

# The Role of the Local Labour Market for Competing Risks in Quitting Self-Employment. Evidence for previously unemployed founders in Germany.

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Abstract:

This paper investigates the role of the regional labour market in interaction with the founder's qualification for self-employment duration. Particularly, the analysis will concentrate on the importance of opportunity costs of being self-employed as they associate with a variation of the local labour market conditions. In order to account for the nature of exits I use a competing risk duration model based on a parametric specification of the baseline hazard function. Subject of the analysis are founders who have started their new venture from a position of unemployment. The major finding emphasizes that accounting for local labour market conditions yields a substantial model improvement at explaining self-employment duration. However, the interaction of the founder's human capital and labour market conditions is less informative. The results show that the worse the local labour market conditions the longer the expected duration in self-employment.

Keywords: self-employment, human capital, duration, competing risk

JEL-classification: C41, J24, J44, J62, J64, R23

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## Introduction

This paper is motivated by the idea that opportunity costs may be one reason why individuals quit self-employment. Local labour market conditions may affect these opportunity costs due to an increase or decrease of the likelihood for alternative employment options (for an overview of the search theory see Whipple, 2007). Kangasharju/Pekkala (2002) for example present a first impression on this for Finland. They find that individuals with a higher qualification tend to react on the economic conditions in the way they are quitting self-employment. During a period of an economic upturn they find an increase of self-employment quits, whereas the likelihood decreases during an economic downturn.

The role of macro-economic conditions has been long discussed in the industrial relations literature (see for example: Armington/Acs, 2002; Fritsch et al. 2006). And, recent literature also shows the importance of regional economic differences for the likelihood of becoming self-employed (e.g. Bergmann/Sternberg, 2006; Wagner/Sternberg, 2004 and 2005). However, the role of the labour market conditions for the exit choice has been part of the investigation only in a few studies (Great Britain: Taylor, 1999; US: van Praag, 2003; Gimeno et al. 1997; Spain: Carrasco 1999; Cueto/Mato, 2006; Finland/Sweden: Andersson, 2006; Tervo/Haapanen, 2005; Johansson, 2000). Only two of them also account for the variation on a local or regional level.

Of particular interest in this study are individuals who have been unemployed before starting their self-employment period (Andersson/Wadensjö, 2006; Böheim/Taylor, 2002; Carrasco, 1999; Evans/Leighton, 1990; Cueto/Mato, 2006). This for three reasons: First: starting a self-employment period out of unemployment has become an increasing part of the self-employment activities in Germany in the last decade. Focusing on start-ups promoted by the Federal Employment Service shows that the subsidies have been increased from almost 100.000 in the late 90s up to more than 150.000 in 2005. This is almost one quarter of all new self-employed individuals in Germany (for studies that focus on this population in Germany see for example: Caliendo/Kritikos, 2007a; Oberschachtsiek, 2008; Reize, 2004; Wießner, 2001; Hinz-Jungbauer-Gans, 1999). Second: Quitting self-employment because of external options may be even more important for individuals who are discussed to be pushed into self-employment (e.g. Bögenhold/Staber, 1991). And third: Focusing on this population allows using a large data set that offers a regional stratification that has not been possible before.

The paper at hand contributes to the existing literature and adds an investigation that accounts for the importance of regional attributes, the interaction between individual characteristics and the local labour market situation and (extensively) the role of the founders' qualification. Particularly, individual characteristics enter the analysis as constant attributes whereas the regional pattern enters as time variant and constant information. This approach allows controlling for the comparative advantages of the individuals' productivity (e.g. Bates, 1990; Cressy, 1996; Robinson/Sexton, 1994; Copper et al. 1994; Bosma et al. 2004; Gimeno et al. 1997) as well as for the importance of the

external change of the value of the founders' productivity and the demand side (e.g. Fritsch et al. 2006). The data used for this analysis is taken from the administrative data of the Federal Employment Services and includes longitudinal information on individuals that have received a bridging allowance (subsidy to encourage self-employment out of unemployment). Technically the investigation uses a parametric duration model based on a lognormal distribution of the overall hazard function. Furthermore, the analysis also accounts for competing exit risks that allow a distinct analysis of the importance for different types of exits. Finally, the investigation controls for unobserved heterogeneity by using frailty models based on a flexible gamma distribution.

The rest of this paper is organized as follows: Section 2 presents previous studies that include macro-economic parameter to estimate the self-employment duration. The selection of the studies also accounts for the competing risk nature of quits in self-employment. Section 3 introduces the dataset. Section 4 presents descriptive findings that relate to the profile of the individuals and the nature of the exit events. Section 5 informs about the econometric setting of the investigation. Finally, the last two sections present and discuss the results.

### **Previous findings**

Taylor (1999) and Carrasco (1999) are some of the first who investigate the role of macro-economic conditions for the self-employment duration. Both use the nationwide unemployment rate at the beginning of the self-employment period. Taylor (1999) focuses on Great Britain, whereas Carrasco investigates the case for Spain. What they found is a clear positive relationship between the unemployment rate and the likelihood to exit. However, most important, they find, that this relationship limits to exits in general and voluntary exits whereas involuntary quits (mainly representing exits into unemployment) remain statistically unaffected by the variance of the national unemployment rate.

Tervo/Haapanen (2005) focus on the role of the annual local unemployment rate in Finland. In contrast to Taylor (1999) and Carrasco (1999) they find that the level of unemployment becomes insignificant if one controls for the changes of the unemployment rates across time. This indicates that not the pressure per se effects periods of self-employment but rather changes in the labour market conditions since the beginning of the self-employment period. Likewise, also controlling for other macroeconomic parameters van Praag (2003) studies the exit choice of young self-employed males in the US. She also finds that the unemployment rate remains statistically unimportant but that the exit density at the begin date of each spell increases the likelihood to exit self-employment. No evidence can be found for the importance of subjective measures of economic prospects (Gimeno et al., 1997).

Andersson (2006) presents a more elaborated approach to capture the regional labour market conditions for the duration in self-employment in Sweden. Beside the unemployment rate the study also controls for the magnitude of entrepreneurial culture approximated due to the density of self-

employment, agglomeration and the regional mean income. The results related to the role of the labour market conditions support previous findings and show a clear negative correlation between the unemployment rate and the self-employment duration. Most important she finds an important positive effect of the self-employment density on the self-employment duration and a moderate effect of the mean income and the agglomeration.

Table 1: macro-economic conditions and self-employment duration  
near here

With reference to start-ups out of unemployment Cueto/Mato (2006) also study the relationship between the unemployment rate and the longevity of a self-employment period in Spain. Particularly, they are interested in the declining importance of the unemployment rate at the beginning of the start up as the start-up continues to operate. What they find is a significant effect of the unemployment rate only at the very beginning of the self-employment period and two quarters later. To some extent this supports an interaction between macro-economic conditions and the so-called effect of the liability of adolescence, which emphasises high hazard rates after a period (mostly 6 months) of learning. However, most important they find significant effects only for the female population and voluntary exits. And, in contrast to previous studies they find a positive correlation between the unemployment rate and the self-employment duration.

Johansson (2000) finds similar results for Finland. Particularly, he investigates the role of time varying local unemployment rate on the longevity of new self-employment periods. Johansson (2000) reports that the likelihood of quits followed by a wage work decreases with the unemployment rate whereas involuntary exits show a positive correlation for females. Similar to Cueto/Mato (2006) this reflects that high unemployment rates also may cause a longer period in self-employment.

## **Data and Variables**

### The data sources

The data used for this analysis is taken from the Integrated Employment Biographies (IEB), which is a merged dataset conducted by the Institute for Employment Research (see Jacobebbinghaus/Seth, 2007). The IEB consists of four distinct sources and contains observations of employment, unemployment benefits, participations in measures and of job search periods on a daily basis. Periods of employment and unemployment benefits are integrated since 1990, whereas

information associated with job search and participation in measures begins with 1999. All data sources cover at least the period until the end of 2005.<sup>1</sup>

The IEB is a completely process generated administrative data set with longitudinal information of the individuals' employment history. Each observation is linked with socio-economic characteristics and source-specific information. Employment information originates from the employment register, which covers all individuals who are captured by the notification scheme of the German social insurance system (mainly excluding self-employed and civil servants). This source contains information on wage, type of employment, job characteristics and on qualification. Observations of unemployment are limited to periods that are associated with payments of unemployment benefits system and cover information on the type and the amount of received benefits. The third source comes from an administrative register that mainly contains information on measures. Finally, the job search register contains detailed attributes of the individuals' qualification and job search profile.

This data is supplemented with information coming from the Establishment History Panel (EHP; for details see Spengler, 2007) and with regional labour market information taken from the official statistics of the Federal Employment Services. The first one contains information of employment notifications valid at the 30<sup>th</sup> June of each year, which are aggregated on an establishment level. This allows capturing further information of the establishment related to the employment notification in the IEB and to identify local information related to movements of establishments. The official statistics offer detailed information of the local labour market, which are classified due to the official labour market assignment (labour market districts) of the Federal Employment Services.

### Preparation of the data set

For any further analysis the IEB needs extensive cleansing procedures (e.g. Scioch/Oberschachtsiek, 2009). Particularly, the IEB contains the whole population of participations, employment observations and search register information observed in Germany.<sup>2</sup> Moreover, one has to note that the IEB does not contain direct information of self-employment periods. However, the IEB includes periods of participations within a promotion programme that encourages individuals to avoid or to end up with unemployment by becoming self-employed.<sup>3</sup> This population is used to identify self-employment periods. Since the legal system rules out that the start of a promoted self-employment period has to be close to the begin date of the subsidy, I use the begin date of participation as the

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<sup>1</sup> The IEB will be updated every year. The version used for this study allows observation for all sources at least until the end 2005.

<sup>2</sup> Please note, access to this data is usually limited to a 2.2% random sample offered by the research data centre of the Federal Employment service (see <http://fdz-iab.de>).

<sup>3</sup> The promotion programme addressed here is called bridging allowance and offers a full payment of unemployment benefits while setting up a new business. Access is granted in any case an independent authority values the business concept to be potentially successful (for details see Wießner, 2001 and Caliendo/Kritikos, 2007b).

starting point of the self-employment observation. Any observation in the data after starting the participation is than used to identify quits of the self-employment episodes (excluding additional promotion periods related to the bridging allowance). Thus, the duration of the self-employment period will be the difference between the begin date of participation and the date of the first observation hereafter.

I limit the population to participations between 1999 and 2002<sup>4</sup> and also exclude individuals with implausible<sup>5</sup> periods of participation and with more than three notifications of self-employment promotion within the time span under observation. For technical reasons the final data set will be restricted to a 50% random sample of the constructed data. Finally, the analysis below will rest upon 161.871 founders from whom 90.417 have quit self-employment within the observation period. Additional data processing mainly relates to single variables (see table A1 in the appendix).

For a detailed description of the attributes see table A1 in the appendix. Information that relate to the individual level refers to the begin date of self-employment period. This covers socio-demographic information, qualification, prior duration in unemployment, job characteristics of the past employment history (e.g. the modus of the job characteristics within the last five years). Moreover, the data includes also information of the founding year, the main profession of the previous employment periods and an east/west assignment. Variables that refer to the local labour market situation are captured as fixed and time varying covariates.

The information on the labour market condition is focused on the local labour unemployment rate, the standardized unemployment index and a regional specific attribute of the unsteadiness<sup>6</sup> of the local unemployment. Additionally, I use the share of vanished establishments (exits and movements) in each year in the region as an indicator for the general economic condition and the economic prospects of the regional market (demand and supply side). In order to capture the interaction between the founders' human capital and the local labour market I use interaction terms between a selected set of individual characteristics and the local labour situation (see below).

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<sup>4</sup> Note that in 2003 and 2004 several changes were made that relate to the self-employment promotion of the Federal Employment Service in Germany (see Caliendo/Kritikos, 2007b).

<sup>5</sup> These are observations with less than 60 days of participation (which is likely to identify abortions) and periods of participation greater than 740 days (incorrect notifications).

<sup>6</sup> This covariate is defined due to the measurement error of a time series estimation of the local unemployment rate covering the period between 1999 and 2004 - this technique mainly captures the variation of the local unemployment rate (correlation: 0.82) but also accounts for 'unexpected' variation.

## **Descriptive findings: profile, exits and post exit status**

### The profile of self-employment out of unemployment and macroeconomic situation

Note that previous research has shown that founders in general tend to be a highly selective population from all adult individuals (e.g. see Lückgen et al., 2006). This is certainly also the case for founders out of unemployment. For the population addressed here one finds mainly males, mid aged individuals around 38, highly qualified people (for details see table 2, first column; for a comparison see Lückgen et al. 2006). Almost 83% of the founders had worked in the sales or trades industry, and 50% came with a working background in a small establishment (lower than 20 employees). Experience in small businesses certainly fosters a multiple skill development of the individuals' human capital (Wagner, 2004). Moreover, experience in small firms may also cause lower switching costs - compared to a wage work in a larger establishment with high scaled division of labour. Likewise, referring to the Lazear's 'Jack-of-all-Trades'-hypothesis (Lazear, 2005) almost 30% had changed the occupational field during their employment history.

table 2: descriptive statistics for entries and exits  
near here

An important issue for founders out of unemployment concerns the duration of unemployment prior setting up the business. Van Praag (2003) for instance uses the unemployment spell as a proxy for the motivation to become self-employed. The longer the unemployment duration the higher the likelihood that an individual starts a business in order to avoid further unemployment (Bögenhold/Staber, 1991). However, 27% (65%) have been unemployed for four month (one year) before setting up a business, which is more likely to describe a mid scaled rather than high motivated population.

The macro-economic conditions and the development of the labour market situation show an economic downturn in Germany during the observation period between 1999 and 2005. The unweighted average unemployment rate (across all regions) increases from 10.4% in 2000 to 13.03% in 2005. The spread of the local unemployment situation also increases from a span of 24%-points to 26%-points, whereas the unemployment-index (standardized to 100 in 1999) shows strong differences in the development between 40 and 142 Points. Similar results can be found for the share of vanishing firms in the local labour market (ranging from 6% to 13.8% in 2000 and increasing to a range between 8.7% and 15.5% in 2005). After this period of an economic downturn the economic situation changed in 2006 and turned to an improvement of the macro-economic conditions.

### Exits and post exit status

Table 2 also displays the distributions of the covariates conditional for exits in general and exits to wage work, unemployment and into other states. These descriptive findings allow a first brief overview. It indicates that males, founders with a higher qualification (high school diploma, college or university diploma, crafts master, with premium income and short unemployment duration) and who have an employment background associated to small business tend to be less likely to exit. Stronger differences emerge at focusing on the differences between the post exit states. For example it turns out that exits in general seem to be less likely in East Germany compared to West Germany. However, exits in East Germany are more often followed with a period of unemployment. Exits seem to be related with worse local economic conditions – particularly exits into unemployment.

figure 1: sequence of employment states after quitting self-employment  
near here

Overall, 56% of all individuals have been quitting self-employment during the observation period of 83 months. Life table estimates show that almost 61% of the founders are still self-employed two years after starting the self-employment period. Focusing on the fourth year this reduces to 48% and after seven years it decreases to 39%. As found in other studies the shape of the hazard rate shows an inverse u-shaped pattern that peaks around the seventh month of observation (not displayed here, see Taylor, 1999; Brüderl et al., 1992; Wießner, 2001; Oberschachtsiek, 2008).

Compared to previous findings the population considered here reveals an inverse structure of the nature of quitting self-employment. Taylor (1999), Johansson (2000) and Cueto/Mato (2006) show that most self-employed end up with self-employment by entering a new job or quitting voluntarily. As found here, almost 60% quit self-employment by exiting into unemployment and only 28% enter into a new employment directly following their self-employment state. The left 12% change into an unknown status.

However, only focusing on exits does not answer if the state that follows self-employment remains stable. Figure 1 provides a simple overview on this. It shows that 45% of all exits into employment fall back into unemployment again and 36% of those who have quit self-employment by entering unemployment change to an employment state. However these counts are censored. To address this issue, figure 1 also displays the 50% and 75% percentile and the kurtosis of the distribution of the spells length until the next status change. It clearly shows that 50% of all post exit states change within the first six months and that 75% of the new employment states do not hold for more than one year.

## Econometric Setting

Duration models account for the nature of exit events allowing a consistent analysis of the relative importance of the covariates for the expected duration. More precisely, duration models account for the time dependency (process time  $t$ ) of an event (episode  $\tau$ ), conditional on a selected set of attributes ( $x$ ) that may scale ( $-x_i\beta_x$ ) the timing of the event. This can be described as follow:

$$\tau_i = \exp(-x_i\beta_x)t_i \quad (1)$$

In formula (1)  $\tau$  is a random variable measured in  $t$  and  $\beta_x$  is a vector that describes the average impact of a covariate on the expected length of an episode. Rewriting (1) yields the regression function:

$$\ln(t_i) = x_i\beta_x + \vartheta \quad \text{with } \vartheta \sim F(\tau_i) \quad ; \quad \ln(t_i) = \beta_0 + x_i\beta_x + u_i, \quad (2)$$

where the logarithm of the process time  $\ln(t_i)$  is a linear function of the individual characteristics  $x$ .  $\vartheta$  is a parameter that determines the distribution properties of the error term  $u_i$ . Brought forward to the current setting, formula (2) means that the time spent in self-employment will be completely described by a parametric baseline hazard function - related to a certain function of time - and the scale effect of the covariates. Additionally, to capture also systematic effects that remain unobservable, one may separate the error term into two parts, which yields a random ( $\varepsilon$ ) and a systematic part ( $\alpha$ ) of the error term (Gutierrez, 2002):

$$\ln(t_i) = x_i\beta_x + \ln(\tau_i) = \beta_0 + x_i\beta_x + \varepsilon_i + \alpha_i \quad (3)$$

However, formula (3) assumes a systematic misspecification in (2) that is strictly related to a certain function of time which adds to the baseline hazard function. Usually this systematic part of  $u$  is captured by a flexible gamma distribution of  $\alpha$  with a mean of one and a variance of  $\Theta$  (Cleves et al., 2004).<sup>7</sup>

To implement the regression set up in formula (3) I assume a log normal distribution of  $u$ , which is in line with the qualities of the hazard function discussed above (showing an inverse u-shaped pattern). The estimation now depends on  $\beta$ ,  $\sigma$ , and the input vector  $x$  with  $\tau_i \sim \text{lognormal}$ . Sigma ( $\sigma$ ) refers to the properties of the fixed density distribution of the episodes (or hazard rates) and  $\beta$  is the estimated vector for the scale parameter.

As noted before the input vector  $x$  is separated into attributes that are constant for  $i$  ( $x_i$ , capturing  $t_0$ ) and a set of covariates that describe the local labour market ( $x_r$  and  $x_{r,i}$ ). Moreover, I

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<sup>7</sup> The empirical importance of the systematic error can be verified by testing the null hypothesis that the variance equals zero.

introduce a vector that captures interaction effects between the local labour market situation and the individuals' human capital ( $x_{rt,i}$ ). Note that the regional attributes address both, fixed and time varying effects, which allows controlling for a fixed and a varying component of the local labour market situation for the self-employment duration:

$$\ln(t_i) = \beta_0 + x_i \beta_x + x_r \beta_x + x_{rt} \beta_x + x_{rt,i} \beta_x + \varepsilon_i + \alpha_i \quad (4)$$

To allow a distinct analysis on comparative advantages formula (4) can be specified for different exit events. For the interest of the current analysis this is reduced to different exits events in  $j$  focusing on exits into employment and exits into unemployment (for details see Cleves et al., 2004):

$$\ln(t_i^j) = f(x_i^j, x_{rt}^j, x_r^j, x_{rt,i}^j, \beta_x^j, \sigma, g(\alpha_i^j)) \text{ mit } j = 1, \dots, j \text{ and } \tau_j = \min\{\tau_1, \dots, \tau_j\} \quad (5)$$

The coefficients reflect  $\beta_i = E\{\ln(t_i) | x_i\}$  which represent semi-elasticities related to unit-change of  $x$  on the expected duration in self-employment. The interpretation is thus very close to a percentage change of  $t$  related to a change in  $x$ . The natural exponent of the coefficients can be interpreted as time ratios for the individuals expected duration given the baseline distribution.

### **Determinants of duration - empirical findings**

The first step of the analysis focuses on the overall importance of the local labour market situation at explaining the self-employment duration. The results of this investigation can be found in table 3. It shows the development of the entropy of the statistical model by introducing additional blocks of covariates. I use a likelihood-ratio test (LR) supplemented with the Bayesian information criteria (BIC) to test the improvement of the entropy adjustment.<sup>8</sup> All estimations base on a parametric lognormal duration model with a gamma frailty term to control for unobserved heterogeneity.<sup>9</sup>

The first block of attributes is used as the reference model, which includes control variables (profession, start-up cohort, gender, age, and the east/west-assignment (type 1 model). The second set of covariates covers information of the founders' motivation and the qualification of the founder (type 2 model). The third step also incorporates regional characteristics (type 3 model). Finally, the last step also includes the interaction of selected individual characteristics and regional information (type 4 model).

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<sup>8</sup> The advantage of the latter one is an inclusion of the complexity of the model relatively to the sample size, which is not controlled for in the likelihood-ratio test (Raftery, 1986).

<sup>9</sup> This model performs best in terms of the AIC and BIC (Burnham/Anderson, 2004) compared to other specifications (e.g. log-logistic, gamma).

table 3: model improvement  
near here

Three findings are to be found: First, at all levels the likelihood ratio test rejects the equality of the models and shows an improvement of the BIC. This reveals that using more information to explain self-employment duration clearly improves the entropy of the model. Second, it is important to note that the magnitude differs conditional on the type of exit. For instance introducing human capital attributes is more likely to improve explaining exits into unemployment than exits into employment. And in contrast, explaining exits into employment improves more from including local labour market characteristics. Third, the most important improvement of the entropy shows up for the human capital attributes, whereas introducing the interaction between the founders' qualification and local labour market characteristics yields only moderate model improvement.<sup>10</sup>

The second step of the analysis focuses on the importance of the covariates for the self-employment duration. The discussion below will mainly rest upon the model type 3 (see table 4) which also accounts for cluster adjusted standard errors as suggested by Moulton (1990).<sup>11</sup> Reference for the discussion of the interaction effects are the estimations based on the model type 4 (see table 5). Information of the cohort<sup>12</sup> and of the profession will be used as control variables and is excluded from the discussion.

#### *Local labour market characteristics*

The local labour market situation will be captured by a set of multiple parameters. Focusing solely on the unemployment rate has great disadvantages since it captures time varying effects and variation across regions. Using an unemployment index separately controls for the development of the local labour market situation since the beginning of the self-employment period. Thus the coefficient related to the unemployment rate focuses on the cross-regional variation (absolute pressure on the labour market) whereas the coefficient of the unemployment index accounts for the variation across time. Additionally, the unemployment rate may also capture macro-economic effects that relate to the demand side (e.g. Fritsch et al. 2006).

Overall, the local unemployment situation shows ambiguous effects. Table 4 shows that a percentage point increase of the local unemployment rate causes a shortage of a self-employment

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<sup>10</sup> In fact in terms of the BIC this is also negative. Note that the order of introducing the variables does not have an important impact on these findings. In the case of the nested model analysis I do not account for cluster adjusted standard errors.

<sup>11</sup> The identification of regional clusters refers to Eckey et al. (2006 and 2007) - see also table A1 in the appendix. Using regional data usually causes problems concerning spatial inter-correlation. Given the context at hand this refers to the non-independency of local labour market districts. One way out might be using weighted attributes that account for the labour market situation in neighbourhood districts. However, the correlation between the used parameters and those with a weighting scheme (commuter; see Eckey et al. 2007) is greater than 0.82, which indicates that this problem should be less important for the estimates.

<sup>12</sup> I observe four cohorts. Using 1999 as the reference year I find that the younger the start-ups the higher the likelihood to exit - particularly for exits into unemployment.

period. However, the effect for changes into employment remains statistically insignificant, which emphasizes that labour market pressure per se, randomly effect opportunity costs. Conversely, the unemployment index shows that the worse the situation since the beginning of the self-employment observation the longer the expected self-employment duration (insignificant for exits into unemployment). This clearly supports the relevance of opportunity costs, which are assumed to be relatively low in the case of few external employment options.

Additionally, I use the share of vanishing establishments as an indicator for the intermediate- and long-term prospects of the local market (e.g. demand side, production costs). This is the sum of firms that had existed in the previous period but do not exist in the local labour market in the current period (sum of movers and hazards). Again, the results show that the worse the market conditions (higher share of vanishing establishments) the longer the expected duration in self-employment.

The analysis also controls for the overall instability of the local labour market, which is captured by a regional specific variation index:<sup>13</sup> the higher this index the greater the variance of the quarterly local unemployment rates and the greater the deviation between the real and the predicted values. Again, the results indicate a positive relationship between instability and the expected duration in self-employment. However, the magnitude of the effect is not simple to interpret. One standard deviation of the variation index relates to a change of the time ratio which is similar as a one year change in age, and thus seems to be of relative low importance for the self-employment duration. Furthermore, relating the magnitude of the coefficients for the regional labour market to their standard deviation shows that this effect is also low compared to the other attributes of the regional labour market. One standard deviation of the unemployment rate (share of vanishing firms) relates to an impact that is similar as a 2.6 (2) year change in age.

Finally, East-Germany relates to high unemployment rates, low economic dynamics and usually high amounts of people that receive social transfer payments. As also found before there is a clear prolongation that relates to this type of macroeconomic situation. Both, exits into employment and unemployment occur later in East Germany than in West Germany.

#### *Interaction effects (qualification and labour market conditions)*

The best way to identify the role of outside employment options is controlling for interaction effects. These capture the average reaction of the subjects with certain attributes (e.g. qualification) given a certain pattern of the local labour market situation. However, the local labour market is usually multi-dimensional which makes it difficult to obtain interaction effects between a set of individual characteristics and one indicator for the local labour market. Since the analysis at hand focuses on the role of the development of the local labour market situation I use the unemployment index to identify the interaction effects. Again, note that an increase of the index is associated with a rise of labour market pressure.

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<sup>13</sup> More precisely this is the root mean squared error of the time series estimation.

The results displayed in table 5 show that males have a higher elasticity on a negative economic development than females. The worse the labour market conditions the longer their duration in self-employment. Parameters related to qualification (higher education, college and university degree, premium earnings) show a positive interaction effect. Thus, a higher qualification in conjunction with an increase of the labour market pressure yields longer expected self-employment durations. However, the effect is not constantly significant for all variables and all types of exits.

#### *Individual characteristics*

Back to the estimates displayed in table 4. Gender is usually discussed as being a predominant characteristic for entrepreneurship (e.g. Georgillis/Wall, 2005; Wagner, 2006; Johansson, 2000; Caliendo/Kritikos, 2007). This is also supported here, males tend to be longer self-employed than females, which is in line with previous findings (e.g. Taylor, 1999; Johansson, 2000, Tervo/Haapanen, 2005). However, I find this positive relation only for exits in general and for exits into employment. In contrast, males tend to quit self-employment earlier if one focuses on exits into unemployment and when controlling for the interaction effects for exits in general.

Age has an inverse u-shaped effect on duration in self-employment with a maximum in the expected duration at 40. Above that age the effect of a marginal change in age on the duration becomes negative, which supports previous findings (e.g. van Praag, 2003; Preisendörfer/Voss, 1990; Taylor, 1999). However, focusing on the competing risks shows that age becomes unimportant for exits into employment. This is surprising since age also captures productivity and outside opportunities (e.g. van Praag, 2003).

#### *The founders' qualification and motivation*

Both, higher school education and holding (at least) a college degree prolongs the duration in self-employment. However, the effects differ in their relative importance. An academic degree fosters to a higher extent exits into employment whereas higher school education seems to be more important for exits into wage work. This also indicates the importance of opportunity costs which are assumed to be higher for subjects with a high formal education.

Similar effects as found for the formal education relate to the managerial experience: decelerating exits in general and also into unemployment but accelerating exits into employment. Likewise, later exits can also be found for subjects with premium wages before starting the business.<sup>14</sup> This variable captures unobserved productivity that leads to a premium earning. However, the effect is insignificant for exits into employment. A possible interpretation might be that a wage premium will be less likely when returning to a wage work and thus remains uncorrelated with opportunity costs.

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<sup>14</sup> The premium wage indicator reflects that an individual has earned more than the expected income plus one half of the standard deviation (given the occupation, industry and a set of individual characteristics).

Most interesting, being experienced in a commercial field of occupation does not relate to an improvement of the capabilities in running a business. Exits in general and exits into employment or into unemployment accelerate. Obviously, founders with such experience tend to have comparative disadvantages at being self-employed. Particularly, having a commercial background relates to strong comparative advantages in returning to wage work and also might foster exits into unemployment to restart search activities.

In contrast, clear comparative advantages at being self-employed relate to a qualification as a crafts master and to an employment background in small sized establishments. Both indicate positive effects on the duration in self-employment independent of the type of exit. Crafts master are usually high qualified at combined technical and commercial capabilities and are trained at becoming self-employed or entering a managerial position. However, it surprises a little that there is no effect related to the outside options, which also might refer to motivational aspects of being self-employed. The effect found for the indicator of an employment background in small sized establishments clearly emphasises the hot-houses hypothesis (Wagner, 2004; Blanchflower/Meyer, 1994): low division of labour fosters a broad set of capabilities that are useful for a self-employment activity. Likewise, this may also be in line with the 'Jack-of-all-Trades'-hypothesis stated by Lazear (2005). Furthermore, note that the coefficients for a qualification as a crafts master and experience in small sized establishments reflect the highest time ratio effect found in the estimation. To put it more precisely: a 10 year (3 year) increase in age – before reaching the inverse age effect – has a similar impact on the extension of the self-employment duration as being qualified as a crafts master (experience in small firms).

Long unemployment durations and a minor job should be associated with strong push-effects into self-employment and also lower opportunity costs. However, short periods of unemployment clearly induce longer durations in self-employment. A minor job is related to a two-sided effect with a dominating negative effect on duration in self-employment. Individuals who have been engaged in a minor job tend to exit earlier into employment, whereas exits into unemployment remain unaffected. Obviously, people may use a period of self-employment to signal motivation or use this period as a springboard, which both associates with earlier exits into employment.

Job changes may also reflect motivation - addressing the individual's disposition to switch jobs (e.g. unsteadiness). In contrast, Lazear (2005) also suggests a skill related dimension to job changes. Broad experience may lead to a more balanced skill set which associates with comparative advantages for self-employment. However, the result is not found here.

## Summary and conclusions

This paper focuses on the importance of the local labour market situation for the duration in self-employment. The analysis assumes that the labour market conditions and individual characteristics interact by affecting the exit choice and the self-employment duration since both affect the distribution of potential incomes. The data set used for the analysis consists of a large sample size, which allows controlling for this interaction. Particularly, the focus of this study is analyzing individuals who have been unemployed before setting up their business.

Overall, 56% of all individuals quit self-employment during the observation period of 81 months. The results show an inverse u-shaped pattern of the hazard rates. 61% of the founders are still self-employed two years after starting the self-employment, which reduces to 48% two years later. However, in contrast to other studies the exit choice focuses on quits into unemployment (Taylor, 1999, Johansson, 2000 and Cueto/Mato, 2006). Almost 60% quit self-employment by exiting into unemployment and only 28% enter into a new employment directly following their self-employment state. Moreover, investigating the post exit status shows, that 45% of the exits into employment fall back into unemployment again and 36% of the quits into unemployment re-enter wage work. The results also indicate that 50% of these transitions occur within the first six months. This clearly shows a high instability of those who exit self-employment and indicates high dynamics of the employment states right after having quitted self-employment.

The multivariate analysis uses non-parametric lognormal duration models that account for unobserved heterogeneity. Using a stepwise integration of parameters shows that introducing human capital variables yields the highest net gain in terms of improving of the entropy. However, adding local labour market characteristics and interaction terms (individual attributes in conjunction with an indicator of the local labour market situation) shows also significant improvements but with a diminishing marginal net gain of the entropy - particularly for the interaction terms.

Testing single attributes shows that an increase of the founders' qualification clearly relates to a prolongation in self-employment, whereas exits into employment accelerate. Thus, opportunity costs do count for quitting self-employment. Clear comparative advantages relate to short unemployment duration, experience in small establishments and holding a crafts master, which relate to an overall extension of the self-employment period. This strongly emphasizes the significance of motivation and broad and applicable experience for self-employment. Likewise, an increasing pressure on the local labour market and instability of the labour market situation cause an extension of the self-employment, which again shows the importance of opportunity costs: Particularly, high qualified founders tend to exit later the worse the development of labour market situation. This supports in general the findings of Kangasharju/Pekalla (2007) as well as the results found by Johansson (2000) and Cueto/Mato (2006) but contradicts the findings of Taylor (1999), Carrasco (1999), Tervo/Haapanen (2005) and

Andersson (2006). Finally, the results indicate that the overall pressure of the labour market situation (as indicated by the unemployment rate) seems to be the most important character of a region.

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## Appendix

table 1: macro-economic conditions and self-employment duration

Study	data	macro-economic variables	
		labour market	other
Taylor (1999)	British Household Panel Survey; two cohorts: entries in 1979 and 1991; n = 1361 (910 male, 451 female)	national unemployment rate at start-up: all exits: + voluntary exits: + involuntary exits: :n.s.	/
Carrasco (1999)	Spanish Family Expenditure Survey (ECPF); changes between 1998 und 1991; n = 821	national unemployment rate at start-up: all exits: + voluntary exits: + involuntary exits: n.s.	/
Johansson (2001)	micro data of the „Labour Employment Statistics“ (LES) Finland; entries between 1987 and 2000; n = 4192 Spells	regional annual unemployment rate all exits: - voluntary exits: - involuntary exits: + (f)	/
Tervo/Haapanen (2005)	micro data of the LES, Finland; entries in between 1987 and 2000; n (random sample) = 12661 individuals	regional annual unemployment rate: n.s. increase of the ue-rate: +	/
Andersson (2006)	process generated data, Sweden; entries in 1991; annual panel; n = 20217	regional annual unemployment rate: all exits: + voluntary exits: n.s. involuntary exits: +	self-employment density: all exits: - voluntary exits: - involuntary exits: -
Cueto/Mato (2006)	survey data; promoted entries out of unemployment between 1996 and 2000; Spain; n = 848	national quarterly unemployment rates in the year of the start up: all exits: - (f) voluntary exits: - involuntary exits: n.s.	/
Van Praag (2003)	US National Longitudinal Survey of Youth (NLSY); entries between 1985 and 1989; n = 271	national unemployment rate at start-up: n.s.	business failure rate each year and industry: +
Gimeno et al. (1997)	Survey data based on addresses coming from the US trades organization „National Federation of Independent Businesses“; n = 1547	/	dynamic (change of the competition): n.s. market growth: -

explanation: + (-) indicates a positive (negative) correlation between the attribute and the exit probability  
 (f) indicates significance only for the female population  
 n.s. stands for “not significant”

table 2: descriptive statistics for entries and exits

	entries		exits			
	n		all	into employment	into unemployment	into unknown status
		161871	90417	25177	54110	11130
<b>individual characteristics</b>						
male <sup>d</sup>		0,72 (0,451)	0,70 (0,460)	0,69 (0,465)	0,74 (0,440)	0,52 (0,499)
age <sup>n</sup>		37,80 (8,646)	37,92 (8,922)	36,81 (8,126)	38,53 (9,332)	37,43 (8,306)
<b>Motivation</b>						
short unemployment (< 4 months) <sup>d</sup>		0,27 (0,443)	0,24 (0,425)	0,26 (0,437)	0,23 (0,422)	0,21 (0,408)
minor job <sup>d</sup>		0,05 (0,212)	0,05 (0,221)	0,04 (0,201)	0,04 (0,207)	0,10 (0,305)
number of job changes <sup>n</sup>		1,34 (0,692)	1,38 (0,735)	1,42 (0,731)	1,38 (0,745)	1,31 (0,687)
<b>qualification</b>						
schooling (>= high school) <sup>d</sup>		0,28 (0,449)	0,27 (0,443)	0,31 (0,464)	0,23 (0,418)	0,37 (0,484)
academic degree <sup>d</sup>		0,16 (0,371)	0,15 (0,361)	0,18 (0,382)	0,13 (0,340)	0,21 (0,404)
crafts master / foreman <sup>d</sup>		0,03 (0,170)	0,02 (0,126)	0,02 (0,140)	0,02 (0,122)	0,01 (0,114)
Management <sup>d</sup>		0,06 (0,229)	0,05 (0,224)	0,07 (0,248)	0,05 (0,215)	0,04 (0,205)
commercial background <sup>d</sup>		0,16 (0,370)	0,18 (0,384)	0,19 (0,394)	0,17 (0,378)	0,19 (0,389)
wage premium <sup>d</sup>		0,27 (0,445)	0,25 (0,435)	0,31 (0,461)	0,23 (0,421)	0,25 (0,430)
small business (< 20) <sup>d</sup>		0,51 (0,500)	0,47 (0,499)	0,48 (0,500)	0,46 (0,498)	0,49 (0,500)
<b>local labour market</b>						
unemployment rate <sup>n,t,r</sup>		12,30 (5,368)	12,59 (5,442)	11,38 (5,103)	13,33 (5,549)	11,75 (5,028)
unemployment index <sup>n,r,t</sup>		100,00 (0,000)	103,54 (14,185)	102,60 (15,013)	103,32 (13,380)	106,74 (15,557)
variation index <sup>n,r</sup>		0,42 (0,196)	0,42 (0,192)	0,39 (0,186)	0,43 (0,194)	0,39 (0,188)
% vanishing establishments <sup>n,r,t-1</sup>		9,81 (2,055)	10,54 (2,067)	10,14 (2,054)	10,71 (2,062)	10,61 (1,989)
east Germany <sup>d</sup>		0,29 (0,456)	0,28 (0,449)	0,19 (0,396)	0,34 (0,473)	0,19 (0,391)
<b>Cohort</b>						
1999 <sup>d</sup>		0,21 (0,410)	0,22 (0,415)	0,27 (0,444)	0,20 (0,401)	0,21 (0,407)
2000 <sup>d</sup>		0,24 (0,429)	0,25 (0,431)	0,27 (0,445)	0,24 (0,425)	0,24 (0,428)
2001 <sup>d</sup>		0,25 (0,432)	0,25 (0,430)	0,23 (0,418)	0,26 (0,436)	0,24 (0,429)
2002 <sup>d</sup>		0,29 (0,456)	0,29 (0,452)	0,23 (0,421)	0,31 (0,462)	0,31 (0,461)
<b>Profession</b>						
1 (primary sector) <sup>d</sup>		0,02 (0,132)	0,02 (0,127)	0,01 (0,114)	0,02 (0,134)	0,01 (0,118)
2 (trade/manufacturing) <sup>d</sup>		0,39 (0,488)	0,36 (0,479)	0,33 (0,469)	0,39 (0,488)	0,25 (0,433)
3 (commercial/administration) <sup>d</sup>		0,34 (0,474)	0,37 (0,482)	0,39 (0,488)	0,35 (0,478)	0,38 (0,484)
4 (transport/security/post) <sup>d</sup>		0,08 (0,270)	0,09 (0,286)	0,09 (0,280)	0,10 (0,294)	0,07 (0,259)
5 (medical/care) <sup>d</sup>		0,04 (0,185)	0,02 (0,153)	0,03 (0,180)	0,02 (0,128)	0,04 (0,193)
6 (education/social welfare) <sup>d</sup>		0,05 (0,216)	0,05 (0,218)	0,06 (0,241)	0,04 (0,198)	0,07 (0,255)
7 (else profession) <sup>d</sup>		0,09 (0,281)	0,10 (0,294)	0,09 (0,281)	0,08 (0,275)	0,18 (0,383)

explanation: d = dummy-variable, n = metric, r = regional information, t = time varying attribute  
the table displays mean statistics; standard deviation are in parenthesis

figure 1: sequence of employment states after quitting self-employment

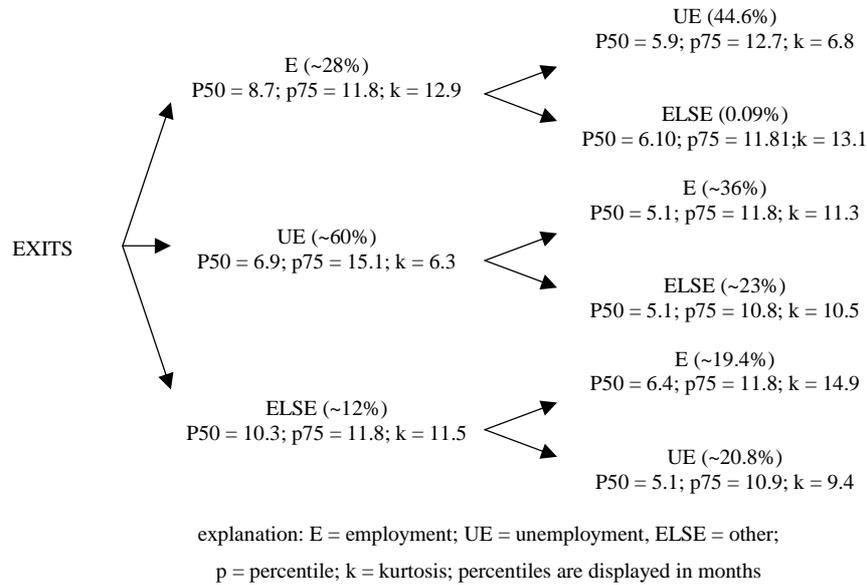


Table 3: LR-test and the entropy of nested models

block of variables	all	exits	
		employment	into unemployment
reference <sup>1</sup> (type 1)	LR: 2947* BIC: 439816	LR: 2590* BIC: 187077	LR: 2247* BIC: 315173
human capital <sup>2</sup> (H; type 2)	LR: 4365* BIC: 435610	LR: 978* BIC: 186258	LR: 3286* BIC: 312032
labour market <sup>3</sup> (R; type 3)	LR: 588* BIC: 435080	LR: 367* BIC: 185949	LR: 831* BIC: 311273
H*R <sup>4</sup> (type 4)	LR: 123* BIC: 435058	LR: 98* BIC: 185953	LR: 109* BIC: 311265

explanation: \* indicates a significant rejection of the null-hypothesis of the likelihood ratio test; the test relates (sequentially) to the less complex model

content of the blocks: type 1 (gender, age, cohort, profession, east/west); type 2 (short unemployment, minor job, number of job changes, schooling, academic degree, crafts master, management, commercial background, wage premium, small business); type 3 (unemployment rate, unemployment index, variation index, vanishing establishments); type 4 (interaction effects as displayed in table 4)

table 4: scale effects of the self-employment duration (without interaction effects)

	all exits		exits into employment		exits into unemployment	
<b>individual characteristics</b>						
male	0,101***	-8,239	0,152***	-7,524	-0,055***	(-2,943)
age	0,079***	-17,875	0,01	-1,441	0,098***	-16,601
age (squared)	-0,001***	(-17,842)	0	-1,18	-0,001***	(-18,188)
<b>motivation</b>						
short unemployment (< 4 months) <sup>d</sup>	0,287***	-18,874	0,206***	-9,607	0,303***	-17,52
minor job <sup>d</sup>	-0,108***	(-6,708)	-0,355***	(-11,714)	-0,016	(-0,968)
number of job changes <sup>n</sup>	-0,020***	(-5,540)	0,023***	-2,821	-0,036***	(-9,081)
number of job changes (squared) <sup>n</sup>	-0,219***	(-7,465)	-0,088**	(-2,463)	0,111***	-4,081
<b>qualification</b>						
schooling (>= high school) <sup>d</sup>	0,120***	-9,239	-0,055*	(-1,943)	0,259***	-15,953
academic degree <sup>d</sup>	0,047***	-3,135	-0,083***	(-2,725)	0,123***	-7,165
crafts master / foreman <sup>d</sup>	0,727***	-23,642	0,498***	-9,908	0,832***	-19,626
management <sup>d</sup>	0,127***	-6,286	-0,097***	(-2,854)	0,211***	-9,19
commercial background <sup>d</sup>	-0,059***	(-3,873)	-0,061***	(-2,607)	-0,051***	(-2,847)
wage premium <sup>d</sup>	0,177***	-15,398	0,031	-1,645	0,189***	-11,352
small business (< 20) <sup>d</sup>	0,264***	-31,326	0,208***	-12,74	0,293***	-23,205
<b>local labour market</b>						
unemployment rate <sup>n,t,r</sup>	-0,042***	(-6,896)	-0,004	(-0,670)	-0,068***	(-6,857)
unemployment index <sup>n,r,t</sup>	0,002**	-2,497	0,006***	-5,158	0,003	-1,409
variation index <sup>n,r</sup>	0,358***	-5,553	0,544***	-5,55	0,320***	-3,868
% vanishing establishments <sup>n,r,t-1</sup>	0,092***	-6,1	0,094***	-4,305	0,110***	-4,671
east Germany <sup>d</sup>	0,277***	-4,594	0,361***	-4,193	0,229***	-3,208
<b>cohort</b>						
year 1999 <sup>d</sup>						
year 2000 <sup>d</sup>	-0,128***	(-6,723)	-0,040*	(-1,664)	-0,176***	(-5,279)
year 2001 <sup>d</sup>	-0,258***	(-9,420)	0,024	-0,726	-0,414***	(-7,325)
year 2002 <sup>d</sup>	-0,429***	(-10,429)	0,016	-0,352	-0,647***	(-8,100)
<b>cluster of profession</b>						
1 (primary sector) <sup>d</sup>	-0,039	(-1,045)	0,146**	-2,371	-0,063	(-1,521)
2 (trade/manufacturing) <sup>d</sup>						
3 (commercial/administration) <sup>d</sup>	-0,221***	(-16,289)	-0,377***	(-14,034)	-0,148***	(-8,622)
4 (transport/security/post) <sup>d</sup>	-0,285***	(-16,870)	-0,344***	(-11,311)	-0,223***	(-10,448)
5 (medical/care) <sup>d</sup>	0,320***	-8,17	-0,014	(-0,201)	0,592***	-12,929
6 (education/social welfare) <sup>d</sup>	-0,182***	(-7,678)	-0,466***	(-11,307)	-0,004	(-0,145)
7 (else profession) <sup>d</sup>	-0,197***	(-9,760)	-0,216***	(-6,465)	-0,051***	(-2,829)
constant	1,322***	-10,391	3,173***	-14,553	1,620***	-6,385
sigma (constant)	0,244***	-17,987	0,566***	-33,894	0,223***	-7,222
theta (constant)	-0,512***	(-5,068)	0,621***	-5,664	0,592***	-5,343
observations	2044271		2044271		2044271	
chi2	7481,842		5022,665		5459,944	
bic	435080,34		185949,55		311273,18	

explanation: d = dummy-variable, n = metric, r = regional information, t = time varying attribute

table 5: scale effects of the self-employment duration (including interaction effects)

	all exits		exits into employment		exits into unemployment	
<b>individual characteristics</b>						
male	-0,413***	(-3,926)	0,327**	-2,364	-0,172	(-1,179)
age	0,079***	-17,814	0,01	-1,445	0,097***	-16,985
age (squared)	-0,001***	(-17,808)	0	-1,186	-0,001***	(-18,744)
<b>motivation</b>						
short unemployment (< 4 months) <sup>d</sup>	0,366***	-4,112	0,440***	-3,58	0,409***	-3,027
minor job <sup>d</sup>	0,267***	-4,417	-0,235**	(-2,432)	0,497***	-5,068
number of job changes <sup>n</sup>	-0,021***	(-5,536)	0,023***	-2,786	-0,036***	(-9,208)
number of job changes (squared) <sup>n</sup>	-0,220***	(-7,416)	-0,088**	(-2,465)	0,110***	-3,977
<b>qualification</b>						
schooling (>= high school) <sup>d</sup>	0,064	-0,512	-0,627***	(-3,956)	-0,056	(-0,327)
academic degree <sup>d</sup>	0,047***	-3,163	-0,083***	(-2,708)	0,123***	-7,214
crafts master / foreman <sup>d</sup>	0,052	-0,29	0,449	-1,35	-0,24	(-0,765)
management <sup>d</sup>	0,126***	-6,13	-0,099***	(-2,935)	0,210***	-9,14
commercial background <sup>d</sup>	-0,059***	(-3,875)	-0,060***	(-2,580)	-0,050***	(-2,774)
wage premium <sup>d</sup>	-0,001	(-0,012)	-0,129	(-0,778)	0,041	-0,227
small business (< 20) <sup>d</sup>	-0,139	(-1,269)	0,217	-1,578	-0,392***	(-2,661)
<b>local labour market</b>						
unemployment rate <sup>n,r</sup>	-0,041***	(-6,888)	-0,004	(-0,613)	-0,068***	(-7,059)
unemployment index <sup>n,r,t</sup>	0,000	-0,277	0,008***	-3,939	0,004	-1,326
variation index <sup>n,r</sup>	0,357***	-5,656	0,543***	-5,593	0,319***	-3,964
% vanishing establishments <sup>n,r,t-1</sup>	0,091***	-6,11	0,093***	-4,304	0,109***	-4,793
east Germany <sup>d</sup>	0,276***	-4,641	0,359***	-4,19	0,227***	-3,197
<b>interaction terms</b>						
male * labour market index (factor score)	0,005***	-5,023	-0,002	(-1,269)	0,001	-0,8
schooling (>= hs) * labour market index	0,001	-0,449	0,006***	-3,702	0,003*	-1,805
crafts master / foreman * labour market index	0,007***	-3,861	0,000	-0,159	0,011***	-3,44
short unemployment * labour market index	-0,001	(-0,904)	-0,002*	(-1,916)	-0,001	(-0,787)
number of job changes * labour market index	-0,004***	(-6,187)	-0,001	(-1,299)	-0,005***	(-5,254)
wage premium * labour market index	0,002*	-1,808	0,002	-0,979	0,001	-0,813
small business * labour market index	0,004***	-3,715	0,000	(-0,065)	0,007***	-4,637
<b>cohort</b>						
year 1999 <sup>d</sup>						
year 2000 <sup>d</sup>	-0,128***	(-6,744)	-0,039	(-1,644)	-0,178***	(-5,490)
year 2001 <sup>d</sup>	-0,258***	(-9,557)	0,023	-0,7	-0,416***	(-7,640)
year 2002 <sup>d</sup>	-0,426***	(-10,631)	0,014	-0,307	-0,646***	(-8,444)
<b>cluster of profession</b>						
1 (primary sector) <sup>d</sup>	-0,038	(-1,025)	0,145**	-2,351	-0,062	(-1,507)
2 (trade/manufacturing) <sup>d</sup>						
3 (commercial/administration) <sup>d</sup>	-0,220***	(-16,432)	-0,378***	(-14,076)	-0,148***	(-8,787)
4 (transport/security/post) <sup>d</sup>	-0,284***	(-16,782)	-0,345***	(-11,349)	-0,222***	(-10,511)
5 (medical/care) <sup>d</sup>	0,320***	-8,125	-0,014	(-0,200)	0,592***	-12,898
6 (education/social welfare) <sup>d</sup>	-0,183***	(-7,718)	-0,464***	(-11,336)	-0,005	(-0,176)
7 (else profession) <sup>d</sup>	-0,197***	(-10,002)	-0,216***	(-6,473)	-0,051***	(-2,866)
constant	1,525***	-8,71	3,010***	-11,917	1,560***	-5,233
sigma (constant)	0,243***	-18,455	0,566***	-33,411	0,223***	-7,647
theta (constant)	-0,503***	(-5,302)	0,610***	-5,625	0,585***	-5,709
observations	2044271		2044271		2044271	
chi2	9109,696		5648,714		6365,152	
bic	435075,28		186029,32		311268,5	

explanation: d = dummy-variable, n = metric, r = regional information, t = time varying attribute

table A1: definition of the variables

male	Sex is male. Source: Employment History.
age	Age of the founder at the begin of the self-employment episode. Source: Employment History.
schooling (>= high school)	Schooling equals high school degree or higher (Germany: Abitur / Fachabitur). Source: Job Search Register.
academic degree	The founder holds an academic diploma (university or college). Source: Job Search Register.
crafts master / Foreman	The founder has worked as a crafts master or foreman (job position) in last employment episode before starting the business. Excluded are employment episode with a daily income lower than 5 Euro or less than 60 days of employment (valid employment episode). Source: Employment History.
management	The founder has worked in a management position in the last employment episode before starting the business. Source: Job Search Register.
commercial background	The founder is experienced and (formally) trained in a commercial profession. Source: Job Search Register (apprenticeship information); Employment History (using the two digit classification of a selected set of professions; experience).
short unemployment	The unemployment duration before setting up the business is lower than 3.5 months (difference between last employment and begin of the promoted self-employment episode; missing values are imputed). Source: Employment History
job Changes	Number of distinct two digit classified professions during the last two years before starting the business. Source: Employment History.
minor job	Founder has worked in a minor job of the last valid employment episode before setting up the business. Source: Employment History.
wage-premium	Identifies if a founder has earned 1.66 times more than the expected monthly wage income in the last valid employment episode. The expected income is a regressed function of the income and a selected set of covariates (e.g. age, schooling, job changes, gender, job position, size of the establishment) conditional on the type of profession and part- or full time. Source: Employment History.
size of establishment / small business	Size of the Establishment: modus of the number of employees of the establishments during the last five years before setting up the business. Source: Establishment History Panel. Small Business: The founder has usually worked (modus of the last five years) in establishments with less than 20 employees. Source: Establishment History Panel.
unemployment rate (UER)	Monthly unemployment rate of the local labour market district. This information is merged with the micro data after having split the data set every three months. Berlin is treated as one region (un-weighted average). Source: Employment Statistics.
unemployment index	Time varying covariate that covers a normalized unemployment rate relatively to the starting point (index = $UER*100/UEER$ ). Source: Employment Statistics.
variation index	Captures the variation of the monthly unemployment rate for each local labour market district. The index relates to the square root of the squared mean error of a time series estimation. Source: Employment Statistics.
share (%) of vanishing establishments	Identifies the share of establishments that are found in t-1 but do not exist in t in the local labour market district. Source: Establishment History Panel.
cohort	Represents the year the founder has set up the business. Source: Participation in Measure Register.
profession	Distinguishes seven cluster of professions based on a two digit job classification related to the last valid employment episode. Source: Employment History.
exit	Equals one if there is a non-self-employment episode after having started the business (begin of the promotion). Source: using all sources of the IEB.
exits into	Identifies the first type of spell after having started the business. The Identification distinguishes between a) employment, b) unemployment or participation in measure and c) else. Before identifying these spells the data set is reorganized at summarizing different types of spells. Source: using all sources of the IEB.
duration in self-employment	The duration of self-employment is the difference of the begin date of the promotion (start-up of the business) and the date of the first non-self-employment episode after having started the business. Censoring refers to the 31. dec 2005.
clustering the local labour market districts	I used an approximation the results of Eckey et al. 2006 and 2007: I clustered the following local labour market districts 1. Berlin 2. Hamburg, Lüneburg, Oldesloe 3. Hannover, Hameln, Celle Nienburg 4. Verden, Oldenburg, Bremen 5. Oschatz, Leipzig, Altenburg 6. Köln, Bonn, Brühl 7. Solingen, Wuppertal, Düsseldorf 8. Rheine, Ahlen Münster 9. Krefeld, Wesel 10. Essen, Oberhausen 11. Halle, Sangerhausen 12. Gießen, Wetzlar 13. Zwickau, Annaberg, Chemnitz 14. Nürnberg, Ansbach, Weißenburg 15. Dresden, Pirna, Riesa 16. Saarbrücken, Saarlouis, Neunkirchen, 17. Karlsruhe, Landau, Rastatt, 18. Frankfurt, Offenbach, Limburg 19. Bochum, Dortmund, Hamm 20. Agenturbezirke Berlin