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NECESSITY AND OPPORTUNITY ENTREPRENEURS IN GERMANY: CHARACTERISTICS AND EARNINGS DIFFERENTIALS**

ABSTRACT

In this paper we discuss necessity and opportunity entrepreneurship. We use panel data to analyze how these two types of entrepreneurs differ in general, and in their ability to discover and exploit entrepreneurial opportunities. We find that the opportunities exploited by opportunity entrepreneurs are generally more profitable than are those exploited by necessity entrepreneurs. We also find that the determinants of success differ to a strong degree. Standard wage equations seem to work better for opportunity than for necessity entrepreneurs. Our findings indicate a need to distinguish between the two groups in entrepreneurship theory and practice.

JEL-Classification: C23, J23, J24, J31, M13.

Keywords: Earnings Equation; Necessity Entrepreneurship; Opportunity Discovery; Opportunity Entrepreneurship; Opportunity Exploitation.

1 INTRODUCTION

Since 2001, the Global Entrepreneurship Monitor (GEM) has differentiated between two different types of entrepreneurship, necessity and opportunity entrepreneurship (Reyn-

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olds et al. (2002); Sternberg et al. (2006)). The difference between the two types of entrepreneurs is in the motivation of the entrepreneurs to start their venture. Opportunity entrepreneurs are viewed as entrepreneurs who start a business in order to pursue an opportunity, while necessity entrepreneurship is more need-based.

The distinction between necessity and opportunity entrepreneurship becomes increasingly relevant in entrepreneurship research, chiefly because of its practical impact in terms of recent policy initiatives aimed at necessity entrepreneurs. In many industrialized countries, economic policy differs greatly between these two types of entrepreneurs. For example, in Germany, the state uses funds to promote entrepreneurship as a way out of unemployment and thereby (almost exclusively) supports necessity entrepreneurs (Bergmann and Sternberg (2007); for an overview of such policies, see Meager (1996))[1]. So far, the academic discussion focuses on each group's impact on economic growth and job creation (Wennekers et al. (2005); Wong et al. (2005)), which is essentially a *macro* perspective. Our paper is different, in that we analyze necessity and opportunity entrepreneurship from a *micro* perspective (see also Block and Sandner (2009); Block and Koellinger (2009)). Doing so enables us to theorize about the differences between necessity and opportunity entrepreneurship. We then empirically test whether these differences really exist and, based on our results, discuss whether distinguishing between the two types of entrepreneurship in entrepreneurship theory and practice is justified. Since there is no comprehensive theory on the issue of necessity and opportunity entrepreneurship, some parts of our paper are exploratory in nature.

For our study, we use data from the German Socio Economic Panel Study (GSOEP) and select persons who are self-employed. We use information about the way these individuals came to become self-employed and use this information as a selection criterion for necessity and opportunity entrepreneurs. Using this sample, we address three research questions: What are the respective socio-economic characteristics of each group? Which group is generally more successful with opportunity recognition and exploitation, in that it reports higher earnings? What are the respective determinants of success?

We find that the two groups differ, particularly with respect to human capital. We also find that on average, opportunity entrepreneurs exploit more profitable opportunities than do necessity entrepreneurs. The respective determinants of success differ strongly; the most widely used specification of a wage equation in the labor economics literature – the Mincer equation – works better with opportunity than with necessity entrepreneurs; and education and general labor market experience have a positive impact on the earnings of opportunity entrepreneurs, but not on those of necessity entrepreneurs. However, we find that specific vocationally oriented education is related positively to the earnings of necessity entrepreneurs but not to those of opportunity entrepreneurs.

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1   In Germany, the policies promoting entrepreneurship out of unemployment have changed over the years. The "Ich-AG" (introduced in January 2003) and the "Überbrückungsgeld" (introduced in January 1986) are two important labor market instruments that concern the time period covered in our paper. See Caliendo et al. (2007) and Sandner et al. (2008) for a description of the "Ich-AG" and its policy goals. See Wießner (2000) for a description of the "Überbrückungsgeld".

Based on these results, our study contributes to entrepreneurship research in two ways. First, because we objectively discuss the classification of necessity and opportunity entrepreneurship and relate it to the concept of opportunity discovery and exploitation. Second, because we show empirically that the two types of entrepreneurs differ with respect to their socioeconomic characteristics, the quality of opportunities exploited and their respective determinants of success. We conclude that the differences we uncover indicate a need to differentiate between the two groups in entrepreneurship theory and practice.

The paper proceeds as follows. In Section 2 we relate the concept of necessity and opportunity entrepreneurship to entrepreneurship theory and formulate our research questions. In Section 3 we introduce the data, and in section 4 we describe our empirical model. Section 5 reports the results. Section 6 compares our findings to other entrepreneurship research. Section 7 discusses some practical implications of our findings.

2 OPPORTUNITIES EXPLOITED BY NECESSITY AND OPPORTUNITY ENTREPRENEURS – THEORY

2.1 ENTREPRENEURIAL OPPORTUNITIES AND THE ENTREPRENEUR

We define an entrepreneurial opportunity as a situation in which new goods or services can be introduced and sold at higher price than their cost of production (Casson (1982)). Although entrepreneurial opportunities themselves are objective in nature, their recognition and exploitation by individuals is a subjective process (Shane and Venkatamaran (2000)). For entrepreneurship to take place, an opportunity needs to be both discovered and exploited. Both steps involve a significant number of subjective aspects. Entrepreneurial opportunities exist primarily because different members of society have different beliefs about the relative value of resources, in particular the prices at which markets should clear (Kirzner (1997)). We ask why some people discover entrepreneurial opportunities and others do not. Apart from being a question of pure luck, there may be two particular reasons. First, prior information, such as that gained through industry experience or education, might be necessary to identify a particular opportunity (Shane (2000)). Second, specific cognitive properties might be necessary to discover the value of an opportunity (see, e.g., Busenitz and Barney (1997); Corbett (2007); Shaver and Scott (1991)).

As with the discovery of the opportunity, the decision to exploit an opportunity not only depends on the objective nature of the opportunity itself, but also on subjective aspects that have to do with the potential entrepreneur. An individual who acts in a rational way will only exploit an opportunity when the opportunity has a higher expected value than the opportunity cost of the best alternative. Since individuals are likely to have different alternatives with different payoffs, the propensity to exploit a particular opportunity should then differ on an individual level (Amit et al. (1995)). Furthermore, to exploit an opportunity, people might differ in how they consider their costs for obtaining the resources. Better capital availability or stronger social ties make it easier to obtain the resources that are necessary to exploit an opportunity, and thus have been found to be positively related to the chance of an opportunity being exploited (Aldrich and Zimmer

(1986); Evans and Leighton (1989)). Another determinant is how useful the information from a previous employment might be, and its transferability (Cooper et al. (1989)). Necessity and opportunity entrepreneurs are likely to differ in several of these aspects.

2.2 Definition of Necessity and Opportunity Entrepreneurship

The GEM introduced the terms necessity and opportunity entrepreneurship in 2001 in its statement that a distinction should be made between entrepreneurship that reflects a voluntary pursuit of opportunity and entrepreneurship that reflects the necessity to engage in such activity in the absence of other employment opportunities (Reynolds et. al. (2002)). They clarify by saying that "each respondent was asked to indicate whether he was starting and growing his business to take advantage of a unique market opportunity (opportunity entrepreneurship) or because it was the best option available (necessity entrepreneurship)" (Reynolds et al. (2002)).

We classify necessity and opportunity entrepreneurship in a slightly different manner, but one which is nevertheless consistent with the GEM definition. Our classification focuses on the way the entrepreneur came into entrepreneurship. In particular, we examine the circumstances under which the entrepreneur left her previous job as a paid employee. When a person voluntarily leaves her paid job to set up a business, we classify this person as an opportunity entrepreneur. We argue that this person is drawn into entrepreneurship by a prior discovered entrepreneurial opportunity. We also include those individuals who become entrepreneurs after deliberately moving through several jobs that they used to acquire all the competencies they considered relevant for starting their own business. But when a person leaves her previous job involuntarily (e.g., her place of work closed down or she was fired), we interpret this job change to mean that she was pushed into entrepreneurship by external factors. We define such a situation as necessity entrepreneurship.

The notions of necessity and opportunity entrepreneurship are similar to those of the push and pull motivations for pursuing an entrepreneurial opportunity (Amit and Mueller (1995); Cooper and Dunkelberg (1986); Solymossy (1997)). However, they differ slightly in that according to Solymossy (2005) independent of "[…] whether initiated by push or pull motivation, an opportunity is required to establish entrepreneurship." This is not necessarily the case with necessity entrepreneurship as we define it in this paper. Also, the push notion does not require that an individual leaves her employment involuntarily. She might also leave voluntarily following dissatisfaction with her job. Hence, although we note some similarities between the two concepts, we focus on the GEM-based distinction between necessity and opportunity entrepreneurship.

2.3 Opportunities Exploited by Necessity and Opportunity Entrepreneurs

Kirzner (1985) proposes an "alertness" view of entrepreneurship as a middle ground between the "neoclassical" entrepreneur who maximizes their utility by choosing to pursue an entrepreneurial opportunity and the view of entrepreneurship as a disequilib-

rium phenomenon. Shane (2003) proposes differences in the discovery of opportunities that are related to better information. Other researchers identify three mechanisms that influence access to information valuable for opportunity discovery: life experience (Romanelli and Schoonhoven (2001)), social networks (De Carolis and Saparito (2006); Ozgen and Baron (2007)), and search processes (Hills and Shrader (1988)). Furthermore, absorptive capacity (Cohen and Levinthal (1990)), intelligence, and cognitive abilities (Sarasvathy et al. (1998)) are seen as three personality characteristics that enable superior use of information. We argue that differences in experience and embeddedness in social networks between necessity and opportunity entrepreneurs should lead to differences in opportunity discovery and exploitation. We argue that differences in opportunity costs between necessity and opportunity entrepreneurs translate into differences in self-employment earnings.

Experience matters in venture creation. It provides the would-be entrepreneur with prior information about, for example, which market to enter, how to use a new technology to serve this market, or how to create a product or service to exploit this new technology. A large portion of this experience is related to the individual's professional life. A person's job function influences the likelihood of gaining valuable information for opportunity discovery. For example, people working in research and development or marketing have privileged access to information about technological change or customer preferences (Freeman (1982); von Hippel (1986); Shane (2003)). Variation in job functions, the industry sectors, and the companies worked for provides access to more diverse information. With more diverse information, a person is more likely to find the missing piece needed to discover an opportunity (Romanelli and Schoonhoven (2001); Shane (2003)).

One particular aspect of gaining experience applies when discussing differences between necessity and opportunity entrepreneurs: the process of gaining experience is to some degree a personal decision taken by the individual, one which can be interpreted as planning or preparation for self-employment[2]. We argue that on average, necessity entrepreneurs, those who involuntarily leave their previous job in paid employment, have less time to gain specific working experience compared to opportunity entrepreneurs, those who leave their previous job in paid employment voluntarily. The latter are more likely to have sought specific and valuable working experience in advance. By making this argument, we implicitly assume that entrepreneurs who have left their previous job in paid employment do so voluntarily, because they planned to become self-employed before leaving their job. We assume that most entrepreneurs who have left their previous job in paid employment involuntarily had not planned to become self-employed before losing their job.

Being embedded in valuable social networks is important for successful venture creation (see, e.g., De Carolis and Saparito (2006); Jack and Anderson (2002); Larson (1992)). Social networks matter in several ways. They assist entrepreneurs in gaining access to the more exclusive or less costly resources needed in the process of setting up a venture. Also, they provide privileged access to information and resources that help to identify both more and better opportunities (Ozgen and Baron (2007)). Our argument about differences

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2   For example, an employee might be able to influence in what particular market she gains her experience and what particular job function she serves in the company.

between necessity and opportunity entrepreneurs is similar to the argument involving experience. As noted above, we assume that opportunity entrepreneurs are more likely to have planned to become self-employed before leaving their previous job, which is why they are more likely to have built their social network in a way that it includes people valuable in the process of venture creation, such as potential customers, cofounders or financiers. This 'planning advantage' leads to a higher likelihood of entrepreneurial success.

Individuals consider the opportunity costs associated with the decision to exploit a discovered opportunity (Amit et al. (1995)), so an opportunity entrepreneur is in a more comfortable position than a necessity entrepreneur. Job search theory from labor market economics states that the longer an individual is unemployed, the more her reservation wage – the minimum wage she is willing to accept – decreases. (For a survey, see Devine and Kiefer (1993)). Hence, necessity entrepreneurs should be more likely than opportunity entrepreneurs to exploit an entrepreneurial opportunity in a low-income sector[3]. In line with this argument, empirical studies show that entrepreneurs with higher opportunity costs pursue more valuable opportunities, resulting in higher earnings (Evans and Leighton (1989); Schiller and Crewson (1997)).

Based on these arguments about differences in experience, the embeddedness in social networks, and the level of opportunity costs, we formulate the following hypothesis:

H1: *Opportunity entrepreneurs pursue on average more profitable opportunities than necessity entrepreneurs. That is, they report higher earnings.*

3 DATA SOURCE, SAMPLE CONSTRUCTION, AND UNIVARIATE ANALYSIS

Our estimations are based on an unbalanced panel data set. The data used are made available by the GSOEP at the German Institute for Economic Research (DIW), Berlin[4]. So far, the GSOEP is almost never used in the context of entrepreneurship research[5]. The GSOEP is an annual longitudinal household survey that provides detailed information about the participant's occupational status. The first wave in the year 1984 included 12,245 individuals. Since then, the GSOEP has expanded its sample size in several steps, interviewing 22,019 individuals in 2004. To construct our estimation sample, we make use of the entire1984-2004 period. We select those persons who are self-employed, and use information about how they came to begin self-employment. We classify those self-employed persons who report having left their job in paid employment on their own as opportunity entrepreneurs, and classify those self-employed who were either dismissed by

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3   Individuals who have just lost their job but expect with high likelihood to be offered a highly paid new position in the near future also have high opportunity costs. Yet on average, these opportunity costs should be lower than the opportunity costs of an individual who has not been made redundant by her employer. The latter has more alternatives, since she can always rely on her current job as a source of income.

4   For more detailed information about the GSOEP, refer to Wagner et al. (1993) or Haisken-DeNew and Frick (2003). Using the GSOEP allows us to use exact information about income. Moreover, the GSOEP is representative of the German population.

5   See Constant and Zimmermann (2006) for a (rare) example.

their employer or laid off because their place of work closed down as necessity entrepreneurs. *Table A2* in the Appendix gives the exact wording of the classifying questions and the corresponding answer categories. We constrain our sample to those cases in which the termination of the last job occurred a maximum of two years before moving into self-employment[6]. Serial entrepreneurs are considered only for their first entrepreneurial activity[7]. We also exclude those who work in a business owned by their family[8]. Finally, we exclude all observations from the former East Germany as we do not want to confound effects related to necessity and opportunity entrepreneurship with effects arising from different macro-economic conditions in East Germany (Sinn (2002))[9].

Our sample comprises 131 necessity entrepreneurs (382 person-year observations) and 414 opportunity entrepreneurs (1,529 person-year observations) (*Table A1*). The share of necessity entrepreneurs, 24% of all entrepreneurs in our sample or 20% of all person-year observations, is consistent with survey data from the GEM (Bergmann and Sternberg (2007); Sternberg et al. (2006))[10]. Also, the descriptive statistics indicate a similar sample composition, which is shown by the share of female entrepreneurs and mean age.

Table 1:   Necessity vs. Opportunity Entrepreneurs

Variables	Necessity Entrepreneurs		Opportunity Entrepreneurs		Opp. vs. Nec. Entrepreneurs	
	Mean	Std. dev.	Mean	Std. dev.	*p*-value *t*-test	*p*-value χ^2-test
Earnings (€/month)	2,423	2,026	2,563	2,233	0.578	
Working hours (h/week)	45.18	18.17	45.76	19.15	0.771	
Job satisfaction (0 = totally unhappy, 10 = totally happy)	7.21	2.22	7.81	1.93	0.012	
German (dummy; 1=yes)	0.79		0.84			0.255
Age (years)	37.66	10.00	35.41	8.77	0.019	
Father self-employed? (dummy; 1=yes)	0.11		0.13			0.752

6   We exclude observations with an interval time longer than two years, since it is difficult to make a statement about the motivation of the self-employment decision. The use of alternative time intervals does not change the main results.

7   We exclude 239 person-year observations. See Alsos and Kolvereid (1998) for a discussion of start-ups by serial entrepreneurs.

8   We exclude 1,050 person-year observations. See Parker (2004) for a discussion of unpaid family workers.

9   We exclude 1,029 person-year observations.

10   Note that the share of necessity entrepreneurs in total changes over the years. This is due to macro-economic conditions as well as due to the introduction of programs supporting entrepreneurship out of unemployment such as the "Ich-AG" (Caliendo et al. (2007)) and the "Überbrückungsgeld" (Wießner (2000)). In this context, Caliendo et al. (2007) show that entrepreneurs using the "Überbrückungsgeld" are more skilled than those using the "Ich-AG", which suggests that the composition of necessity entrepreneurs is not homogeneous over time.

	Necessity Entrepreneurs		Opportunity Entrepreneurs		Opp. vs. Nec. Entrepreneurs	
Variables	Mean	Std. dev.	Mean	Std. dev.	p-value t-test	p-value χ^2-test
Male (dummy; 1=male)	0.77		0.67			0.041
Education (years)	12.39	2.83	12.42	2.78	0.901	
Educated in this profession? (dummy; 1=yes)	0.42		0.48			0.239
Labor market experience (years)	17.56	9.68	15.31	9.18	0.022	
Unemployment duration (months)	8.24	11.01	4.85	11.28	0.004	
Handicapped (dummy; 1 = yes)	0.03		0.03			0.845
Married (dummy; 1 = yes)	0.59		0.62			0.512
Children (dummy; 1 = yes)	0.46		0.48			0.743
Self employment duration (years)	2.92	3.13	4.02	3.99	0.002	

Notes: The t-test column shows the p-values of the t-test on the equality of means. The χ^2-test column shows the p-values of the test on the equality of proportions. A p-value of less than 0.05 means that the null hypothesis can be rejected at an error level of less than 5 percent. Calculations are based on first year observations in self-employment.
Data source: GSOEP 1984-2004; N = 545 individuals

Table 1 uses descriptive statistics to compare necessity and opportunity entrepreneurs. With both types of entrepreneurship, the proportion of men is higher than the proportion of women (77% or 67%). The share of men is significantly higher among necessity than among opportunity entrepreneurs ($p = 0.041$). We find that necessity entrepreneurs are significantly older than opportunity entrepreneurs (37.7 years compared to 35.4 years, with $p = 0.019$). We could find no significant differences in terms of education, nationality, working hours per week, marital status, children, handicap, or whether their father was also self-employed. In terms of success, we find that on a univariate basis necessity and opportunity entrepreneurs do not differ in their earnings (€2,423 compared to €2,563, with $p = 0.578$). However, in terms of length of self-employment, they differ strongly. On average, necessity entrepreneurs are self-employed for a shorter time than are opportunity entrepreneurs (2.92 years compared to 4.02 years, with $p = 0.002$).

Two particular findings support the way we have operationalized necessity or opportunity entrepreneurship and hence provide further confidence in our approach: necessity entrepreneurs are less satisfied with their occupational situation than opportunity entrepreneurs (7.21 compared to 7.81, with $p = 0.012$)[11] and have been unemployed for a longer time before they start their venture (8.24 months compared to 4.85 months, with $p = 0.004$)[12].

11 The GSOEP asks the participants to report job satisfaction on a scale from 1 (totally unhappy) to 10 (totally happy).
12 We measure the accumulated length of unemployment – not the length between the last job in paid employment and self-employment. We note also that we do not use the unemployment length in classifying necessity and opportunity entrepreneurs. Our classification is based only on whether the entrepreneur has been forced to leave her past job in paid employment.

4 METHOD

To investigate possible earnings differentials between necessity and opportunity entrepreneurs, we estimate several earnings equations using random- and fixed-effects panel data models. The random-effects model has the specification

$$S_{it} = \alpha + \beta' X_{it} + c_i + e_{it}, \tag{1}$$

where $i = 1, \ldots, N$ units under observation, and $t = 1, \ldots, T$ time periods for which data were collected (Johnston and DiNardo (1997)). S_{it} denotes log gross earnings per hour for an individual i in period t (dependent variable), X_{it} represents a set of independent variables, β' a vector of coefficients, c_i unobserved individual heterogeneity, and e_{it}, an idiosyncratic error that satisfies $E[e_{it}|X_{it}, c_i] = 0$. We estimate the model through Generalized Least Squares (GLS), assuming no correlation between c_{it} and X_{it}. We also estimate a fixed-effects panel data model.

Although both models have the same formal structure, they differ in the assumptions made about the correlation of the disturbance term with the time-variant independent variables X_{it}. In the random-effects model, neither is correlated with the other. But in the fixed-effects model, the disturbance term u_{it}, which is composed of c_i and the idiosyncratic error ε_{it}, is allowed to correlate with X_{it}. However, both models account for the fact that the characteristics of one person in the SOEP are more similar over time than when compared to the characteristics of other persons. For example, the fixed-effects model introduces a (time-invariant) dummy variable for each person in the data to account for the self-similarity of the characteristics over time. Hence, any effect of the explanatory variables in the model is corrected for this. We use the GLS method to estimate the random-effects model. To decide which of the two models (random or fixed effects) is more appropriate, we use the Hausman test, which tests the null hypothesis that the difference in coefficients is not systematic. If the null hypothesis can be rejected, we use the fixed-effects model. Otherwise, the random-effects model is more appropriate. To also test for the existence of random effects, we apply the Breusch-Pagan test. A significant test statistic implies the existence of random effects[13].

The explanatory variables X_{it} we use in our analysis are based on current research. In particular, they include the large majority of variables that have been used in the estimation of earnings equations (for an extensive discussion or relevant variables, see Parker (2004)). Given that the GSOEP covers a large number of person-related variables and variables that describe context factors, we are able to control for a large number of possibly confounding influences (see *Table A2* for a list of variables included in the regressions).

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13   We note that our random effects model is different from mixture models, which are widely used in the marketing literature (e.g., Andrews and Currim (2003)). Mixture models are applied when regression coefficients are heterogeneous across observations (e.g., consumers). Our random effects model however assumes that regression coefficients are fixed across observations. In our model, the term 'random effects' refers to the correlation of the error term with the time-variant independent variables in the model and not to the variation of regression coefficients across observations (as would be the case with mixture models).

5 Results from Multivariate Analysis

Table A3 reports descriptive statistics, correlations, and variance inflation factors (VIFs) for the variables entered into our multivariate regression models. The correlation matrix and the VIFs show that multicollinearity is not a problem with our regressions.

Table 2: Results of full-sample regression, dependent variable: log gross earnings

Variables	Random effects estimates
Opportunity entrepreneur	0.157 **
	(0.063)
Educated in this profession	0.046
	(0.040)
Male	0.489 ***
	(0.063)
German	0.013
	(0.080)
Education	0.033 ***
	(0.010)
Labor market experience	0.028 ***
	(0.009)
Labor market experience squared	−0.0004 **
	(0.0002)
Self employment duration	0.004
	(0.007)
Industry dummies (15 categories; reference category: manufacturing)	$p = 0.003$
Region dummies (9 categories; reference category: Bavaria)	$p = 0.387$
Year dummies (20 categories; reference category: year 2004)	$p < 0.001$
Constant	1.634 ***
	(0.393)
R^2 within	0.085
R^2 between	0.270
R^2 overall	0.267
No. of observations (individuals)	1,911 (545)
Wald Chi^2 p-value	357.88 < 0.001
Hausman specification test Chi^2 p-value	22.80 0.999
Breusch-Pagan test for random effects Chi^2 p-value	482.77 <0.001

Significance levels: † $0.1 > p \geq 0.05$; * $0.05 > p \geq 0.01$; ** $0.01 > p \geq 0.001$; *** $p < 0.001$ (two-sided tests)
Notes: Heteroskedasticity-robust standard errors in parentheses; model is estimated using the Swamy-Arora method (Baltagi and Chang (1994)); R^2 within refers to the proportion of variance in the dependent variable within the observations for one individual that is explained by the model; R^2 between refers to the proportion of variance in the dependent variable between individuals that is explained by the model.
Data source: GSOEP 1984-2004

Table 2 shows an earnings equation based on a sample in which we include both necessity and opportunity entrepreneurs. The Hausman and the Breusch-Pagan tests together suggest a random effects specification[14]. The dependent variable is hourly log gross earnings (*Table A2*). Accordingly, we interpret the coefficients as semi-elasticities, i.e., they show the percentage changes of earnings caused by a unit change of the respective explanatory variable.

Most importantly, our newly introduced dummy variable *opportunity entrepreneur* has a significant positive effect ($\beta = 0.157$, with $p < 0.01$); ceteris paribus, the earnings of opportunity entrepreneurs are about 16% higher than are those of necessity entrepreneurs, which supports our hypothesis. We note that including the variable *unemployment duration* does not change this result. The coefficient of this variable is –0.002 with $p = 0.317$ and the coefficient of the variable *opportunity entrepreneur* is 0.154 with $p = 0.015$.

The coefficients of most of the other variables are what we expected to find. Labor market experience has a positive association with earnings in its linear term ($\beta = 0.028$, with $p < 0.001$) and a significant negative association in its squared term ($\beta = -0.0004$, with $p < 0.01$). The length of education has a significant positive effect ($\beta = 0.033$, with $p < 0.001$). Both findings suggest using a standard Mincer equation (Mincer (1974); Lemieux (2003)). Gender's influence shows that male entrepreneurs report significantly higher earnings ($\beta = 0.489$, with $p < 0.001$). Being educated in the profession later pursued as an entrepreneur and being of German nationality has no significant effect on earnings. We find that both the industry and time dummies are jointly significant. Region dummies have no statistical significance.

Table 3: Results of sub-sample regressions (random effects estimates), dependent variable: log gross earnings

Variables	Sub-sample necessity entrepreneurs		Sub-sample opportunity entrepreneurs	
	Model I	Model II	Model I	Model II
Educated in this profession	0.199 † (0.102)	0.199 † (0.104)	0.007 (0.042)	0.006 (0.042)
Male	0.517 *** (0.154)	0.516 *** (0.156)	0.459 *** (0.065)	0.465 *** (0.065)
German	0.114 (0.165)	0.113 (0.167)	–0.094 (0.093)	–0.088 (0.091)
Education	0.007 (0.023)	0.008 (0.024)	0.043 *** (0.010)	0.040 *** (0.010)
Labor market experience	0.023 ** (0.006)	0.021 (0.018)	0.005 (0.003)	0.030 *** (0.010)
Labor market experience squared		0.0000 (0.0004)		–0.0006 *** (0.0002)

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14   The results are similar to the results of an OLS model with clustered standard errors. The OLS results can be obtained from the authors on request.

Variables	Sub-sample necessity entrepreneurs		Sub-sample opportunity entrepreneurs	
	Model I	Model II	Model I	Model II
Self-employment duration	−0.027 **	−0.027 **	0.009	0.008
	(0.013)	(0.013)	(0.008)	(0.008)
Industry dummies (15 categories; reference cat.: manufacturing)	$p < 0.001$	$p = 0.009$	$p = 0.017$	$p = 0.017$
Region dummies (9 categories; reference cat.: Bavaria)	$p = 0.005$	$p = 0.020$	$p = 0.013$	$p = 0.013$
Year dummies (20 categories; reference cat.: year 2004)	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$
Constant	0.446	0.460	1.920***	1.708***
	(0.532)	(0.568)	(0.313)	(0.314)
R^2 within	0.176	0.177	0.100	0.105
R^2 between	0.440	0.437	0.293	0.297
R^2 overall	0.341	0.341	0.277	0.283
No. of observations (individuals)	382 (131)	382 (131)	1,529 (414)	1,529 (414)
Wald Chi^2	2930.24	2911.43	326.34	346.23
p-value	<0.001	<0.001	<0.001	<0.001
Hausman specification test Chi^2	43.37	31.35	41.44	20.86
p-value	0.330	0.862	0.624	0.999
Breusch-Pagan test for random effects Chi^2	22.16	22.04	452.79	437.04
p-value	<0.001	<0.001	<0.001	<0.001

Significance levels: [†] $0.1 > p \geq 0.05$; * $0.05 > p \geq 0.01$; ** $0.01 > p \geq 0.001$; *** $p < 0.001$ (two-sided tests)
Notes: Heteroskedasticity-robust standard errors in parentheses; model is estimated using the Swamy-Arora method (Baltagi and Chang (1994)). R^2 within and R^2 between: definition as in *Table 2*.
Data source: GSOEP 1984-2004

Table 3 shows the results of the subsample regressions for necessity entrepreneurs and opportunity entrepreneurs[15]. There are interesting differences between necessity and opportunity entrepreneurs in their respective determinants of success.

The dummy variable *educated in this profession* is significantly and positively associated with the earnings of necessity entrepreneurs, but is statistically nonsignificant for opportunity entrepreneurs ($\beta = 0.199$, with $p < 0.1$, compared to $\beta = 0.006$, with $p > 0.1$; Model II). Self employment duration has a negative effect with necessity entrepreneurs ($\beta = -0.027$, with $p < 0.01$), but no effect with opportunity entrepreneurs. The coefficients of the variables *education*, *labor market experience*, and *labor market experience squared* are significant, but only for the subsample of opportunity entrepreneurs. The vari-

15   Again, we assume random effects, which is what the Hausman and the Breusch-Pagan tests suggest.

able *education* has a positive coefficient only for the subsample of opportunity entrepreneurs. When we compare Models I and II for the subsample of necessity entrepreneurs, we find that the relation between (labor market) experience and earnings is linear. We conclude that the standard Mincer specification works better for the subsample of opportunity than for the subsample of necessity entrepreneurs.

An *F*-test on joint significance shows that industry, region, and time dummy variables are significant for both types of entrepreneurs. Being male has a positive effect on the earnings levels of both necessity and opportunity entrepreneurs. Being German has no effect on the earnings levels of either group.

6 CONTRIBUTIONS TO ENTREPRENEURSHIP THEORY

6.1 OPPORTUNITIES PURSUED BY NECESSITY AND OPPORTUNITY ENTREPRENEURS

We find support for our hypothesis that on average, opportunity entrepreneurs pursue more profitable opportunities. This finding accords with the concept of opportunity discovery and exploitation (Shane (2003); Shane and Venkatamaran (2000)). In the derivation of our hypothesis, we argue that in comparing necessity and opportunity entrepreneurs, the latter are in a better position to acquire the specific human and social capital that are necessary to discover profitable opportunities. We argue that compared to necessity entrepreneurs, opportunity entrepreneurs have more time to gain specific valuable working experience before they start their ventures. We refer to this asset to as a kind of 'planning advantage'. This argument explains why our finding of higher earnings of opportunity entrepreneurs are in line with those studies that argue that careful business planning activities can lead to better start-up performance (Delmar and Shane (2003); Gruber (2007)). Our finding also concurs with the argument that opportunity costs matter when an entrepreneur is deciding on whether to exploit a particular opportunity or not (Amit et al. (1995)). Due to their unfavorable employment situation, necessity entrepreneurs have lower opportunity costs than do opportunity entrepreneurs; ceteris paribus, this should lead to a higher likelihood of necessity entrepreneurs exploiting less profitable opportunities.

6.2 DETERMINANTS OF SUCCESS

When we compare necessity and opportunity entrepreneurs, we find strong differences in the determinants of success. The Mincer specification works better for the sample of opportunity entrepreneurs than for the sample of necessity entrepreneurs[16], but the variable *educated in this profession* has more explanatory power for necessity than for opportunity entrepreneurs. These two findings imply an interaction between context and type of human capital: with opportunity entrepreneurs, it seems that more general human capital, such as formal education, has a high explanatory power, but with necessity entrepreneurs,

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16   The Mincer wage equation states that earnings increase linearly with years of schooling and follow an inverse U-shape for general labor market experience.

more specific human capital, such as being educated in the professional area pursued as an entrepreneur, has a high explanatory power. When we consider the impact of human capital on entrepreneurial success, necessity and opportunity entrepreneurs seem to reflect two different types. This finding contributes to the discussion on the impact of human capital on entrepreneurial success. Cooper et al. (1994) find that measures of general human capital influence both survival and growth of a new venture. However, our findings suggest that this only applies to opportunity entrepreneurs, but not to necessity entrepreneurs. In our view, the discussion on the impact of human capital on entrepreneurial success could benefit by including contextual variables that might act as moderating variables influencing the relationship between human capital and entrepreneurial success. Second, we note that in the labor economics literature, there is a discussion on the returns of education for entrepreneurs compared to employees. In a meta-analytic review, van der Sluis and van Praag (2008) find "that the effect of education on earnings is smaller for entrepreneurs than for employees in Europe, but larger in the USA." In addition, they find that the returns to schooling in entrepreneurship are higher in the U.S. than in Europe. We argue that some of these findings may be driven by the entrepreneurs being motivated to start their ventures and the different effects of education associated with these two groups. In the U.S., there is a substantially larger share of opportunity entrepreneurs as compared to some European countries such as Germany. In 2006, the share of opportunity entrepreneurs in the U.S. was about 80%, but in Germany, this number was only about 60% (Bosma and Harding (2006)).

6.3 DISTINCTION BETWEEN NECESSITY AND OPPORTUNITY ENTREPRENEURS

Why should entrepreneurship research distinguish between these two types of entrepreneurs? Our findings are that necessity and opportunity entrepreneurs differ in some socio-economic characteristics, the profitability of the opportunities pursued, and their respective determinants of success. We believe that empirical research in the field of entrepreneurship could benefit from a distinction between these two types of entrepreneurs. To give two examples: First, there are a number of studies that compare the earnings of self-employed individuals with the wages of individuals in paid employment (Hamilton (2000)). A central finding is that entrepreneurship pays off only for a small subgroup of entrepreneurs and thus the decision to start a venture is not primarily driven by monetary reasons. Based on our results, we argue that this finding should be interpreted more cautiously; excluding those entrepreneurs who start their ventures for necessity reasons is very likely to produce different results. Second, an important goal of entrepreneurship research is to explain the determinants of success in entrepreneurship. Our findings suggest that the determinants of success differ strongly between these two groups. By not accounting for context-related differences, we risk under- or overestimating a particular factor.

6.4 LIMITATIONS AND FURTHER RESEARCH

As with other classifications, our classification of necessity and opportunity entrepreneurs has some limitations. It restricts the set of necessity and opportunity entrepreneurs to those entrepreneurs who start a business to those coming out of paid employment,

thereby excluding, e.g., ventures created immediately after or even during university studies. Furthermore, due to data restrictions, we do not include the possibility that an individual voluntarily resigns from a job in paid employment because she anticipates losing her job at some time in the future. Also, we do not include serial entrepreneurs beyond their first venture. And we exclude unpaid family workers and part-time ventures, since in these cases nonmonetary motives might be the reason for starting their venture. However, we believe that these limitations are not so serious as to render the use of the GSOEP data infeasible.

To the best of our knowledge, this paper is one of the first attempts to theorize about the issue of necessity and opportunity entrepreneurship. Our hypothesis about the level of earnings of necessity compared to opportunity entrepreneurs is based mainly on the literature of opportunity recognition. However, due to the lack of a comprehensive theory about necessity and opportunity entrepreneurship, we cannot formulate specific hypotheses about the respective determinants of success of either group. Nevertheless, our exploratory analysis shows that differences exist between the two groups. The Mincer wage equation seems to work better for opportunity than for necessity entrepreneurs. This finding opens up a promising avenue for further research. In our opinion, there is a lack of more fine-grained theory on the issue of success factors of necessity compared to opportunity entrepreneurship. This gap could be filled by both conceptual, qualitative-empirical research and large-scale, specifically designed surveys, ideally resulting in panel data sets that combine necessity and opportunity entrepreneurs.

7 IMPLICATIONS FOR ENTREPRENEURSHIP PRACTICE

Start-up policy in Germany and other industrialized countries often differentiates between necessity and opportunity entrepreneurs (Bergman and Sternberg (2007); Meager (1996); Caliendo et al. (2007)). In Germany, some subsidies are open for every kind of start-up, some only for particular types. For example, the state-owned SME bank (*KfW Mittelstandsbank*) offers subsidized financing for all kinds of start-ups, regardless of whether they are born of necessity or opportunity, but the federal employment agency (*Bundesagentur für Arbeit*) gives subsidies only to entrepreneurs who start their businesses because they have been forced out of employment. Thus, such subsidies are more likely to apply to necessity entrepreneurs.

Our empirical findings carry some interesting implications for these kinds of tailor-made policies. First, we find evidence that generally, necessity and opportunity entrepreneurs differ in socioeconomic characteristics, earnings levels, and determinants of success. This finding lends support to tailor-made policies that suit each group's particular needs. Second, our finding that necessity entrepreneurs lack specific human capital necessary to succeed as an entrepreneur, together with the finding that specific human capital is a determinant of success, offers an interesting guidance for policy. Instead of merely providing money to start-ups by necessity entrepreneurs, the state could make its financial support contingent on a certain level of specific human capital, e.g., very specific labor market experience or a professional education in the professional field in which the venture is started.

Appendix

Table A1: Observations per year

Year	Necessity entrepreneurs	Opportunity entrepreneurs	Σ	Necessity entrepreneurs in % of all entrepreneurs
1984	1	6	7	14%
1985	2	10	12	17%
1986	6	21	27	22%
1987	8	30	38	21%
1988	10	31	41	24%
1989	9	33	42	21%
1990	11	39	50	22%
1991	15	41	56	27%
1992	9	63	72	13%
1993	14	70	84	17%
1994	12	77	89	13%
1995	19	79	98	19%
1996	21	86	107	20%
1997	27	92	119	23%
1998	22	96	118	19%
1999	32	99	131	24%
2000	32	115	147	22%
2001	26	131	157	10%
2002	27	137	164	16%
2003	34	140	174	20%
2004	45	133	178	25%
Total	382	1,529	1,911	20%

Note: The GSOEP has increased its sample size strongly.
The number of successful interviews in 1984 has been 12,254; in 2004, 22,019 persons have been interviewed (Frick (2005)).
This also partly explains the increase in self-employment over the years.
Data source: GSOEP 1984-2004

Table A2: Description of variables

Variable	Description
	Categorial variables
Opportunity entrepreneur	Dummy for an entrepreneur who quit her last job on her own. The wording of the question in the GSOEP is: "How was this job terminated?". The corresponding answer categories are: "Because your place of work or office has closed" (7.7%), "My resignation" (32.9%), "Dismissal" (18.3%), "Mutual agreement" (10.4%), "A temporary job or apprenticeship had been completed" (15.7%), "Reaching retirement age/pension" (7%), and "Suspension" (8%). Answer categories 1 and 3 are interpreted as necessity entrepreneurship; answer category 2 is interpreted as opportunity entrepreneurship. The remaining answer categories do not allow for a classification into necessity or opportunity entrepreneurship. The number in brackets refers to the percentage of answers that fell into this category in the year 2001.
Educated in this profession	Dummy for individual who is self-employed in the profession she has learnt; self-reported by respondent
Male	Dummy for individual who is male
German	Dummy for individual who is German by nationality
Father self-employed	Dummy for individual whose father was self-employed
Married	Dummy for individual who is married
Handicapped	Dummy for individual who is handicapped
Children	Dummy for individual who has at least one child under age 16
Industry	Dummies for agriculture (NACE 1,2,5), construction (NACE 45), car sale (NACE 50), wholesale (NACE 51), retailing (NACE 52), hotel and restaurant (NACE 55), transportation (NACE 60, 61, 62, 63), banking and insurance (NACE 65, 66, 67), real estate (70), databases (NACE 72), consulting (NACE 74), education sector (NACE 80), health sector (NACE 85), culture and sports (92), manufacturing (NACE 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 40, 41, 96, 97, 100), and other (NACE 10, 11, 12, 13, 14, 64, 71, 73, 75, 90, 91, 93, 95, 98, 99)
Region	Region dummies (Berlin West, Schleswig-Holstein, Hamburg, Lower Saxony, Bremen, North Rhine-Westphalia, Hesse, Rhineland-Palatinate and Saarland, Baden-Wuerttemberg, Bavaria)
Year	Dummies for years 1984-2004
	Continuous variables
Gross earnings	Monthly gross earnings from self-employment (in €); generated by GSOEP
Working time	Actual working time per week (in hours); generated by GSOEP
Log gross earnings	Log gross earnings per hour (in €)
Job satisfaction	Job satisfaction on a scale from 1 (totally unhappy) to 10 (totally happy)
Age	Current age of individual (in years)
Education	Years of education (incl. time at university); generated by GSOEP
Labor market experience	Current age minus age at first job
Unemployment duration	Months that an individual has been unemployed in her entire working life before entering self-employment (accumulated length of unemployment)
Self-employment duration	Duration of self-employment (in years)

Table A3: Descriptive statistics and correlations

Variables	Mean	Std. Dev.	Min.	Max.	1	2	3	4	5	6	7	VIF
1 Log gross earnings	2.50	0.76	–0.29	5.36								
2 Opportunity entrepreneur	0.80		0	1	0.063							1.11
3 Male	0.74		0	1	0.262	–0.055						1.25
4 German	0.83		0	1	0.000	–0.004	–0.101					1.26
5 Education	12.48	2.78	7	18	0.222	0.067	–0.050	0.300				1.55
6 Labor market experience	18.78	9.10	0	46	0.069	–0.063	0.012	–0.015	–0.167			1.28
7 Educated in this profession	0.54		0	1	0.141	0.072	0.002	0.133	0.256	–0.004		1.42
8 Self-employment duration	4.43	3.79	1	20	0.159	0.062	0.100	0.078	0.025	0.364	0.067	1.32

Notes: Correlations with an absolute value greater than 0.05 are significant with $p < 0.05$; associations between categorical variables are calculated using Cramer's V.
The VIF values are from the fully specified model in *Table 3*. That is, they include industry, region, and year dummies.
VIF = Variance inflation factor
N: 1,911 obs.
Data source: GSOEP 1984-2004

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