share of job openings	Earnings risk	Median wages	Average skill set	Self-employment rate
Farmers	0.182	0.130	0.013	0.680	1,950.4	2.958	0.322
Stoneworkers	0.083	0.035	0.009	0.527	2,231.3	3.151	0.217
Paper processors	0.077	0.053	0.007	0.506	2,696.3	1.953	0.055
Wood-working technician	0.135	0.101	0.004	0.278	2,171.7	1.000	0.123
Metal producers and processors	0.061	0.038	0.037	0.371	2,811.9	2.230	0.018
Metal and machinery mechanics	0.079	0.037	0.018	0.459	2,592.0	2.799	0.076
Electricians	0.079	0.039	0.025	0.418	2,692.2	3.314	0.076
Textile workers	0.171	0.167	0.008	0.513	1,878.5	1.246	0.158
Leather producers and processors	0.104	0.105	0.018	0.529	1,897.0	5.793	0.264
Food producers	0.162	0.102	0.018	0.581	1,709.0	1.764	0.078
Constructors	0.210	0.117	0.019	0.474	2,434.7	2.194	0.075
Interior fitters	0.227	0.111	0.031	0.560	2,273.6	2.906	0.260
Carpenters	0.190	0.085	0.018	0.594	2,275.8	2.674	0.187
Painters	0.229	0.105	0.024	0.449	2,341.0	2.622	0.146
Operators	0.049	0.028	0.014	0.480	4,740.1	5.435	0.146
Engineers	0.033	0.021	0.009	0.435	3,663.2	4.132	0.046
Technicians	0.124	0.077	0.010	0.674	2,195.7	2.093	0.052
Goods traders	0.046	0.022	0.020	0.583	3,427.2	3.119	0.173
Services traders	0.103	0.078	0.013	0.622	2,263.9	1.056	0.042
Transport	0.055	0.035	0.006	0.566	3,303.1	3.218	0.076
Administration	0.113	0.083	0.027	0.464	2,811.7	2.894	0.092
Lawyers	0.130	0.069	0.007	0.734	3,260.2	3.066	0.431
Artists	0.039	0.014	0.007	0.582	2,417.6	3.206	0.136
Healthcare professionals	0.068	0.032	0.007	0.543	3,114.4	3.734	0.076
Social & natural sciences professionals	0.163	0.116	0.018	0.781	1,457.6	1.207	0.133
Total	0.083	0.049	0.012	0.563	2,872.7	2.963	0.097
Number of observations	36,238	36,238	36,238	36,238	36,238	36,238	36,238