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Leaving Unemployment for Self-employment

A Discrete Duration Analysis of Determinants and
Stability of Self-employment among Former Unemployed

Frank Reize

Non-technical summary

The paper investigates the transition from unemployment to self-employment, which has become an important re-employment opportunity due to increasing subsidies during the last decade. The transition is subsidised with the so called bridging allowance (BA, "Überbrückungsgeld") as part of active labour market policies in Germany. So far, there have been only few attempts to analyse the effects of BA on labour market success or income. The fundamental problem of every programme evaluation is that a participant is never observed in the case of non-participation. In this study I will address this problem by introducing the unemployed who move into paid-employment as a control group for those entering self-employment.

On behalf of this comparison, the paper aims to identify, firstly, the determinants of self-employment among the unemployed, and secondly, the differences in employment duration among those entering self-employment and those entering paid-employment initially after unemployment. Thirdly, this paper demonstrates the effects of BA at the individual level on the basis of the first 14 waves of the German Socio-Economic Panel (GSOEP) covering the years from 1983 to 1996. The analysis shows that the determinants of self-employment among the unemployed are similar to the determinants of transitions from paid-employment to self-employment. Furthermore, the hypothesis that self-employment is a reaction of unemployed job applicants on discrimination by the employer can be rejected: Among the unemployed, those entering self-employment in fact have a higher educational degree than those entering paid-employment. This result is confirmed by the analysis of job stability, which yields higher survival rates in self-employment than in paid-employment. Moreover, and this is particularly important in the context of the evaluation of self-employment as a (permanent) way out of unemployment, the self-employed, given their characteristics, face a lower risk to become unemployed again than they would have faced, if they had entered paid-employment.

One political advice which emerges from the analysis is that an unrestricted grant of BA can be important, as it can lower capital constraints and therefore open the door to self-employment for more unemployed who are suited for self-employment. However, one should also have in mind that a very liberal use of BA or even an extension of BA can cause serious dead-weight effects. BA in the actual form may help more unemployed people to become self-employed, but on the other hand it may "help" more dependent workers who are already willing to start a business to become (temporary) unemployed in order to get in favour of the subsidy. The fact that the self-employed people emerging from unemployment are a positive selection supports the possibility of dead-weight effects. Therefore, the shortcoming of this programme is rather represented by the circumstance that the grant of BA is non-refundable than by the fact that the funds are hardly limited.

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Abstract

The paper investigates the determinants and the success of self-employment among former unemployed. Self-employment has become an important re-employment opportunity during the last decade due to increasing subsidies. The econometric analysis is carried out using discrete hazard rate models on 14 waves of the German Socio-Economic Panel, covering the period from 1983 to 1996. I do not find any effects of unemployment duration on the transition from unemployment to self-employment. Moreover, unemployed people entering self-employment have higher skills than the average of the unemployed population and self-employment seems to be more stable than paid-employment would have been because people face a lower risk of becoming unemployed again.

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1 Introduction

In times of high unemployment, as in the last decade, new instruments of active labour market policy have become popular. Beside the classical programmes like training or re-education, most industrialised countries introduced programmes to promote the transition from unemployment to self-employment. In the view of most politicians, a higher rate of self-employment is promising innovation and growth for the economy. Therefore, politics try to establish a "new culture" of self-employment to open up new sources of employment which in turn shall help to reduce unemployment.

In Germany, the increase in promotion led to a rising number of self-employed people in the 1990s. Especially among the unemployed a growing number of people has become self-employed. Between 1991 and 1998 450,000 unemployed were promoted by the so called bridging allowances (Überbrückungsgeld) to become self-employed. On this occasion, the figures rose from 13,000 in 1991 to almost 100,000 in 1998, which determined about one fifth of all the new self-employed people. The aim of bridging allowances (BA) is to reduce unemployment, directly by re-employment and indirectly by additional job creation of the just established firms. In 1998 the expenditure for BA was about 1.2 billion DM.

So far, there have been only few attempts to analyse the effects of BA on labour market success or income. The fundamental problem of every programme evaluation is that one would like to compare the labour market outcome of a programme participant with the labour market outcome of the same participant, if he or she had not participated in the programme. The latter, however, is never observable. To assess this problem, an adequate control group has to be found for the group of participants (treatment group). Such a control group has to share the same characteristics as the treatment group before participation takes place, but must not benefit from the programme. In terms of BA, this is given e.g. by those unemployed who enter paid-employment instead of self-employment . A study of Wießner (1998) analyses the employment status and income situation of the promoted unemployed three years after transition. Whereas Wießner's investigation is lacking any control group, another study by Pfeiffer and Reize (2000) is based on firm level data using non-subsidised start-ups as control group.

To assess the impacts of BA at the individual level, three questions have to be answered. First: Who are the unemployed entering self-employment? Second: How stable is self-employment out of unemployment? Third: Is the success of self-employment affected by the grant of BA? The aim of this study is to answer those three questions by using the first 14 waves of the German Socio-Economic Panel (GSOEP) covering the years from 1983 to 1996. The advantages of the GSOEP are its longitudinal nature as well as the monthly collected information about employ-

ment status, which enables to identify the transition from unemployment to other employment states. By means of this information, I am able to compare the transition from unemployment to self-employment with the transition from unemployment to paid-employment.

The analysis is carried out in two steps. In the first step, the determinants of self-employment are estimated. This can be done in two ways. One possibility is to model the decision to become self-employed within the framework of utility maximisation[1] and another one is to model unemployment duration based on search theory. To the best of my knowledge, neither investigations of the decision for self-employment nor analysis of unemployment duration have combined these two labour market states so far. The former studies mostly ignore the status of unemployment, solely modelling the transition from paid-employment to self-employment and the latter mostly ignore the possibility to move into self-employment (exceptions are e.g. Addison and Portugal, 1999, Bryson and White, 1996 and Carrasco, 1999). The present study tries to combine both approaches by means of a discrete hazard rate model, explicitly estimating the transitions from unemployment to self-employment and paid-employment, respectively. Furthermore, an individual specific effect to control for unobserved population heterogeneity and time-varying characteristics, which are important according to both theories, are included in the estimation.

In the second step, the success of self-employment is estimated using the same framework of discrete hazard rate models. Unfortunately, the GSOEP does not provide any information on BA. Therefore, it is impossible to estimate the effect of BA on employment stability or income directly. However, this shortcoming is mitigated in two ways. Firstly, given the institutional arrangements it is very unlikely that an unemployed moves into self-employment without promotion (see section 2.2). Secondly, it is possible to identify the effects of several legal changes of BA since 1986 on the stability of self-employment. Hence, the focus of this paper is to compare transitions from unemployment to self-employment with transitions from unemployment to paid-employment in terms of stability. This is done with respect to the risk of becoming unemployed again, taking into account the characteristics of the self-employed. Besides, the third question, concerning the effects of BA, is addressed within the analysis of the impacts of legal changes.

The paper is structured as follows. The next section briefly discusses the two theoretical frameworks mentioned above and the institutional arrangements of BA, whereas section three issues some empirical findings on BA and the transition from unemployment to self-employment. Section four provides the econometric model. In the subsequent section, the data are described. Estimation results are discussed in section six, followed by the conclusions.

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[1] For an extensive study of self-employment in Germany, see Pfeiffer (1994).

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2 Theoretical Framework and Institutional Arrangements

2.1 Theoretical Framework

Concerning the transition from unemployment to self-employment, theory provides two points of departure. The first one is the decision to become self-employed rather than paid-employed as a dynamic utility maximisation problem. This decision depends on the attractiveness of available alternatives, given prevailing governmental conditions.[2] Attractiveness will depend on the initial financial endowment, human capital, risk aversion, the wish for independence, social and family networks and other factors determining preferences as well as costs and benefits (mainly expected incomes).[3]

An unemployed person will decide in favour of self-employment, if the present value of the stream of expected utilities is higher compared to remaining unemployed or to becoming a dependent employee, taking into account the possibilities of firm closure or the probability of finding a job. Additionally, substantial inputs have to be provided prior to firm foundation which might have, in part, the characteristics of sunk costs. These include investments in product and production ideas, in human capital, in the establishments of networks with suppliers and customers, and in capital, which depend on both the legal form of the start-up and the particular trade or industry. Such transition costs hardly arise for the transition to dependent employment.

While this theory mainly explains the decision either to become self-employed or a paid worker, micro-economic search theory provides a guideline for analysing search behaviour of the unemployed, i.e. leaving unemployment or not, no matter into which state.[4] In its simplest form search theory assumes an unemployed individual, facing a known wage distribution and job offers at a constant arrival rate, choosing a reservation wage that maximises the present value of the stream of expected utilities which is a function of leisure and income (see e.g. Mortensen, 1977). The unemployed decides to quit unemployment, if the expected wage of the next job offer or the expected gain from self-employment lies above the reservation wage. In a next step, the determinants of the reservation wage are being identified. If one

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[2] According to the German economic and trade regulations, in principle everybody is allowed to start a business in most parts of the private sector of the economy. However, in the craft sector as well as in some professional occupations (for example lawyer, doctor) special examinations or vocational degrees, and in the banking and insurance sector some minimum requirements with respect to initial capital are a necessary precondition for becoming self-employed.

[3] See e.g. Lucas (1978), Kihlstrom and Laffont (1979) or Evans and Jovanovic (1989).

[4] For comprehensive studies of unemployment duration in Germany, see e.g. Hunt (1995), Steiner (2000) or Wurzel (1993).

takes unemployment insurance as a search subsidy, then search or unemployment duration will be longer the higher this subsidy is compared to the expected gains form working. Thus, the probability of escaping unemployment (the hazard rate of unemployment) negatively depends on the ratio of unemployment assistance and expected income from wage work or self-employment, the so called income replacement ratio (IRR).

Thus, the discussion of those two economic theories lead to some essential variables explaining the transition from unemployment to self-employment: e.g. expected income, risk aversion, wish for independence, human capital, assets, IRR, social background etc..

Beside these factors, costs and benefits of self-employment or paid-employment are determined by aggregate economic factors as well. A shift from unemployment to employment might be more likely to occur in a phase of general economic growth, since in such a phase, profit expectations and hiring rates of firms might be higher. This might also favour the transition from unemployment to self-employment. Contrarily, a weak labour market can also be a decisive factor for becoming self-employed. In times of increasing unemployment, an unemployed person might be "forced" into self-employment due to the poor prospects of finding a job. In the literature there is a debate about the relevance of unemployment push vs. demand pull factors for company formations (see e.g. Meager, 1992, and Staber and Bögenhold, 1993). The notion of demand pull and unemployment push is, however, far from being conclusive from a theoretical point of view. It remains an empirical question whether higher or lower unemployment rates lead more people to become self-employed or not.

2.2 Institutional Arrangements of bridging allowances

The transition from unemployment to self-employment is subsidised as part of active labour market policies in Germany. In order to allow and facilitate this transition, the Federal Employment Services may pay what is known as a bridging allowance (Überbrückungsgeld) according to §57 of the 3rd Social Security Code (SGB III).[5] The bridging allowance (BA) was first introduced with the 7th amendment to the Labour Promotion Law (AFG) on January 1st, 1986. Since then, BA has been facing several legal changes, when periods of more liberal use were followed by periods of rather restrictive use and vice versa (see Table 1).[6] Nevertheless, these periods have certain communities. Firstly, the applicant for BA has to be registered as

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[5] Until January 1, 1998, the legal foundation was §55a of the Labour Promotion Law (AFG).

[6] For a more detailed discussion on the legal regulations of BA, see Kaiser and Otto (1990), Brinkmann and Otto (1996) and Wießner (1998).

unemployed for at least one month.[7] Secondly, the activity has to consist of at least 15 hours a week. A competent authority has to assess the sustainability of the self-employment envisaged. Such an authority can be a chamber of commerce and industry, a trade or professional association or a tax consultant. As a rule, it is the task of the unemployed to achieve the assessment which ensures that the business earns, in time, a gross monthly income that represents at least two thirds of the income of an employed person.

The main tools of adjustment for BA are the required duration of unemployment, the duration of promotion and the amount of promotion. In a first period, from January 1986 to July 1987, BA was not restricted; i.e. every unemployed person registered for at least ten weeks was promoted for 13 weeks with the amount of the last paid unemployed assistance.[8] From August 1988 to July 1994, BA was employed restrictively, because public funds were limited to a certain amount. The duration of promotion varied between 8 and 26 weeks and depended on the duration of unemployment. The maximum grant was paid only if unemployment lasted more than 12 and up to 18 months. The amount of promotion was also restricted to a maximum between 300 and 350 DM per week. Finally, not all unemployed willing to become self-employed and fulfilling the legal requirements were promoted. This was mainly the case at the end of a year when the public funds were exhausted.

The introduction of the Employment Promotion Law (Beschäftigungsförderungsgesetz) on August 1, 1994 represents the most recent legal change of BA, implicating a considerable improvement in terms of promotion. Since August 1994, BA has generally been granted to people unemployed for at least four weeks. Promotion duration is in general for 26 weeks and amounts for the lastly paid unemployed assistance. In addition, during the time of support the contributions to health and nursing insurance, as well as to the retirement fund, are financed in an amount equal to the social security contributions which were last paid for the unemployed person.

In 1998, the financial expenditure supporting the transition from unemployment to self-employment amounted to an average of approximately 12,700 DM per unemployed person (see Table 2), which is almost three times more than in 1986. After 1994, the growing unemployment and the improvement in terms of promotion led to

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[7] §55a (1) of the AFG or §57 of SGB III. The people that were supported not only include the unemployed ones, but also people threatened by unemployment, i.e. workers with reduced hours and employees who have participated in work creation measures according to §91 to 96 AFG or measures according to §249h and §242s AFG. The latter ones support the reintegration of unemployed people by financing environmental protection, social and youth work, especially in East Germany.

[8] During this period, the regulations were slightly eased, so that the required minimum duration of unemployment was reduced to four weeks and promotion extended to 26 weeks.

a significant raise in the employment of BA from 25,835 cases in 1993 to almost 100,000 cases in 1998 and thus to an increase in total expenditures.[9] The rising number of self-employed people out of unemployment also affected the total number of self-employed persons. During the last decade self-employment in Germany has grown considerably from about 3 million to almost 3.6 million (see Table 2). Nearly one sixth of the new self-employed were formerly unemployed.

According to the terms of the promotion, an unemployed person does not lose his or her right to unemployment payments or assistance by a transition to self-employment. Thus, even with very low expected revenues, the transition to self-employment seems to be attractive for economic reasons, at least in the short run and for people facing poor prospects as wage workers or slack labour markets. This corresponds to recent work in sociology providing that groups which are possibly discriminated in labour markets are more likely to become self-employed (see e.g. Meyer, 1990). An explanation for such behaviour is that the disadvantages faced by these groups reduce wage earnings relatively more than they reduce self-employment earnings. Therefore, the disadvantaged tend to select themselves into self-employment. The estimation of the determinants of self-employment among former unemployed can show if self-employment is the last chance of an unemployed to get re-employed or if it is chosen by those who are better qualified, have higher financial endowment or social networks. The latter is usually the case among paid workers moving into self-employment.

Moreover, the grant of BA can have a positive effect on the probability of becoming self-employed due to higher capital endowment and lowered capital constraints. An unemployed person subsidised with BA might not have to rely on credits anymore. Consequently, BA might enable more unemployed people to enter self-employment as it would be the case without that programme. On contrary, BA can also yield dead-weight effects, if an unemployed would have moved into self-employment without subsidisation, too. An even worse impact of BA would be that it leads to a higher number of (short-term) unemployed. So, it is likely that dependent workers, who are already willing to start a business, become unemployed in order to get BA.

Beside the impact on the determinants of self-employment, the form of promotion also has impacts on the duration of self-employment. However, these impacts may have different implications. On the one hand, higher capital endowment improves the survival probability in self-employment. On the other hand, due to the fact that an unemployed does not lose his or her right to unemployment benefits, BA extends

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[9] However, the importance of BA is relatively low compared to training measures. In 1996, the expenditure for active labour market policy amounted to 41.2 billion DM altogether. One billion DM was spent on bridging allowance compared to almost 18 billion DM spent on training measures.

the entitlement period by six months. Insofar, opportunistic behaviour cannot be excluded, i.e. an unemployed person may enter self-employment just to receive unemployment benefits for half a year longer, instead of seeking for a stable employment opportunity. Such behaviour may reduce the success of self-employment compared to paid-employment. Hence, one should have these opposite impacts in mind when interpreting the estimates of self-employment duration.

3 Previous Empirical Findings

In order to obtain results on both the use and success of BA, the Institute for Employment Research in Nuremberg (IAB) carried out several descriptive analyses on recipients of BA. The first sample contained people who received BA between 1986 and 1988 (see Kaiser and Otto, 1990). The aim was to determine the influence of legislative changes on the granting of BA, the tendency to become unemployed again after the subsidisation and the socio-demographic structure of the BA recipients.

The second survey on BA began in 1994. The IAB obtained a full census of the founder cohort during 1994/95 in 15 selected labour market districts. The 4,486 unemployed receiving BA can be subdivided into "old cases" (BA in the $1^{st}/2^{nd}$ quarter of 1994 before the promotion terms were improved on August 1, 1994) and "new cases" (4th quarter 1994, $1^{st}/2^{nd}$ quarter 1995). For an analysis of the differences in the socio-economic structure of the recipients of payments, see Wießner (1998). 38 weeks after the start-up, 5.4 % were again registered as unemployed; after 78 weeks, this figure rose to 6.9 %. The study could not find any differences between old and new cases. The unemployed founders were surveyed again in 1997. 70.4 % were still self-employed, 12 % were working in an employment relationship that was subject to social security payments and approximately 13 % were registered as unemployed.

So far, an econometric analysis on the effects of BA is only provided by the study of Pfeiffer and Reize (2000). Their analysis is based on firm level data using non-subsidised start-ups as control group. They investigate business start-ups promoted by BA in comparison to non-subsidised start-ups and find a negative effect of BA on firm survival and no significant differences in firm growth for Eastern Germany. For Western Germany, there are significant differences neither in firm survival nor in firm growth between the two groups of firms.

For other countries than Germany, there exist only few studies regarding the transition from unemployment to self-employment. For the United States, Evans and Leighton (1989, 1990) analyse the probability of being self-employed including a dummy variable indicating unemployment. They find that the unemployed are more likely to become self-employed than the formerly paid-employed. Moreover, they

obtain the result that the formerly unemployed who enter self-employment have lower earnings than those entering paid-employment do. Thus, white males face earnings that are 34.4 % lower than the ones of their previous jobs if entering self-employment but 3.0 % higher if entering wage work. Evans and Leighton (1990) also compare the determinants of self-employment among the unemployed and paid-employed. They find similar results for both groups, e.g. that a higher educational degree favours the transition to self-employment. Besides, they claim that unemployment duration has no effect on the probability of entering self-employment. In contrast, Alba-Ramirez (1994) obtains a positive effect of unemployment duration on the probability of becoming self-employed among Spanish and U.S. workers who recently moved out of non-agricultural wage work. In Spain, unemployment duration has also a positive effect on the possibility of choosing a low quality self-employment, e.g. part-time work or holding another job, whereas in the U.S. the former long-term unemployed among the self-employed are more likely to occupy low quality jobs compared to the paid-employed. Whereas these studies rely on cross-sectional information on job status and therefore taking unemployment or unemployment duration as exogenous, the study of Carrasco (1999) uses spell information for Spain. Using competing risks discrete hazard rate models she obtains a stronger negative effect of unemployment benefits on transitions from unemployment to self-employment than on transitions from unemployment to paid-employment. She also finds that previous unemployment among the self-employed increases the risk of re-entering unemployment more than the risk of re-entering paid employment.

The focus of those studies is rather to find empirical evidence for the theory of self-employment as a reaction of discrimination than to compare self-employment and paid-employment among the former unemployed. As a consequence these studies mainly compare self-employment out of unemployment with self-employment out of paid-employment.

The most comparable study to my analysis is the report of Bryson and White (1996) for the United Kingdom. They analyse the determinants and the success of self-employment among former unemployed using discrete hazard rate models. Like Evans and Leighton (1990), they find that better labour market histories among all unemployed and higher qualification among unemployed women favour the transition to self-employment. In contrast to previous findings, unemployment duration proves to be insignificant. Moreover, assets and previous self-employment show up to be important determinants of the transition to self-employment. Macroeconomic factors are working in opposite direction for men and women. For men, pull-factors are important for leaving unemployment for self-employment, whereas for women push-factors are dominant. Concerning the stability of self-employment, Bryson and White (1996) find that self-employment is more stable than paid-employment in terms of re-entering unemployment, whereas age has a negative and duration has a

positive effect on surviving in self-employment among men. In contrast to Evans and Leighton (1990), they do not find any differences in earnings between the self-employed and the paid-employed among men.

This paper will go beyond previous research by using discrete hazard rate models to estimate the transitions from unemployment to self-employment and the duration in self-employment. It incorporates unobserved heterogeneity, which affects mainly the influence of time dependence on the transition rate. Neither the work of Bryson and White (1996) nor the one of Carrasco (1999) modelled unobserved heterogeneity.

4 Econometric Modelling of Transitions into and out of Self-employment

4.1 Evaluation Methodology

The empirical model is divided in two different stages of transition (see Figure 1) to address the questions: who is entering self-employment, how stable is self-employment and can the grant of BA affect employment stability. In a first stage, unemployment duration is investigated to obtain the determinants of self-employment. As possible exit states self-employment, paid-employment and out-of-the-labour-force are regarded.

To measure the stability of a chosen occupation and the effects of BA on employment stability the methodology of programme evaluation is used. The fundamental problem of every programme evaluation is that one would like to compare the labour market outcome of a programme participant with the labour market outcome of the same participant, if he or she had *not* participated in the programme. The latter, however, is never observable. Therefore, to assess this problem, one has to find an adequate control group for the group of participants (treatment group). Such a control group has to share the same characteristics as the treatment group before participation takes place, but must not benefit from the programme. In terms of BA, two different control groups can be considered to address two different issues. The first issue to be addressed is whether an unemployed person is generally suited for self-employment or not. Therefore, employment duration of those entering self-employment is compared to employment duration of those entering paid-employment. If self-employment proves to be at least as stable as paid-employment, then in a further step the effects of BA on employment duration have to be estimated. For such an analysis one would like to compare the self-employed out of unemployment obtaining BA with those without promotion. Unfortunately, the GSOEP does not provide any information on the grant of BA. Therefore, the effects of BA on employment duration can only be measured as effects of legal changes in the grant of BA.

Since the aim of this study is to compare self-employment and paid-employment in terms of their impact on the risk of re-entering unemployment, non-employment is modelled as a single state of exit including the states of unemployment and out-of-labour-force (see Figure 1). Furthermore, the duration of employment is modelled ignoring transitions from self-employment to paid-employment and vice versa. Consequently, the differentiation between self-employment and paid-employment is being abandoned, except for the initial state out of unemployment. Employment duration is then estimated separately for those initially entering self-employment and for those initially entering paid-employment, respectively.

4.2 Econometric Modelling

For the econometric analysis discrete hazard rate models including unobserved heterogeneity are used to measure the determinants and the stability of self-employment compared to paid-employment.[10] For both stages, reduced forms are estimated. Given the monthly information in the GSOEP on employment status and the associated heavy ties of observations, the use of discrete time models rather than continuous time models seems to be appropriate.

The basic concept of discrete hazard rate models is to divide the variable of interest, namely duration of a specific process, into t discrete time intervals. Now assume T as a non-negative random variable, taking integer values only, which denotes the amount of time spent in a certain state before transition or censoring occurs. Then $T = t$ if transition occurs and $T > t$ if the spell is censored. The framework of discrete hazard rate models proceeds by defining the hazard rate $\lambda_{i,j}^{k}$ as the probability for the i-th individual in spell k to leave into state j during the time interval t conditional on occupying this state until t, i.e.

(1) $\quad \lambda_{i,j}^{k}(t_i \mid x_{ij}(t), \varepsilon_i) = \Pr[T_i^k = t_i, \Omega = j \mid T_i^k \geq t_i, x_{ij}(t), \varepsilon_i]$,

$\quad\quad i = 1...N ; k = 1...K_i; j = 1...J_i.$

$x_i(t)$ is a vector of (time-varying) covariates (see section 5) for individual i, and ε_i is an individual and time-invariant effect, which accounts for unobserved population heterogeneity and is assumed to be uncorrelated with the observable individual characteristics $x_{ij}(t)$. In the stage of unemployment duration analysis $\Omega = 1$ if transition is into self-employment, $\Omega = 2$ if transition is into paid-employment and $\Omega = 3$ if transition is into out-of-labour-force. In the second stage, only one state (non-employment) is considered.

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[10] For a survey on duration models see e.g. Petersen (1995).

The overall hazard rate is given as the sum of the state specific rates. This is

$$(2) \quad \lambda_i^k(t_i \mid x_i(t), \varepsilon_i) = \sum_{j=1}^{J_i} \lambda_{i,j}^k(t_i \mid x_{ij}(t), \varepsilon_i).$$

The probability of surviving a specific interval t, i.e. staying unemployed in the first stage or staying employed in the second stage, conditional on having been in this state until $t\text{-}1$ is given by

$$(3) \quad 1 - \lambda_i^k(t_i \mid x_i(t), \varepsilon_i) = \Pr[T_i^k > t_i \mid T_i^k \geq t_i, x_i(t), \varepsilon_i].$$

This leads to the unconditional probability of remaining in the original state, the so-called survivor function, which is defined as

$$(4) \quad S_i^k(t_i \mid x_i(t), \varepsilon_i) \equiv \Pr[T_i^k > t_i \mid x_i(t), \varepsilon_i] = \prod_{s=1}^{t_i-1}(1 - \lambda_i^k(s \mid x_i(s), \varepsilon_i)).$$

Thus, the unconditioned probability of leaving the original state into state j in interval t can be expressed in terms of the respective hazard rates as

$$(5) \quad \Pr[T_i^k = t_i \mid x_i(t), \varepsilon_i] = \lambda_i^k(t_i \mid x_i(t), \varepsilon_i) \prod_{s=1}^{t_i-1}(1 - \lambda_i^k(s \mid x_i(s), \varepsilon_i)).$$

The next step is to specify a functional form for the hazard rate. For this analysis, the logistic function is used as a non-proportional hazard specification.[11] Therefore, the hazard rate is given as

$$(6) \quad \lambda_{i,j}^k(t_i \mid x_{ij}(t), \varepsilon_i) = \frac{\exp(\alpha_j(t) + \beta_j' x_{ij}(t) + \varepsilon_i)}{1 + \sum_{l=1}^{L} \exp(\alpha_l(t) + \beta_l' x_{ij}(t) + \varepsilon_i)},$$

and the survivor function as

$$(7) \quad S^k(t_i \mid x_{ij}(t), \varepsilon_i) = \prod_{s=1}^{t_i-1} \frac{1}{1 + \sum_{l=1}^{L} \exp(\alpha_l(s) + \beta_l' x_{il}(s) + \varepsilon_i)}.$$

$\alpha_j(t)$ is the so-called baseline hazard rate, which describes the dependence of the hazard rate on process time (duration dependence). The baseline hazard rate is mod-

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[11] The non-proportional specification has less restrictive assumptions than proportional hazard rate models, which assume that effects of the covariates on the hazard rate are independent of duration. See e.g. Kalbfleisch and Prentice (1980) or Lancaster (1990) for more details.

elled as piece-wise constant hazard rate by using dummy-variables for different categories of process time. Such a flexible (non-parametric) modelling seems to be important to avoid serious misspecifications. Narendranathan and Stuart (1993) claim the importance of modelling the baseline hazard rate non-parametrically to avoid biased estimates due to parametric misspecifications, compared to model the unobserved heterogeneity non-parametrically as suggested by Heckman and Singer (1984).

The competing risks of leaving unemployment are estimated separately for the transition to self-employment and the transition to paid-employment, keeping the other states always as right censored.[12] The stage of out-of-labour-force is not modelled explicitly. Therefore, spells ending in this state are always treated as right-censored. Thus, we can define four indicator variables for the unemployment duration model, which are

$$\delta_{i1}^k = \begin{matrix} 1 & \text{if the k-th unemployment spell ends in self-employment} \\ 0 & \text{otherwise} \end{matrix},$$

$$\delta_{i2}^k = \begin{matrix} 1 & \text{if the k-th unemployment spell ends in employment} \\ 0 & \text{otherwise} \end{matrix},$$

$$c_{i1}^k = \begin{matrix} 1 & \text{if the k-th unemployment spell ends in employment or out-off-labour-force or is right-censored} \\ 0 & \text{otherwise} \end{matrix} \text{ and}$$

$$c_{i2}^k = \begin{matrix} 1 & \text{if the k-th unemployment spell ends in self-employment or out-off-labour-force or is right-censored} \\ 0 & \text{otherwise} \end{matrix}.$$

For the employment duration models, similar indicator variables can be derived. These are

$$\delta_{i3}^k = \begin{cases} 1 & \text{if the k-th employment spell initially beginning in self-employment ends in non-employment} \\ 0 & \text{otherwise} \end{cases},$$

$$c_{i3}^k = \begin{cases} 1 & \text{if the k-th employment spell initially beginning in self-employment is right-censored} \\ 0 & \text{otherwise} \end{cases},$$

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[12] This simplification may have an effect on the overall hazard rate from unemployment if the unobserved characteristics are common to or correlated across the states (see Petersen, 1995). This should be a minor issue in this analysis, which concentrates on the state specific hazard rates rather than on the overall rate. The extension to a multinomial model could in principle be realised, but due to the complexity of incorporating unobserved heterogeneity (i.e. a CPU time of several weeks) this is beyond the scope of this paper.

$$\delta_{i4}^k = \begin{cases} 1 & \text{if the k - th employment spell initially beginning in paid - employment ends in non - employment} \\ 0 & \text{otherwise} \end{cases} \quad \text{and}$$

$$c_{i4}^k = \begin{cases} 1 & \text{if the k - th employment spell initially beginning in paid - employment is right - censored} \\ 0 & \text{otherwise} \end{cases}.$$

For each of the four models (from unemployment into self-employment, from un-employment into paid-employment, from self-employment into non-employment and from paid-employment into non-employment) a likelihood function of the form

$$(8) \quad L_m = \int_{-\infty}^{\infty} [\phi(\varepsilon_i) \prod_{i=1}^{n} \prod_{k=1}^{K_i} \lambda_i^k (t_i \mid x_i(t), \varepsilon_i)^{\delta_{im}^k} \prod_{s=1}^{t_i-1} (1 - \lambda_i^k (s \mid x_i(s), \varepsilon_i))^{c_{im}^k}] d\varepsilon_i \,,$$

with $m = 1,..,4$ and ϕ as the density of the standard normal distribution can be de-rived.

To assess the stability of self-employment compared to paid-employment the "po-tential-outcome-approach to causality" is used (see Rubin, 1974). For example, the survival rates in self-employment are compared to the potential survival rates in paid-employment in the sample of the self-employed. [13] Hence, the difference Δ_{SE} in the survival rates among those entering self-employment is given as the difference of the expected observable survival rate in self-employment and the expected poten-tial survival rate in paid-employment, which is

$$(9) \quad \begin{aligned} \Delta_{SEi} &= E[S_{SEi} \mid \delta_{i1}^k = 1] - E[S_{PEi} \mid \delta_{i1}^k = 1] \\ &= \prod_{s=1}^{t_i-1} \frac{1}{1 + \exp(\alpha_{SE}(s) + \beta_{SE}' x_{SEi}(s))} - \prod_{s=1}^{t_i-1} \frac{1}{1 + \exp(\alpha_{PE}(s) + \beta_{PE}' x_{SEi}(s))} \,, \end{aligned}$$

where S_{SE} and P_{SE} are the unconditioned (observable) survival rates in self-employment and paid-employment, respectively, $x_{SE}(t)$ are the characteristics of the initially self-employed, α_{SE} and β_{SE} are the estimated coefficients of the probability of leaving self-employment and α_{PE} and β_{PE} are the estimated coefficients of the probability of leaving paid-employment. The second expectation of the difference is of course never observed in reality, but can be simply estimated by plugging the co-efficients of the paid-employment model on the characteristics $x_{SE}(t)$ of the self-employment model. The naive comparison of the observable survival rates in em-ployment among the self-employed and the observable survival rates in employment among the paid-employed can seriously bias the effects, because of self-selection

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[13] In the following the terms self-employment and paid-employment always refer to the initial state after unemployment. The wording may be imprecise as e.g. a self-employment spell can include times of paid-employment, but to differentiate between self-employment out of unemployment and paid-employment out of unemployment this facilitates things a lot.

processes in either state. Thus, it is very likely that the individual characteristics of the self-employed differ from the characteristics of the paid-employed, i.e. the naive control group of the paid-employed is not an adequate control group for the sample of the self-employed (see section 6.1). To control for the selectivity, all characteristics explaining the transition from unemployment to self-employment are included in the survival equation. Thus, a reduced form control function estimator is used (see Barnow et al., 1980).

Whereas Δ_{SE} refers to what is known as treatment-on-the-treated, a corresponding effect for the sample of the initially paid-employed could be derived as

$$
\Delta_{PEi} = E[S_{SEi} \mid \delta_{i2}^k = 1] - E[S_{PEi} \mid \delta_{i2}^k = 1]
$$
(10)
$$
= \prod_{s=1}^{t_i-1} \frac{1}{1 + \exp(\alpha_{SE}(s) + \beta'_{SE} x_{PEi}(s))} - \prod_{s=1}^{t_i-1} \frac{1}{1 + \exp(\alpha_{PE}(s) + \beta'_{PE} x_{PEi}(s))} \; .
$$

Then, Δ_{PE} refers to treatment-on-the-non-treated.

To proceed with estimation, equation (8) shows that the likelihood function is the same as for a binary random-effects-logit-model. Assume a binary variable y_i which equals one if $\delta_i = 1$ and which equals zero if $c_i = 1$. Then rearrange the data in a way that you have K_i times t_i observations for each individual. This results in a model of binary discrete choice of y_{it} for each observation within an individual. The random individual specific effect ε_i controls for the dependence of choices within an individual (i.e. within a spell and between spells). In general, this likelihood function can be estimated by a random-effects-logit-model. However, this estimator has the shortcoming of relying on the Gauss-Hermite-Quadrature method, which yields bad results if the panel is large, e.g. $T > 50$.[14] As this study uses monthly spell data of fourteen waves, the panel size is quite large with T up to 168. Therefore, the analysis is carried out using Generalised Estimation Equation (GEE) methods.[15] The starting point of the GEE model is to specify a so-called link function and a distributional family for the dependent variable. In our case, we have a logit function and a binary distribution. Thus, the first two moments of the distribution are

(11) $\quad \mu_i = E(y_{it}) = \dfrac{\exp(\alpha_t + \beta' x_{it})}{1 + \exp(\alpha_t + \beta' x_{it})}$ and

(12) $Var(y_{it}) = g(E(y_{it}))$.

---

[14] See e.g. the Stata Handbook Release 6.0, commands "xtlogit" or "quadchk" for a discussion on the reliability of the Gauss-Hermite-Quadrature method.

[15] See Liang and Zeger (1986).

Considering the covariance for independent observations, it is assumed that

$$(13) \quad Cov(y_{it}) = A_i,$$

where $A_i = \text{diag}[g(E(y_{i1}))...g(E(y_{it}))]$. Last but not least, a so called working correlation matrix $R(\gamma)$ is specified, which for this analysis is assumed to be fix, i.e.

$$(14) \quad R_{s,t} = \begin{cases} 1 & if \quad s = t \\ \gamma & if \quad s \neq t \end{cases}.$$

γ refers to the correlation within individuals. The estimates of the coefficients β [16] and γ are obtained by solving the following GEE

$$(15) \quad U(\beta) = \sum_{i=1}^{n} \frac{\partial \mu_i}{\partial \beta} V_i^{-1}(\gamma)(y_i - \mu_i) = 0,$$

where $V_i = A_i^{1/2} R(\gamma) A_i^{1/2}$.

The estimation is carried out by switching between iteratively reweighted least squares (IRLS) methods to obtain β and a moment estimation to obtain γ.[17] The standard errors of the estimates are calculated using a robust variance-covariance matrix instead of V_i, in terms of getting unbiased standard errors, even if the within-correlation γ is not correctly specified (see Liang and Zeger, 1986). However, the model has to specify correctly the mean in order to get unbiased standard errors. Therefore, the obtained standard errors are more or less semi-robust than robust.

Altogether, four GEE models are estimated. In the first stage of the analysis, the determinants of self-employment and paid-employment among the unemployed are estimated separately and in the second stage, two models of employment duration are estimated, one for the sample of the initially self-employed after unemployment and one for the sample of the initially paid-employed (see section 6 for the results).

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[16] To facilitate writing, β also includes the coefficients of the baseline hazard rate.

[17] See Liang and Zeger (1986) or Ziegler and Arminger (1995) for a detailed description of the estimation procedure. Furthermore, it should be noted that the parameters of the GEE approach are not the same as for the random-effects-model, apart from the fact that there is no within-correlation. However, if there is within-correlation, the GEE approach will estimate a population averaged coefficient rather than an individual specific one (see Neuhaus et al., 1991).

5 Data, Sample and Variables

The econometric analysis is based on the first 14 waves of the German-Socio-Economic-Panel for West Germany (GSOEP) covering the years from 1983 to 1996.[18] Data of the GSOEP is collected yearly starting with 5,921 households. Every person living in these households and aged 16 years and older is interviewed. The first wave included 12,245 persons. The data of these persons was followed up every consecutive year. The number of people was increased due to the splitting of established households and due to children exceeding 16 years. These new entrants partly compensated panel attrition, so that the panel included almost 9,000 individuals in 1997. The GSOEP provides yearly information on various individual and household characteristics, such as labour market status, income, education, social background. Besides, the GSOEP contains retrospective information on monthly labour market status and income of the year prior to the interview, the so-called employment and income calendars. This monthly information provides an ideal database to analyse transitions between different labour market states. There are eleven different states reported in the employment calendar.

For the econometric analysis four different states of employment are considered: *self-employment, paid-employment, unemployment and out-of-labour-force*. Unfortunately, self-employment is not reported in the employment calendar. Despite of that, self-employment spells can be generated using the yearly information on job status as well as the beginning date of the job. Additionally, the income calendar, which provides information on self-employment income, was used to check the yearly information. Paid-employment includes full-time employment, short time working, part-time employment and training at work. Unemployment refers to registered unemployment, following the same definition used by the Federal Office of Employment. This definition disposes of the well-known under- or over-reporting bias: people not seeking for employment but being registered are called unemployed while the ones seeking for employment but not being registered as unemployed are called not unemployed. In the context of this analysis, however, the official definition is well suited because it corresponds to the legal requirements of receiving the subsidy of BA (see section 2.2). The out-of-labour-force category includes retirement, maternity leave, schooling, military service, house-husband/ -wives and other not specified states.

The sample used for the analysis consists of individuals that were registered as unemployed for at least one month in the period between January 1983 and December 1996. These 3,782 individuals are drawn from the so-called "Artkalen" which is a spell data file constructed out of the employment calendar. The "Artkalen" reports every spell on employment status, that has been collected for each interviewed indi-

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[18] For a detailed description of the GSOEP see http://www.diw.de/soep/.

vidual including the type of the spell, beginning and end of the spell and the censoring status of the spell. For the econometric analysis, left-censored spells are excluded. Left-censoring occurs due to gaps in the employment history or due to spells which begin prior to January 1983. In addition to left-censoring there is the problem of overlapping spells. For the analysis, only non-overlapping spells were constructed according to the priority: self-employment, paid-employment, unemployment and out-of-labour-force. The only exception is the case of an unemployment spell with the same date of beginning as a self (paid)-employment spell. In such a case, an "artificial" unemployment spell of one month is generated instead of overwriting the complete unemployment spell. Out of the 3,782 unemployed individuals, 5,564 unique not-left-censored spells are constructed. 1,002 (18.0 %) of those are right-censored, i.e. ending in unemployment, 110 (2.0 %) are ending in self-employment, 3,354 (60.4 %) in paid-employment, 1,087 (19.6 %) in out-of-labour-force and 11 have an unknown employment status.[19] This sample yields the base of the analysis of the determinants of individual labour market status if leaving unemployment, whereas the state of out-of-labour-force is not explicitly modelled but treated as right-censored.[20]

The second stage of the analysis, employment duration, is based either on the 110 spells ending in *self-employment* or on the 3,354 spells ending in *paid-employment*. Out of these initial spells one constructs an employment spell, which lasts until the person becomes unemployed or drops out of labour force, no matter if he or she quits self-employment for paid-employment or vice versa. Hence, a labour market status is considered to be stable as long as the individual remains employed. Accordingly, there is only a single risk of leaving the status of employment modelled, namely *non-employment*, which includes unemployment and out-of-labour-force. In the sample of the self-employed, 73 (66.4 %) spells are right-censored, i.e. ending in self-employment or paid-employment and 37 (33.6 %) spells are ending in non-employment. In the sample of the paid-employed, 1,367 (40.8 %) spells are right-censored and 1,987 (59.2 %) are ending in non-employment.

The factors which determine the transition from unemployment to other labour market states are mainly derived from the theoretical models described in section 2.1. Furthermore, variables controlling for process and calendar time effects are included. Table 3 reports some information on theses variables. Process time, the so-called baseline hazard, is modelled non-parametrically by using 10 different categories. To control seasonal effects for each quarter of spell beginning and each quarter of actual process time, a dummy variable is constructed. Calendar time is included

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[19] The unknown status is due to the construction of self-employment spells. For some spells it was not possible to differentiate between self-employment or paid-employment.

[20] See Reize (2000) for estimations where the states of *self-employment*, *paid-employment* and *out-of-labour-force* are modelled as competing risks within multinomial logit frameworks.

due to four dummy variables, which also characterise four different periods of legal regulations of BA. During the first period from January 1983 to December 1985, no BA was available. The second period from January 1986 to July 1988 is characterised by a liberal employment of BA, whereas during the period from August 1988 to July 1994 the legal regulations and their implementations were more or less restrictive. During the period following August 1994, BA has been employed most liberally.

According to search theory, I include the income replacement ratio (IRR) to model unemployment compensation. The IRR is calculated as the ratio of actual unemployment benefits and expected earnings (see Steiner, 1997) instead of earnings in the previous job. Expected earnings are gross earnings estimates from reduced form earnings functions, calculated separately for the paid-employed and the self-employed.[21] Thus there are three different IRRs: one for those spells ending in paid-employment, one for those ending in self-employment and a weighted IRR, if the spell is right-censored. The weight is obtained from the sample probability of being self-employed.[22]

A central variable for the explanation of transitions to self-employment, which is provided by the theory of utility maximisation, is represented by the difference in expected earnings. The difference is obtained from the same earnings equations as the IRR and is calculated as the difference of expected self-employment earnings and expected paid-employment earnings. The sign of the estimated coefficient is expected to be positive in the self-employment equation and negative in the paid-employment equation, respectively. Furthermore, variables explaining the endowment with human capital are included: namely, the individual age as a proxy of labour market experience and the degree of occupational qualification. In addition, financial endowment is regarded due to home-ownership and capital income. To control for the socio-economic background several variables are used, such as gender, foreigner, disabled, marital status, children, labour market participation and income of the partner, household-income and the employment status of the father, when the individual was aged fifteen. Moreover, gender is interacted with marital status, children and occupational qualification in order to capture differences in labour market behaviour between males and females.

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[21] Earnings of the paid-employed were estimated using 14 cross-sections obtaining 14 different parameter vectors. Due to a smaller sample size, self-employment earnings were estimated on a pooled sample using GEE methods (see Liang and Zeger, 1986). These estimates were obtained using a reduced form instead of a structural selection model to control for labour market participation.

[22] I.e. unemployment-benefits / [Prob(being self-employed)*expected-self-employment-income + Prob(being employed)*expected-employment-income)].

Following the discussion on push and pull-factors (see section 2.1), a regional un-employment-to-vacancy-ratio (UV-ratio) is included in the estimation to control for the tightness of the labour market. The UV-ratio is calculated on a monthly basis for the ten federal states and West-Berlin using the inflow of unemployed people and the stock of vacant jobs. The pull-hypothesis is tested by using yearly GDP growth rates for West Germany based on quarterly data. Besides, dummies for the federal states are included in both equations, whereas the interest rate of credits up to one million DM is only inherent in the self-employment equation.

Finally, to control for unobservable characteristics like risk-aversion and wish of independence I include worries about the personal economic situation and the satisfaction with income and the general satisfaction with life in both models.

To assess the stability of employment and the effects of BA on the stability, the same characteristics used for the estimation of the determinants of the employment status are considered in this case. Additionally, job describing characteristics are included, for example industry, number of employees and occupation for the sample of the paid-employed and the required occupational degree, working in trained occupation and "information on job is missing" for both samples. The effects of BA on employment stability are measured in terms of the date of entrance in self-employment and paid-employment, respectively. The same calendar periods of legal changes in BA as in the analysis of employment determinants are applied in this case. Table 4 provides some descriptive information on these variables.

6 Econometric Results

6.1 Determinants of Self-employment

In this section, I will discuss the estimates of the determinants of self-employment and paid-employment. The focus of discussion is based on the characteristics derived from economic theory (see section 2.1). These and the other estimates are documented in Table 5. The estimated within-correlation proves to be very small for the transition to paid-employment (0.025) and even zero for the transition to self-employment. Consequently, the population-averaged model is similar to the pooled model. This is also documented by similar coefficients in both models with exception of the baseline hazard rate.[23]

The estimated coefficients of the baseline hazard rate are insignificant for the transition to self-employment. This result contrasts the findings of Bryson and White

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[23] The estimates of a pooled logit model are not presented in the paper. The results are available upon request.

(1996) who found that the entry into self-employment depends negatively on the duration of unemployment. Their result, however, might be due to the fact that they do not control for unobserved heterogeneity. Not controlling for population heterogeneity can result in downwards biased estimates of the baseline hazard rate (see Steiner, 1994). The hazard rate for exits into paid-employment remains almost stable along unemployment duration. Only for a process time between 10 and 12 months and over 18 months, the hazard rate is significantly lower than for a process time of one month. This can be a sign for the stigmatisation of long-term unemployed by the employers. For the self-employed, such stigmatisation can only occur through customers or credit institutions. The latter may be revealed as liquidity constraints (see Battistin et al., 2001). Whereas discrimination through customers is more or less unlikely, liquidity constraints can be overcome by promotion with BA, which in turn might lead to the stable hazard rate into self-employment over unemployment duration.

Relative to the first month of unemployment duration the hazard rates into self-employment and the ones into paid-employment are very similar (seeFigure 2). Both hazard rates are declining compared to the first month with increased process time until one and a half-year and then become stable.

For the effect of calendar time, estimation yields the expected result that the transition to self-employment is most likely after the last legal change of BA. Additionally, this shows that during the phase of the introduction of BA the transition was least likely. The coefficients for the other periods are also negative, but insignificant.

The age profile for unemployed people becoming self-employed is similar to the age profile of wage workers becoming self-employed (see e.g. Evans and Leighton, 1990). Most unemployed people enter self-employment at the age between 35 and 45 years, whereas people younger than 25 or older than 50 are less likely to enter self-employment. Younger people might not enter self-employment because of lower endowment with human capital and older unemployed are likely to drop out of the labour force due to early retirement regulations. Considering the entrants into paid-employment, the hazard rate is declining with age, which is a typical pattern found by other studies (e.g. Hunt, 1995).

As assumed, the difference in the expected incomes has a negative effect on the transition to paid-employment, whereas it proves to be insignificant for the transition to self-employment. In addition to the strong negative effect of the IRR on the probability to leave into self-employment, this shows that the alternative of unemployment seems to be more important than the alternative of paid-employment. The effect of unemployment benefits, which is strongly negative and quite high compared to the transition to paid-employment, is also found by Carrasco (1999). Whereas she interprets this as strong evidence for the hypothesis of self-employment as a reaction to discrimination, I explain this effect with the uncertainty of self-employment in-

come. For sure, expected self-employment earnings are more uncertain than actual unemployment benefits. Therefore, only self-employment earnings, which are much higher than unemployment earnings, are worth for a transition.

Regarding the effects of education, one can find evidence against the discrimination theory, too. The transition to self-employment is more likely for unemployed persons with higher qualifications, especially among master craftsman, and also among unemployed with higher technical college or university degree, but to a lesser extent. Moreover, this shows that human capital is an important determinant of self-employment not only among former wage workers (see Pfeiffer and Reize, 1999) but also among the unemployed.[24] Higher education also favours the transition to paid-employment, but the coefficients are smaller than those for the transition to self-employment.

As pointed out in other studies (e.g. Pfeiffer, 1994), the former employment status of the father is an important determinant of self-employment. This is also true for unemployed people, whose probability of self-employment rises if the father was self-employed, when the individual was aged fifteen. This observation can be a reference for the importance of social networks. The dummy variable, which indicates that the father's employment status is unknown, is insignificant.

The impacts of financial endowment yield no clear picture for the transition to self-employment. According to the theory of unemployment duration, one would expect that unemployment duration be prolonged as the unemployed can rely on assets. However, higher assets will also favour the transition into self-employment. This could be the reason why neither household income nor income of the spouse nor capital income nor housing ownership have a significant effect on the transition to self-employment. The income of the spouse and capital income has a negative effect on the transition probability for entrants into paid-employment. Besides, household income and housing ownership have a positive effect on that risk.

Concerning the macro-economic factors, I find evidence neither for the unemployment-push nor for the demand-pull hypothesis. Furthermore, the interest rate has no influence on the transition to self-employment. This could be further reference to lowered capital constraints through the grant of BA, in the sense that the unemployed people subsidised with BA do not have to rely that much on credits.

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[24] Part of this effect may be due to legal requirements according to the German economic and trade regulations. In the craft sector as well as in some professional occupations (for example lawyer, doctor) special examinations or vocational degrees, and in the banking and insurance sector some minimum requirements with respect to initial capital, are a necessary precondition for becoming self-employed. However, in principle everybody is allowed to start a business in most parts of the private sector of the economy.

Finally, unemployed people not worrying about their personal economic situation and being more satisfied with their lives are more likely to become self-employed. The same holds true for the probability of becoming paid-employed, but to a lesser extend. If one believes that people with optimistic views about their situations are less averse to risk, then this effect coincides with the theory that people who are ready to take risks are more likely to become self-employed.

From the discussion of the determinants of self-employment one can draw the following conclusions: *firstly,* the hypothesis of self-employment as a reaction to discrimination can be rejected. On the contrary, the self-employed coming from unemployment are not long-term unemployed, have a higher educational degree than the average unemployed and move into self-employment only when the expected income from self-employment is very high compared to unemployment benefits. Therefore, the self-employed coming from unemployment have similar characteristics to the ones of the self-employed coming from paid-employment. *Secondly*, the insignificance of the baseline hazard rate and the interest rate may indicate that the promotion with BA helps to overcome liquidity constraints. *Thirdly,* the determinants of self-employment differ from those of paid-employment, which confirms the hypothesis that both groups are selective and a naive comparison of employment duration may be biased (see the following section).

6.2 Stability of Self-employment and the Effects of BA

The estimation results of the job stability are derived from two reduced form population averaged models for the sample of the initially self-employed and the sample of the initially paid-employed, respectively. As in the models of unemployment duration, the within correlation proves to be small with a value of 0.002 in the sample of the paid-employed and with a value of 0 in the sample of the self-employed. Since the coefficients of the reduced form estimations are difficult to interpret and since the focus of this section is primarily based on the difference between survival rates and the effects of legal changes of BA on survival rates in self-employment and paid-employment, the coefficients will not be discussed in detail. The results of the estimation are listed in Table 6.

Turning to the effects of job-stability, Figure 3 shows that the initially self-employed, given their characteristics, face a lower risk to become unemployed again than they would have faced, if they had entered paid-employment, i.e. $\Delta_{SE} > 0$. After four years of employment, the self-employed have a survival probability in employment of more than 80 % in contrast to the 50 % they would have had if they had decided to enter paid-employment. This shows that self-employment could be the right way out of unemployment for those who in fact entered self-employment. It is important to note that this result refers only to treatment-on-the-treated and therefore does not allow to draw conclusions about the sample of the non-treated. To answer

the question whether BA should be extended considerably in order to enable as many unemployed people as possible to enter self-employment, one has to assess the effect of treatment-on-the-non-treated, i.e. the difference in employment duration among the paid-employed (Δ_{PE}). Considering the survival rates in employment in the sample of the paid-employed (see Figure 4), the answer tends to be no. Although self-employment is more stable in the first eighteen months, in the long run paid-employment shows much more stability with a survival probability of nearly 50 % after eight years of employment. In contrast, the probability of staying employed would only be slightly more than 30 %, if the initial state after unemployment was self-employment. Those results give strong evidence for the existence of self-selection processes, i.e. an unemployed is in the position to select the kind of job that yields better perspectives for him or her.

On behalf of these findings and accordingly to the previous section, the hypothesis of the self-employed as being discriminated can be rejected. The probability of staying employed in the case of self-employment is at least as high as in the case of paid-employment. The estimated survival probability in employment among the self-employed is about 30 percentage points higher than the estimated survival probability in employment among the paid-employed. In the case of the self-employed population, even the hypothetical probability of staying employed after entering paid-employment is almost as high as the observable probability among the paid-employed. Therefore, those who decide to enter self-employment are probably "the good" in the pool of the unemployed.

The highest employment stability among those entering self-employment can be found during the period of the most liberal exercise of BA, i.e. the period after the last legal change in August 1994 (see Table 6). The highest risk of losing employment is found in the period prior to the introduction of BA and in the first period of generous use of that programme. However, coefficients and standard errors are quite large because of the small cell sizes and should therefore be interpreted carefully. Nevertheless, this can represent a reference that (a broader use of) BA can improve the stability of (self-)employment, due to either higher capital endowment of the new businesses or reduced capital constraints, which can help more unemployed who are suited for self-employment to enter this state.[25] The graphs in Figure 5 confirm this point of view. As shown above, the hypothetical survival probability in self-employment among the paid-employed would be higher between August 1988 and July 1993 than prior to 1986 and it would be even higher than the survival probability in paid-employment. Thus, in this period an unemployed person would have been better off with a transition to self-employment than with a transition to paid-

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[25] Another possible effect could be a higher re-employment opportunity in paid employment due to the escape of unemployment with the help of BA. It might be easier to find a job from self-employment than from unemployment signalling economic activity.

employment. However, as explained in section 2.2, the grant of BA was restricted along this period.

Therefore, the main conclusion from this analysis is that the unemployed entering self-employment are rather "the good" unemployed than the discriminated and that self-selection is an important factor when choosing the status of employment. Thus, BA could help to overcome capital constraints and, if sufficient funds are available, even to enable more unemployed to escape unemployment permanently by open up the possibility of entering self-employment. But one should also have in mind that a generous grant of BA can cause high dead-weight effects, as the self-employed are a positive selection out of the pool of the unemployed and therefore might have entered self-employment even without any subsidisation.

7 Conclusions

This study provided an analysis of the transition into and out of self-employment among former unemployed by comparing this state with the state of paid-employment. So far, such a study has not been carried out for Germany. Nevertheless, it is important to analyse self-employment among former unemployed since about 1 billion DM is spent yearly to promote such transitions and nearly one sixth of the new self-employed population comes from unemployment. The evaluation of the success of this route out of unemployment followed the "potential-outcome-approach to causality" by using discrete hazard rate models to estimate survival in self-employment compared to the hypothetical survival in paid-employment.

The main results of the estimation can be summarised as follows: the determinants of self-employment show great similarities to the determinants known from transitions from paid-employment to self-employment. The hypothesis that self-employment is a reaction to discrimination can be rejected. The self-employed coming from unemployment have a higher education than the average unemployed. Furthermore, the estimation of job stability confirms that the unemployed entering self-employment are in fact not the low skilled but rather "the good" unemployed. The survival rates in self-employment are higher than the ones in paid-employment.

Moreover, and this is particularly important in the context of the evaluation of self-employment as a permanent way out of unemployment, employment among those entering self-employment initially after unemployment proves to be more stable than employment would have proved, if those unemployed had entered paid-employment. But from this result, one cannot conclude that self-employment is the ideal way out of unemployment. The econometric analysis also show that the higher stability of self-employment compared to paid-employment is based on self-selection processes. As a consequence, unemployed people entering paid-employment face a lower risk of re-entering unemployment than if they had entered

self-employment initially after unemployment. Hence, an unemployed rather selects an occupation, which provides a higher utility for him or her, than being pushed in a certain labour market status.

Which conclusions can be drawn from the effects of BA on employment stability? Firstly, the extension of the grant of BA seems to have a positive effect on lowering the risk of becoming unemployed again among the self-employed. Secondly, in periods of restrictive use of BA (not all unemployed can get in favour of this subsidy), those entering paid-employment would have been better off, if they had entered self-employment instead. Therefore, as political advice for the usage of BA, one can conclude that it is important to offer BA, as it could lower capital constraints and therefore open the door to self-employment for a greater number of unemployed people who are suited for self-employment. Moreover, this offer should not be restricted by limitations in the funds of BA. In this sense, the present legal form of BA (after the last change on August 1 1994) seems to be the right way, as the funds are sufficient for all unemployed, who wish to enter self-employment. However, one should also have in mind that such a liberal use of BA or even an extension of BA could cause serious dead-weight effects. BA in the actual form may help more unemployed people to become self-employed, but on the other hand it could cause more people to become (temporary) unemployed in order to get in favour of the subsidy. The fact that self-employed people out of unemployment are a positive selection out of the pool of the unemployed population supports the possibility of dead-weight effects. Therefore, the shortcoming of this programme is rather the circumstance that the grant of BA is non-refundable than the fact that the funds are hardly limited.

To draw a final conclusion on the effectiveness of the actual legal form of BA, however, a longer period of time, say two to three years, than the GSOEP can currently provide is required. Beside the long term effects of a generous grant of BA, further topics of research could be the estimation of competing risks within the framework of multinomial or nested hazard rate models in order to incorporate both stages of the analysis. A further extension could be the estimation of self-employment earnings compared to wage earnings.

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Appendix

Tables

Table 1: Changes in Legal Regulations of Bridging Allowances from 1986 to 1999

Period	Required unem-ployment duration	Required hours/week	Required gross income (month.)	Subsidisation of business take-over	Duration of promotion	Amount of promo-tion	Target group	Funds were
1.1.86-31.12.87	10 Weeks	19 Hours	1000 DM	Yes	13 Weeks	UE-benefits	Unemployed	Unrestricted
1.1.88-30.7.88	4 Weeks	19 Hours	1000 DM	Yes	6 Months	UE-benefits	Unemployed	Unrestricted
1.8.88-30.10.88	<= 3 Months 3 - 6 Months > 6 Months	19 Hours	3400 DM	No family busi-nesses	13 Weeks 18 Weeks 26 Weeks	Max 350 DM p.W.	Unemployed	Restricted
1.11.88-31.12.88	No Promotion	No Promotion	No Promotion	No Promotion	No Promotion	No Promotion	Unemployed	Restricted
1.1.89-31.5.89	<= 3 Months 3 - 9 Months 9 - 12 Months > 12 Months	19 Hours	3400 DM	No family busi-nesses	8 Weeks 13 Weeks 18 Weeks 26 Weeks	Max 320 DM p.W.	Unemployed	Restricted
1.6.89-31.12.92	<= 6 Months 6 - 12 Months 12 - 18 Months > 18 Months	19 Hours	3400 DM	No family busi-nesses	8 Weeks 13 Weeks 18 Weeks 26 Weeks	Max 300 DM p.W.	Unemployed	Restricted
1.1.93-31.7.94	<= 6 Months 6 - 12 Months 12 - 18 Months > 18 Months	19 Hours	3500 (2200) DM	No family busi-nesses	8 Weeks 13 Weeks 18 Weeks 26 Weeks	Max 300 DM p.W.	Unemployed 4 Weeks short-time work Public work pr.	Restricted
1.8.94-2.1.97	4 Weeks	18 Hours	None	No family busi-nesses	6 Months	UE-benefits	Unemployed 4 Weeks short-time work Public work pr	Unrestricted
Since 3.1.97	4 Weeks (flexible)	15 Hours	None	No	6 Months (in exceptions 1 month)	UE-benefits	Unemployed 4 Weeks short-time work Public work pr	Restricted

Source: Kaiser and Otto (1990), Brinkmann and Otto (1996), Wießner (1998) and 3rd Social Security Code (SGB III).

Table 2: Self-employment, Unemployment and Bridging Allowances from 1983 to 1998

Year	Number of self-employed people (millions)	Number of unemployed people (millions)	Subsidised unemployed	Amount (millions DM)
1983	2.324	2.258	-	-
1984	2.430	2.266	-	-
1985	2.424	2.304	-	-
1986	2.403	2.228	5,576	25.5
1987	2.426	2.229	10,069	51.6
1988	2.422	2.242	17,949	180.7
1989	2.663	2.038	11,013	62.4
1990	2.830	2.123	12,742	54.6
1991	3.037	2.602	13,014	90.3
1992	3.091	2.979	31,587	136.4
1993	3.175	3.419	25,835	98.5
1994	3.288	3.698	37,297	194.8
1995	3.336	3.612	70,634	822.0
1996	3.409	3.965	89,744	1,063.0
1997	3.528	4.385	78,824	944.0
1998	3.594	4.279	98,296	1,247.4

Source: Statistical Yearbook of Germany; Official Bulletin of the Federal Labour Office (ANBA), Wießner (1998), own calculations, 1983 to 1990 West Germany, 1991 to 1998 West and East Germany.

Table 3: Descriptive Statistics of Unemployment Spells

	Exit into self-employment		Exit into paid-employment	
	Right-censored	Self-employed	Right-censored	Paid-employed
Baseline hazard				
1 month	10.13	10.73	6.75	14.97
2 months	8.76	9.09	6.20	12.40
3 months	7.60	7.45	5.84	10.13
4 months	6.54	6.19	5.43	8.13
5 months	5.82	5.68	5.14	6.78
6 months	5.18	5.18	4.76	5.74
7-9 months	12.49	10.61	12.42	12.42
10-12 months	9.67	7.20	10.53	8.25
13-18 months	10.94	9.47	12.24	9.03
>= 19 months	22.87	28.41	30.70	12.15
Calendar-period				
Prior to 86	19.44	17.05	17.33	21.71
86 – 88.7	20.07	19.95	17.31	24.59
88.8 – 94.7	39.20	44.44	39.26	39.91
After 94.7	21.29	18.56	26.10	13.80
Spell begins in:				
First quarter	40.28	22.85	44.89	32.86
Second quarter	21.33	20.45	21.76	20.79
Third quarter	20.59	15.03	17.09	25.00
Forth quarter	17.79	41.67	16.26	21.35
Actual quarter of process-time is:				
First quarter	24.15	24.62	21.68	28.00
Second quarter	23.14	24.75	23.28	23.14
Third quarter	25.24	23.61	25.98	23.95
Forth quarter	27.46	27.02	29.07	24.91
Age < 25	22.74	23.11	14.67	33.65
25 <= age < 30	12.76	21.09	10.34	16.81
30 <= age < 35	9.05	18.06	7.68	11.54
35 <= age < 40	8.49	15.66	8.07	9.66
40 <= age < 45	6.86	14.65	5.81	8.79
45 <= age < 50	9.51	3.28	9.68	9.21
50 <= age < 55	11.35	1.01	13.89	7.32
Age >= 55	19.24	3.16	29.87	3.02
Difference in expected incomes	2.355 (1.92)	2.550 (1.58)	2.425 (1.98)	2.278 (1.83)
No occupational degree	48.22	41.92	51.93	42.91
Apprenticeship	30.57	30.43	28.04	34.04
Technical college	14.22	11.36	14.10	13.93
Master craftsman	3.01	6.69	2.78	3.60
Higher technical college	1.02	2.02	0.98	1.17
University degree	2.94	7.58	2.17	4.35
Foreigner	44.66	19.44	46.30	41.51
Disabled	12.44	3.41	15.90	6.93
Female	44.76	30.43	47.73	39.68

Table 3 continued

Married	59.06	38.64	66.39	48.08
Single	29.15	49.12	20.42	41.92
Not married	10.80	11.87	12.37	8.80
Spouse lives abroad	0.99	0.38	0.83	1.21
Children <16 years	41.16	33.33	37.64	46.12
Female * single	11.83	15.03	8.64	16.20
Female * not married	7.05	2.78	8.05	5.56
Female * children	18.80	10.86	19.69	17.00
Single * children < 16 years	9.06	4.04	6.25	12.60
Not married * children < 16 years	2.65	1.52	2.89	2.34
No spouse	36.51	65.15	29.88	46.72
Income of spouse	1.310 (2.22)	0.656 (1.43)	1.472 (2.44)	1.064 (1.84)
Spouse full-time employed	30.91	15.03	33.70	26.39
Spouse part-time employed	5.11	5.81	4.91	5.40
Spouse unemployed	6.05	2.27	7.15	4.46
Spouse out-of-labour-force	21.42	11.74	24.37	17.03
Household income	2.907 (1.90)	2.678 (1.57)	2.868 (1.95)	2.941 (1.82)
Capital income	0.537 (2.27)	0.516 (1.44)	0.605 (2.55)	0.437 (1.78)
Housing ownership	22.88	33.59	22.52	22.92
IRR	0.419 (0.53)	0.173 (0.15)	0.423 (0.62)	0.406 (0.35)
Father self-employed	5.51	4.92	-	-
Father not self-employment	42.41	15.66	-	-
Father's employment status miss.	52.18	79.42	-	-
Berlin and East Germany [a]	22.14	28.61	5.71	4.56
Northern federal states			19.1	19.92
North Rhine-Westphalia	29.89	36.73	29.91	27.78
Hesse [b]	17.23	12.37	9.80	9.42
Rhineland-Palatinate & Saarland			7.29	6.70
Baden-Wuerttemberg [c]	30.75	22.29	16.56	15.29
Bavaria			11.64	16.34
Regional UV-ratio	2.047 (1.32)	2.094 (1.27)	1.995 (1.28)	2.104 (1.35)
Interest rate	10.493 (1.61)	10.602 (1.63)	-	-
GDP-growth rate	2.117 (1.96)	2.115 (2.03)	2.072 (1.97)	2.189 (1.96)
Hard worries about economic sit.	48.37	51.64	46.09	52.01
Some worries about econom. sit.	37.58	36.74	37.81	36.82
No worries about economic sit.	14.05	11.62	16.10	11.17
Satisfaction with life	6.088 (2.30)	5.908 (2.24)	6.126 (2.28)	6.019 (2.32)
Satisfaction with income	-	-	4.626 (2.67)	4.602 (2.72)

Note: Statistics are the means of independent variables on 5,564 unemployment spells obtained from waves 1-14 of the Western GSOEP; standard errors in parenthesis; for the exit into self-employment [a] Eastern and Northern federal states; [b] Hesse and Rhineland-Palatinate & Saarland and [c] Baden-Wuerttemberg and Bavaria are combined. Due to the design of the GSOEP, an individual refers to West or East Germany depending on his place of residence when entering the panel. Therefore, the GSOEP for Western Germany can also consist of people living in the East, because of migrations.

Table 4: Descriptive Statistics of Self-employment and Paid-employment Spells

	Sample of self-employed		Sample of paid-employed	
	Right-censored	Not-employed	Right-censored	Not-employed
Baseline hazard [a]				
1–3 months	13.90	21.28	5.64	14.36
4-6 months			5.26	12.03
7-9 months			4.94	9.59
10-12 months	9.00	11.77	4.72	7.27
13-18 months	17.51	21.42	8.68	11.53
19-24 months			7.83	8.87
25-30 months	12.97	14.89	6.78	7.01
31-36 months			5.89	5.71
>= 37	46.62	30.64	50.28	23.64
Entry into employment				
Prior to 86	16.90	27.23	31.17	30.33
86 – 88.7	29.96	30.50	29.39	30.55
88.8 – 94.7	42.32	35.74	31.81	35.23
After 94.7	10.82	6.52	7.64	3.89
Spell begins in:				
First quarter	46.98	26.52	32.25	29.53
Second quarter	20.11	37.73	26.12	30.61
Third quarter	21.48	20.43	21.1	23.46
Forth quarter	11.43	15.32	20.52	16.40
Actual quarter of spell is:				
First quarter	23.31	25.11	22.98	23.48
Second quarter	24.4	23.83	24.3	25.29
Third quarter	25.66	25.11	25.49	25.82
Forth quarter	26.63	25.96	27.24	25.41
Age < 25	6.13	6.24	18.84	28.18
25 <= age < 30	20.18	19.86	21.95	21.37
30 <= age < 35	21.2	18.30	18.47	13.06
35 <= age < 40	12.05	11.91	14.27	8.84
40 <= age < 45	12.05	20.99	9.75	7.92
45 <= age < 50	14.38	17.02	8.12	7.98
50 <= age < 55	6.58	5.67	5.95	7.32
Age >= 55	7.43	0.00	2.66	5.33
No occupational degree	15.16	34.75	26.07	34.18
Apprenticeship	44.83	19.01	43.54	42.52
Technical college	9.97	9.65	13.41	13.42
Master craftsman	17.92	10.50	5.93	4.48
Higher technical college	2.07	1.84	2.31	1.24
University degree	10.05	24.26	8.74	4.15

Table 4 continued

Agriculture	-	-	1.36	2.31
Mining/ energy/ construction	-	-	11.52	18.75
Manufacturing	-	-	39.25	34.98
Trade	-	-	12.78	12.81
Transport/ banking/ insurance	-	-	6.98	4.77
Services	-	-	16.54	16.89
Non-business organisations	-	-	2.77	2.87
Regional authorit./ social security	-	-	5.22	3.93
Others	-	-	3.58	2.68
< 20 employees	-	-	24.54	33.87
20 – 199 employees	-	-	32.12	33.99
200-1999 employees	-	-	26.53	20.30
>=2000 employees	-	-	16.82	11.84
Scientist, artist, journalist, author	-	-	5.87	3.92
Engineer	-	-	3.41	2.55
Physician, medical assistant	-	-	2.4	1.50
Lawyer, Accountant, Educator	-	-	2.8	1.87
Manager, bookkeeper, cashier	-	-	13.50	8.62
Other office worker/manager	-	-	6.84	7.47
Wholesale, retail, sales	-	-	2.34	1.51
Sales staff	-	-	4.54	6.02
Restaurant trade	-	-	1.48	4.10
Domestic occup., plain services	-	-	5.09	7.66
Farmer, fisherman, forestry work.	-	-	1.2	2.36
Foodstuffs/ metal/ wood	-	-	6.14	5.83
Textiles/ leather/ naturals	-	-	3.15	2.90
Metal worker	-	-	9.72	7.50
Electrician	-	-	3.18	2.40
Painter/ bricklayer/ carpenter	-	-	15.59	20.51
Operator, others	-	-	12.76	13.26
No occupational training required	4.89	30.10	5.88	8.43
Brief training on the job required	5.62	6.25	15.15	21.73
Longer train. on the job required	9.48	22.53	17.16	16.84
Training off the job required	22.27	10.86	5.5	4.32
Occupational degree required	48.28	22.04	47.26	44.17
Univ. or hi. tech. Coll. Degree req.	9.44	8.22	9.05	4.51
Working in trained occupation	54.38	38.32	46.41	40.65
Not working in trained occupation	44.81	53.12	40.96	40.82
In training on the job	0.00	0.00	1.46	3.14
No occupational degree	0.82	8.55	11.17	15.39
No information on the current job	5.55	13.76	5.87	21.73
Difference in expected income	2.714 (1.53)	1.830(0.99)	2.504 (1.71)	2.205(1.86)
Foreigner	11.8	16.60	29.59	29.20
Disabled	-	-	4.1	5.50
Female	14.67	57.02	33.3	42.43

Table 4 continued

Married	64.21	50.50	57.11	54.65
Single [b]			34.42	36.51
Not married	35.79	49.50	8.47	8.84
Children < 16 years	43.98	39.86	42.7	39.72
Female * single	-	-	12.91	16.80
Female * not married	-	-	5.47	5.32
Female * married	7.01	32.91	-	-
Female * children < 16 years	-	-	9.3	13.24
No spouse	34.74	45.39	37.51	37.77
Income of spouse	1.314 (2.51)	1.118 (1.85)	1.422 (2.14)	1.300 (2.61)
Spouse full-time employed	19.7	24.11	30.19	32.27
Spouse part-time employed	26.55	10.21	10.29	9.56
Spouse unemployed	0.81	1.56	2.5	2.66
Spouse out-of-labour-force	18.2	18.72	19.52	17.73
Household income	3.968 (2.11)	3.726 (2.05)	4.069 (2.31)	3.378 (1.86)
Capital income	1.137 (2.60)	0.710 (1.39)	0.665 (1.77)	0.518 (1.53)
Housing ownership	51.03	39.72	31.23	27.39
IRR	0.006 (0.04)	0.011 (0.06)	0.006 (0.05)	0.010 (0.05)
Northern & Eastern federal states	24.16	23.40	20.68	25.69
North Rhine-Westphalia	19.94	38.58	27.19	23.16
Hesse [c]	18.16	16.31	9.88	7.92
Rhineland-Palatinate & Saarland			6.53	6.10
Baden-Wuerttemberg [d]	37.74	21.70	16.54	16.32
Bavaria			19.18	20.80
Regional UV-rate	1.532 (0.84)	1.796 (1.00)	1.581 (0.80)	1.698 (1.04)
Interest rate	11.113 (1.56)	10.612 (1.71)	-	-
GDP-growth rate	1.929 (2.18)	2.325 (2.16)	2.098 (2.15)	2.535 (2.17)
Hard worries about economic sit.	12.2	21.13	19.49	28.23
Some worries about economic sit.	64.17	55.04	54.42	49.26
No worries about economic situat.	23.63	23.83	26.09	22.51
Satisfaction with life	7.028 (1.81)	6.738 (1.99)	7.053 (1.76)	6.789 (2.03)
Satisfaction with income	-	-	6.336 (2.15)	5.913 (2.42)

Note: Statistics are the means of independent variables on 110 self-employment and 3,354 paid-employment spells, obtained from waves 1-14 of the Western GSOEP; standard errors in parenthesis; for the sample of the self-employed [a] the categories of process-time are defined as: 1-7 months, 8-12 months, 13-24 months, 24-36 months, >37 months; [b] single and not married; [c] the states of Hesse and Rhineland-Palatinate & Saarland and [d] the states of Baden-Wuerttemberg and Bavaria are combined.

Table 5: Estimated Hazard Rates for the Exit into Self-employment and Paid-employment

	Into self-employment		Into paid-employment	
Number of observations	41,679		41,016	
Number of spells	2,991		2,954	
Wald-test	$\chi^2 (30) = 277.20$		$\chi^2 (61) = 1,260.54$	
	Coefficient	P-Value	Coefficient	P-Value
Baseline hazard				
1 month	Not significant		Reference	
2 monts			0.063	0.431
3 months			0.117	0.171
4 months			0.017	0.864
5 months			-0.051	0.588
6 months			0.042	0.678
7 - 9 months			-0.041	0.601
10 – 12 months			-0.232	0.010
12 – 18 months			-0.141	0.101
More than 19 months			-0.448	0.000
Calendar-period				
Prior to 86	-0.327	0.336	0.411	0.000
86 – 88.7	-0.896	0.022	0.272	0.000
88.8 – 94.7	-0.380	0.169	0.152	0.016
After 94.7	Reference		Reference	
Spell begins in:				
First quarter	Not significant		Reference	
Second quarter			-0.038	0.558
Third quarter			0.114	0.061
Forth quarter			0.346	0.000
Actual quarter of process-time is:				
First quarter	Reference		Reference	
Second quarter	0.515	0.136	-0.089	0.196
Third quarter	-0.026	0.947	0.032	0.594
Forth quarter	0.641	0.047	-0.152	0.007
Age < 25	-1.135	0.030	0.468	0.000
25 <= age < 30	0.133	0.754	0.310	0.002
30 <= age < 35	0.480	0.230	0.270	0.007
35 <= age < 40	Reference		Reference	
40 <= age < 45	0.470	0.325	0.098	0.343
45 <= age < 50	-0.427	0.483	-0.309	0.011
50 <= age < 55 [a]	-1.572	0.007	-0.904	0.000
Age >= 55			-2.267	0.000
Difference in income	Not significant		-0.053	0.079
No occupational degree	-0.161	0.602	-0.292	0.000
Apprenticeship [b]	Reference		Reference	
Technical college			0.004	0.964
Master craftsman	1.325	0.001	-0.096	0.458
Higher technical college			0.467	0.014
University degree [c]	0.579	0.124	0.198	0.105

Table 5 continued

	Coefficient	P-Value	Coefficient	P-Value
Foreigner	-1.125	0.002	-0.196	0.008
Disabled	-1.102	0.080	-0.396	0.000
Female	-0.044	0.889	-0.659	0.000
Married	Not significant		Reference	
Single			-0.271	0.009
Not married			-0.149	0.320
Children <16 years	0.637	0.072	-0.061	0.398
Female * single	Not significant		0.643	0.000
Female * not married	Not significant		0.786	0.000
Female * children	-1.066	0.037	-0.467	0.000
No spouse	Reference		Reference	
Income of spouse	Not significant		-0.052	0.030
Spouse full-time employed	-1.124	0.004	0.160	0.146
Spouse part-time employed	0.401	0.345	0.484	0.000
Spouse unemployed	0.205	0.707	0.057	0.690
Spouse out of labour-force	-0.005	0.990	0.320	0.001
Household income	Not significant		0.050	0.002
Capital income	Not significant		-0.029	0.046
Housing ownership	Not significant		0.147	0.020
IRR	-3.563	0.000	-0.356	0.000
Father self-employed	0.948	0.003	-	
Father not self-employed	Reference		-	
No Information on father's empl. status	0.107	0.758	-	
Northern federal states			0.056	0.831
North Rhine-Westphalia	Not significant		Reference	
Hesse			-0.024	0.815
Rhineland Palatinate & Saarland			0.029	0.788
Baden-Wuerttemberg			0.036	0.648
Bavaria			0.348	0.000
Berlin and Eastern federal states			-0.165	0.218
UV- ratio	Not significant		-0.193	0.000
GDP-growth rate	Not significant		0.018	0.143
Hard worries about economic situation	Reference		Reference	
Some worries about economic situation	0.885	0.002	0.181	0.000
No worries about economic situation	1.169	0.002	0.121	0.104
Satisfaction with life	0.096	0.095	0.032	0.005
Satisfaction with income	-	-	0.065	0.000
Constant	-5.815	0.000	-2.416	0.000
Within-correlation	0.000		0.025	

Note: Estimates are obtained from GEEs of the binary logit model based on waves 1-14 of the GSOEP; for the exit into self-employment [a] the age categories 50 to 55 and 55 and more; [b] the occupational degrees apprenticeship and technical college and [c] the occupational degrees higher technical college and university degree are combined.

Table 6: Estimated Hazard Rates for the Exit into Non-employment among Self-employed and Paid-employed

	Self-employed		Paid-employed	
Number of Observations	3,172		75,534	
No of spells	87		1,833	
Wald-test	$\chi^2(35) = 507.88$		$\chi^2(74) = 2,116.81$	
Variables	Coefficient	P-value	Coefficient	P-value
Baseline hazard [a]				
1–3 months	Reference		Reference	
4-6 months			0.387	0.000
7-9 months			0.803	0.000
10-12 months	1.823	0.180	0.626	0.000
13-18 months	1.998	0.120	0.210	0.072
19-24 months			0.040	0.774
25-30 months	1.879	0.153	-0.061	0.686
31-36 months			0.246	0.094
>= 37	1.811	0.109	-0.205	0.086
Entry into employment				
Prior to 86	Reference		-0.064	0.620
86 – 88.7	-0.425	0.635	0.191	0.118
88.8 – 94.7	-2.905	0.035	0.407	0.000
After 94.7	-5.363	0.009	Reference	
Spell begins in:				
First quarter	Reference		Reference	
Second quarter	1.141	0.280	0.218	0.005
Third quarter	2.058	0.142	0.146	0.086
Forth quarter	3.507	0.062	0.127	0.188
Actual quarter of spell is:				
First quarter	Not significant		Reference	
Second quarter			-0.284	0.003
Third quarter			-0.149	0.081
Forth quarter			0.345	0.000
Age < 25	-2.261	0.083	0.427	0.001
25 <= age < 30	-2.488	0.035	0.213	0.083
30 <= age < 35	-2.099	0.017	0.200	0.120
35 <= age < 40	Reference		Reference	
40 <= age < 45	-3.082	0.000	0.376	0.004
45 <= age < 50 [b]	-1.575	0.033	0.167	0.251
50 <= age < 55			0.214	0.144
Age >= 55			0.484	0.003
No occupational degree	-0.107	0.859		
Apprenticeship or technical college	Reference		Not significant	
Master craftsman	-0.779	0.301		
Higher Technical College/ University	1.060	0.225		

Table 6 continued

	Coefficient	P-Value	Coefficient	P-Value
Agriculture	-		0.400	0.521
Manufacturing		Reference		
Construction/Energy/Mining	-		0.506	0.001
Trade	-		-0.121	0.570
Transport/Banking	-		-0.098	0.689
Services	-		-0.037	0.853
Non-business organisations	-		0.185	0.569
Regional authorities and social securities	-		0.119	0.641
< 20 employees	-		Reference	
20 – 199 employees	-		-0.112	0.345
200-1999 employees	-		-0.431	0.003
>=2000 employees	-		-0.389	0.032
Scientist, artist, journalist, author	-		-0.688	0.285
Engineer	-		-0.717	0.290
Physician, medical assistant	-		-0.835	0.250
Lawyer, Accountant, Educator	-		0.062	0.926
Management, bookkeeper, cashier	-		-0.633	0.305
Other office worker/manager	-		-0.244	0.692
Wholesale, retail, sales	-		-0.129	0.855
Sales staff	-		-0.389	0.546
Restaurant trade	-		0.199	0.765
Domestic occupations, plain services	-		-0.355	0.566
Agriculture/Forestry/Fishing	-		Reference	
Chemistry/Metal/Wood	-		-0.321	0.622
Textiles/Leather/Naturals	-		-0.563	0.393
Metal worker	-		-0.572	0.368
Electrician	-		-0.885	0.199
Painter/Bricklayer/Carpenter	-		-0.360	0.558
Services/ others	-		-0.246	0.688
No occupational training required	Reference			
Brief training on the job required[c]	0.752	0.522	-0.028	0.869
Longer training on the job required			-0.300	0.116
Training off the job required[d]	-1.207	0.321	-0.512	0.060
Occupational degree required			-0.794	0.000
University or hi. Tech. College degree req.			-0.888	0.012
Working in trained occupation			-0.184	0.278
Not working in trained occupation	Not significant		Reference	
In training on the job			0.220	0.453
No occupational degree			-0.137	0.505
No information on the current job	-0.124	0.927	1.035	0.110
Foreigner	2.565	0.066	Not significant	
Disabled	-		0.161	0.226
Female	Not significant		0.234	0.012
Married	-1.390	0.117	Reference	
Single	-		-0.001	0.990
Not married	-		-0.033	0.849

Table 6 continued

	Coefficient	P-Value	Coefficient	P-Value
Female * single	-		-0.231	0.096
Female * not married	-		-0.308	0.173
No spouse	Reference		Reference	
Income of spouse	0.330	0.003	0.028	0.005
Spouse employed	0.981	0.311	Not significant	
Spouse not employed	0.725	0.384	Not significant	
Household income	-0.240	0.247	-0.062	0.029
Housing ownership	-1.564	0.196	0.148	0.048
IRR	9.116	0.012	2.120	0.000
Northern Germany	-2.290	0.228		
North Rhine-Westphalia	Reference		Not significant	
Middle of Germany	-1.964	0.172		
Southern Germany	-1.407	0.075		
Regional UV-ratio	Not significant		0.101	0.002
GDP-growth rate	-0.166	0.252	Not significant	
Hard worries about economic situation	Reference		Reference	
Some worries about economic situation	-1.496	0.019	-0.206	0.002
No worries about economic situation	-1.882	0.042	-0.230	0.017
Satisfaction	Not significant		-0.021	0.192
Satisfaction with income	-		-0.023	0.110
Constant	-1.218	0.545	-3.989	0.000
Within-correlation	0.000		0.002	

Note: Estimates are obtained from GEEs of the binary logit model based on waves 1-14 of the GSOEP; For the sample of self-employed [a] the categories of process-time are defined as: 1-7 months, 8-12 months, 13-24 months, 24-36 months, >37 months; [b] age categories 45 to 50, 50 to 55 and over 55; [c] brief and longer training on the job and [d] training off the job, occupational degree and university degree required are combined.
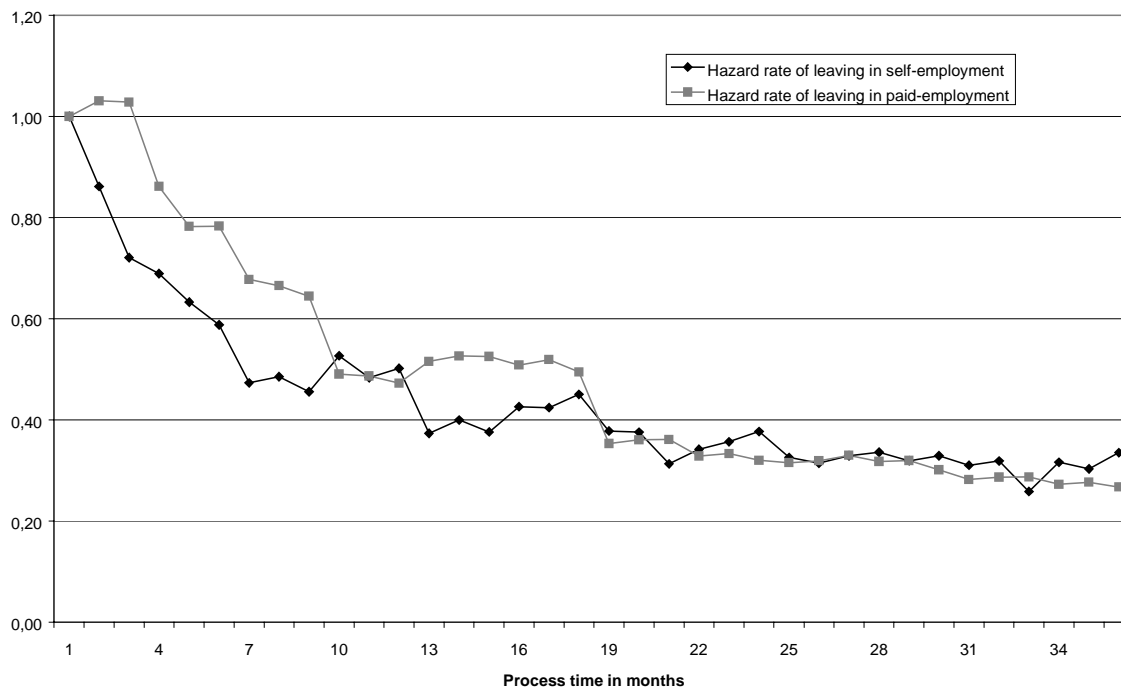
Figures

Figure 1: Different Stages of the Analysis

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              ┌──────────────────────┐
              │  5,564 Unemployed    │
              └──────────────────────┘
           ┌──────────┼───────────────┐
┌──────────────┐ ┌──────────────┐ ┌────────────────────┐
│   110        │ │   3,354      │ │    1,087           │
│ Self-employed│ │ Paid-employed│ │ Out-off-labour-force│
└──────────────┘ └──────────────┘ └────────────────────┘
       │                 │
┌──────────────┐ ┌──────────────────┐
│ 37 Non-employed│ │ 1,987 Non-employed│
└──────────────┘ └──────────────────┘
```
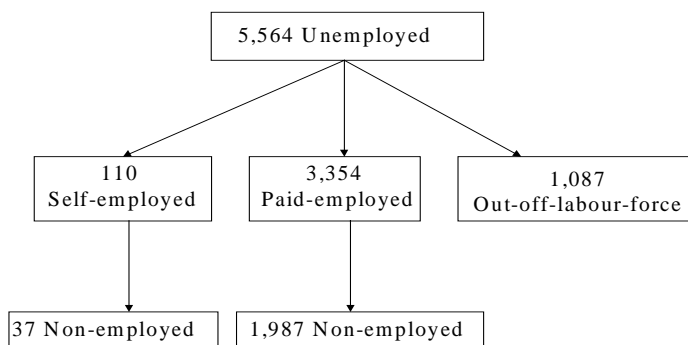
Note: Not-left-censored spells of individuals with at least one unemployment spell between January 1983 and December 1996; 11 unemployment spells are ending in unknown status.

Figure 2: Relative Hazard Rates of the Exit into Self-employment and Paid-employment
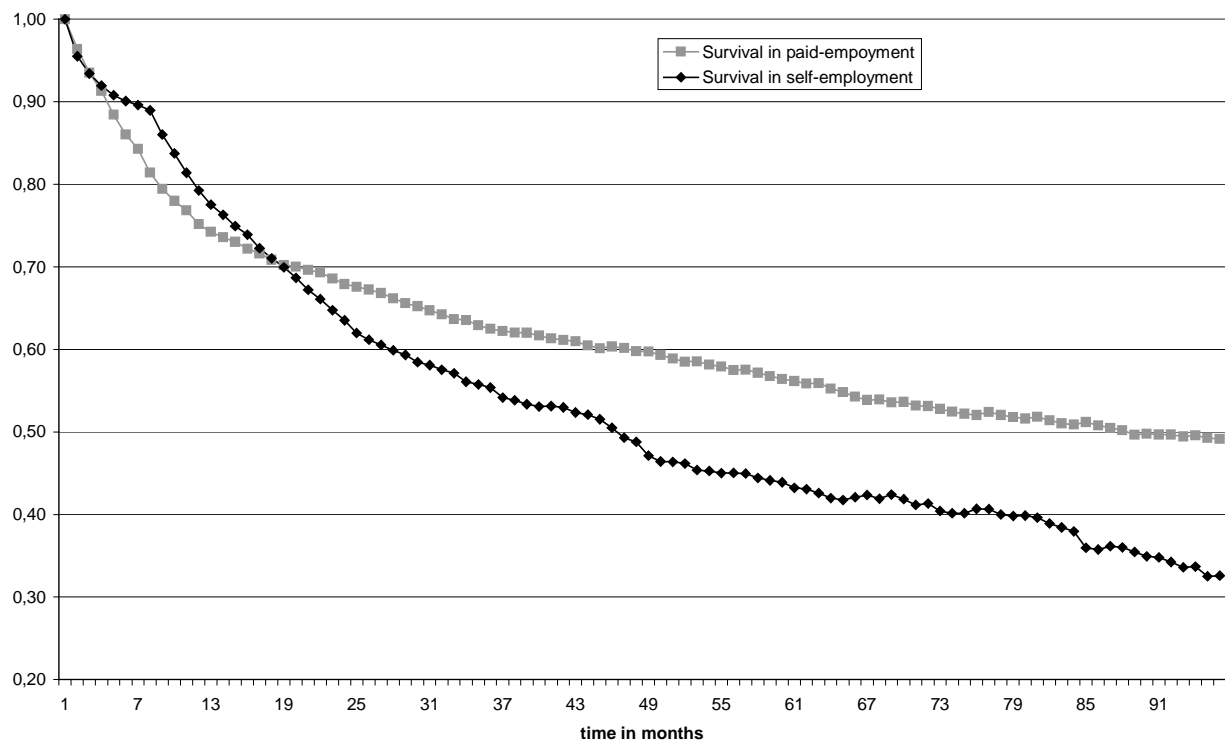

Note: Figure is based on the estimates described in Table 5.

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Figure 3: Survival Rates in Employment among the Initially Self-employed
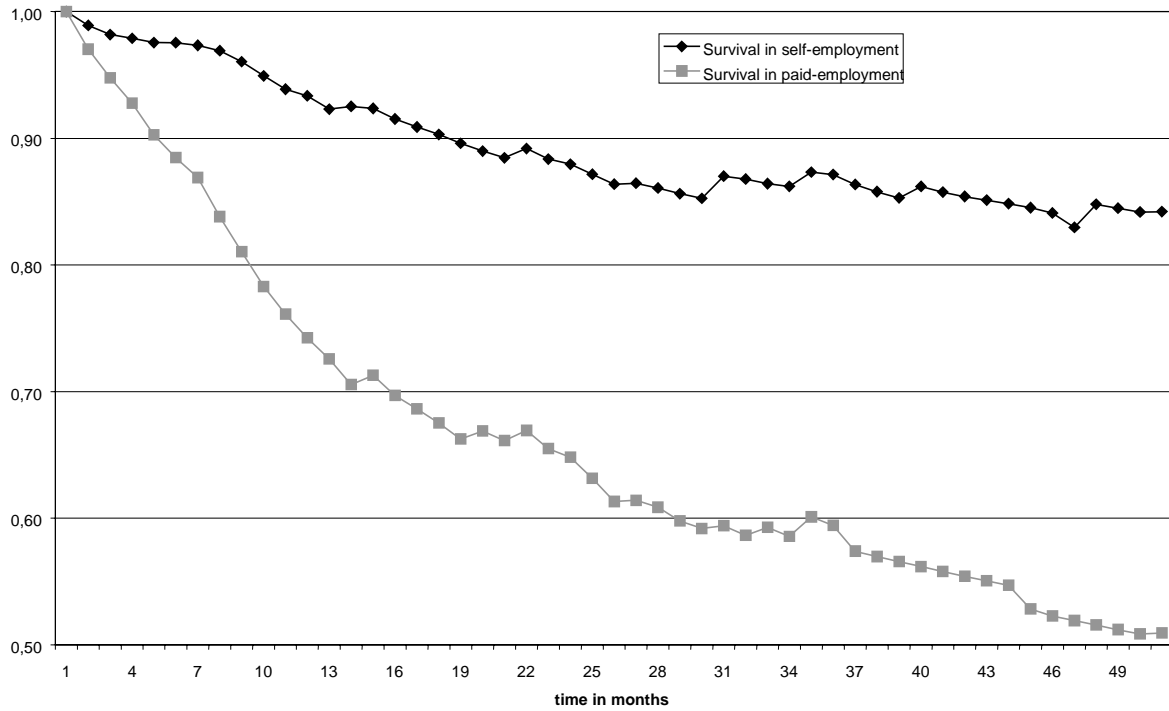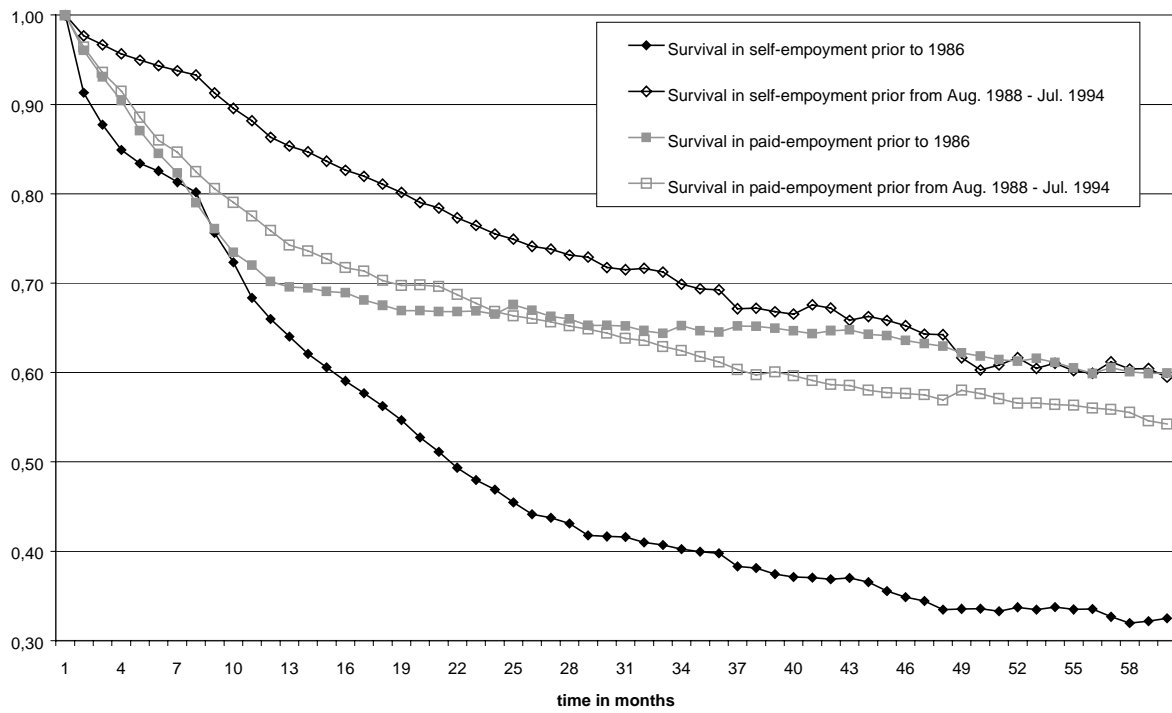

Note: Figure is based on the estimates described in Table 6.

Figure 4: Survival Rates in Employment among the Initially Paid-employed

Note: Figure is based on the estimates described in Table 6.

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Figure 5: Survival Rates in Employment among the Initially Paid-employed for Different Periods

Note: Figure is based on the estimates described in Table 6.