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## Status, Events and Duration

### *Methodological Problems of Measuring Job Stability*

#### **Keywords**

Event history analysis, measuring of duration, job stability, average actual tenure, survivor rate

#### **1. Introduction**

Job stability is a main issue of today's empirical labour market research. It is also important for answering questions about work organisation and the innovative capabilities of firms. However, if we compare the international research literature on job stability it becomes obvious that there are some inconsistent findings.<sup>1</sup> These

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<sup>1</sup> Some authors claim to have observed increased labour market mobility and job stability in Great Britain (Gregg and Wadsworth 1995; Booth *et al* 1999), Germany (Mertens 1999) or the USA (Swinnerton and Wial 1995; Valetta 1999), while others refute these findings and suggest that, despite the alleged (and ongoing) increase in flexibility and deregulation, there is little evidence of any (unambiguous) effects on mobility and duration of employment relationships (cf., for example, on an international perspective OECD 1997; Auer and Cazes 2000; on Great Britain/Burgess/ Hedley 1998; Doogan 2001; on the USA, Diebold *et al* 1996; Neumark *et al* 1999; Gottschalk and Moffitt 1999; on Japan Chuma 1998; on Germany Winkelmann and Zimmermann 1998; Erlinghagen and Knuth 2004).

problems do not only result from the use of different data sources, but also from the application of varying statistical methods. Empirical socio-economic research can use a number of different methods to measure the duration of episodes by using individual data. The deployment of a certain measuring instrument depends on both the particular research interest and the availability of practicable data. The following paper is designed to make a general methodological differentiation between two popular descriptive methods to measure job stability.

But why do we concentrate on these two ‘simple’ descriptive methods? If we take a look on the international research literature on job stability (see footnote 1), the main methodical focus lies on the discussion about the most suitable multivariate transition rate model that should be estimated with regard to the current research question.<sup>2</sup> And surely the estimation of such multivariate models can provide us with a deep insight in human behaviour. But it is also true that „[g]enerally, descriptive studies are [...] much more relevant for sociology as an explanatory enterprise than current journals and university curricula would have us believe“ (Wippler and Lindenberg 1987: 159). It often depends on a useful *combination* of descriptive and analytical methods to improve our understanding of the functioning of social processes (c.f. Bernardi 2001).

*Section 1* introduces (a) Average Actual Tenure and (b) Survivor Rate s as the two methods in question. Further on, both methods are used to analyse gender-specific job stability in Germany. However, if we compare these analyses, it seems as if they lead to inconsistent results. Therefore, it becomes necessary to work on the methodological differences of Actual Average Tenure and Survivor Rates in detail. In this context *section 2* firstly explains different possibilities to aggregate individual tenure information for a descriptive statistical purpose in general. Hence, it becomes clear that the seeming differences of the exemplary gender-specific analyses are caused mainly by totally different measurement concepts. What follows is a discussion of the strength and weakness of the two described methods in *section 3*. *Section 4* eventually gives a final summary.

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<sup>2</sup> For example, Blossfeld and Rohwer (2002) give an overview of the methodical and practical differences of such transition rate models and the related theoretical and empirical literature.

## 2. Introducing the two methods in question

The following paper refers basically on the vocabulary of event history analyses. Event history analyses are investigating the 'event history' of certain 'elements' (e.g. individuals). Its focus lies on the duration of episodes, whereas the beginning and the end of these episodes are defined by 'events'. Through an appearing event a preceding episode is finished and a subsequent episode is started, whereas the specific kind of event could also deliver additional information about the direction of change. For example, a preceding job spell ends and immediately a subsequent unemployment spell begins, both because of the event 'dismissal'. During the period between two 'events' (for example hiring and firing) the 'element of analysis' (for example an employee) remains in a certain 'state' (for example gainful employment) (Blossfeld and Rohwer 2002).

### *Average Actual Tenure (AAT)*

The Average Actual Tenure (AAT) indicates how long a certain group of jobs have, on average, lasted until a specific cut-off date. Hence, the AAT provides information about job stability that has been cumulated in the past. Mostly retrospective survey data is used to calculate the AAT. In such surveys, employees are asked how long they have been employed by their current employer. This retrospective data can principally provide information about any point in time in the past employment history of the respondents, limited only by their memory. Therefore, there are no left-censoring problems. Right-censoring problems are avoided by definition because the AAT method refers only on past and present, whereas 'future' developments cannot be recorded *with regard to the survey date* (see also *section 2* on this topic). In order to calculate the Average Actual Tenure of the interviewed employees, the reported duration of all employment spells have to be summed up and divided by the total number of respondents in the survey (Hall 1982; see also Ureta 1992). The Average Actual Tenure  $T$  at time  $t$  thus can be calculated as follows:

$$[1] \quad T_t = \frac{\sum_{i=1}^n t - t_{s_i}}{n}$$

where  $n$  is the number of respondents and  $t_{s_i}$  describes the point in time when a individual  $i$  has started to work for his or her employer.

For Germany the Average Actual Tenure can be calculated by using data from the German Socio-Economic Panel (GSOEP; see Wagner et al. 1993 and SOEP Group 2001).<sup>3</sup> In order to ensure comparability with another data set which will be used later on in section 1.2, the following analysis of the GSOEP has been restricted only to West-German employees liable to pay social security contributions. Consequently, the self-employed, civil servants and those in marginal part-time employment are not included in the analysis. However, since about 75 per cent of the economically active population is still in insurable employment, this employment form represents the main core of the German labour market (Hoffmann and Walwei 1998).<sup>4</sup>

The GSOEP information about individual tenure is provided as generated values, originally referring to the initial interview when the panel member is asked once to report the duration of his or her current job retrospectively. During the following panel waves, the tenure information is updated yearly by combining the initial retrospective data with new information on employment in the preceding year. *Figure 1* shows the evolution of Average Actual Tenure for gainfully employed West-German men and women from 1984 up to 2000. It is shown that during the whole investigation period men had higher Average Tenure than women. While in 2000,

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<sup>3</sup> The German Socio-Economic Panel (GSOEP) is funded by the Federal Government and run by the German Institute for Economic Research (DIW) Panel Group in Berlin. The GSOEP began in 1984 in West Germany with a sample of 13,919 respondents in 5,921 households. The panel was extended to East Germany in 1990 just before reunification. Respondents have been recontacted every year since 1984 with everyone in the household aged 16 and over interviewed separately. The main topics covered by the GSOEP are individual and household income, employment and unemployment, education and job training, housing and health.

<sup>4</sup> In addition, the respondents were excluded who reported that they had been regularly employed by their current employer before they had reached the age of 12. Further on, only those respondents remained in the analysis sample who were not older than 67 years in the year in question.

male average tenure was approximately 11 years female average tenure reached only 8.5 years.

– **Figure 1 about here** –

Between 1984 and 1993, average male tenure increased from 10.8 to 11.6 years and then dropped in the following period up to 1996 down to 10.3 years. Until 1999, the AAT remained relatively stagnant before it clearly increased in the end of the investigation period to approximately 11 years again. Female AAT showed a very similar pattern but on a considerably lower level: Until 1993 average female tenure clearly increased from 8 to 8.7 years. Although female AAT shrinks up to 1997 to 7.8 years, it should be noted that this decrease was stronger for men during this period. After 1997 the average female tenure was growing again and at the end of the investigation period it reached a new peak at 8.5 years.

### *Survivor-Rates*<sup>5</sup>

Apart from Average Actual Tenure, so-called ‘Survivor Rate s’ (SR) can also be used to analyse job stability. With the aid of such Survivor Rates, time-dependent survival probabilities can be calculated. From a starting point up and for every point in time within a pre-defined investigation period the Survivor Rate reports the share of an initial population that remains within a ‘risk pool’. If you think of employment spells, one could ask how many of 100 jobs that started at time  $t$  have survived up to time  $t+1$ ,  $t+2$ , ...,  $t+n$ . In addition, we can ask how much time elapsed until a specific share of jobs has ‘died’, or respectively ‘survived’ (for example 80 % have survived up to  $t+1$ , 65 % up to  $t+2$ , etc.).

If we want to estimate Survivor Rate s for new beginning jobs, the starting points of all employment spells under observation have to be synchronised, so that every spell that begins within a certain defined period starts at analysis time  $t = 0$ . Hence, with regard to the starting point, it is obvious that the probability for a job to continue, shrinks

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<sup>5</sup> A special variation of the Survivor Rate method is the calculation of so called ‘product limit estimations’ (‘Kaplan-Meyer-Method’). In social sciences the product limit estimation is very popular because of his appropriate dealing with right censored information (c.f. Blossfeld and Rohwer 2002).

with increasing tenure, since day by day people leave their jobs whether because of unemployment, retirement, death, etc.. Therefore, the Survivor Rate can be interpreted as employees' time-dependant probability to stay with a single employer.

The Survivor Rate  $S$  at analysis time  $t_j$  is calculated as follows:

$$[2] \quad S_{t_j} = \frac{n_{t_j}}{n_{t_0}}$$

where at time  $t_j$ , still existing employment spells  $n_{t_j}$  are divided by the origin number of jobs  $n_{t_0}$  that have been under observation at time  $t_0$ .

For Germany the so-called IAB employment subsample (IABES) is particularly well-suited for use as a data set for the analysis of job stability. The IABES contains exact daily data on the employment careers of some 560,000 individuals over the period between 1975 and 1995. The data set is based on a 1% sample of the insurance accounts which the Federal Labour Office (*Bundesanstalt für Arbeit*) maintained in respect of employees liable to pay social security contributions between 1975 and 1995.<sup>6</sup> These 'process-produced data'<sup>7</sup> are supplemented by data on periods of unemployment during which a claimant received benefits and on certain characteristics of the establishments which employed individuals in the subsample during the period of observation. This corresponds to about 7.8 million employment or benefit payment notifications, with each individual record containing 35 variables (cf. Bender et al. 2000).

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<sup>6</sup> Hence, like the calculation of the Average Actual Tenure in section 1.1, the analysis is restricted to West-German employees, whereas self-employed, civil servants and those in marginal part-time employment are not included in the following Survivor Rate estimation.

<sup>7</sup> Process-produced data are data that are required and gathered for administrative purposes or to assist public institutions (particularly social security agencies) to discharge their duties (Schmähl 1985: 277).

Figure 2 shows the survivor function of newly started jobs for men and women. Each survivor function consists of all single Survivor Rates that are calculated for every single analysis time unit (here: for every single day). Further on, we distinguish two different periods in which job spells have started. If the job spell began between 1976 and 1980 it belongs to the 1976-1980 entry cohort; if the job spell began at any time between 1986 and 1990 it belongs to the 1986-1990 entry cohort.<sup>8</sup> All job spells of each entry cohort start at analysis time  $t = 0$  and are followed up over a period of maximum five years ( $t = 1825$  days). Thus, the Survivor Rate calculated at  $t = 1825$  days reports the share of jobs that have begun in the particular entry cohort and that still exist five years later.

– **Figure 2 about here** –

Comparing the survivor functions in figure 2, we can see that women's job stability is almost identically in both entry cohorts. For men, however, the jobs of the entry cohort 1986-1990 are more stable than the jobs of the earlier entry cohort: The median employment duration has increased for about one month and a survivor probability of 25 percent is reached about six months later, than it did ten years before. But beside these results it becomes obvious that women's jobs are more stable than men's, even at the end of our investigation period: If we compare the survivor functions of men and women, for the entry cohort 1986-1990 the median spell duration for men is about 345 days but for women it is 365 days. This becomes more obvious if we take a look at the 25 percent survival threshold: Three quarters of jobs that had been started by men, were finished after approximately 40 months. Compared with this result, jobs that had been started by women reached this point about six months later.

### **3. Methodical comparison between Average Actual Tenure and Survivor Rate**

It seems that the exemplary findings derived from an analysis of the GSOEP and the IABES data are leading to

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<sup>8</sup> These two entry cohorts were selected because both periods were periods of employment growth.

inconsistent conclusions: Based upon a calculation of the Average Actual Tenure, job stability for women seems to be lower than for men. But the estimation of Survivor Rates leads to an opposite result. Thus, job stability is higher for women than for men. How can these differences be explained?

The first and most obvious difference between the two measurement concepts is that the AAT reports job stability as an average value whereas the survivor function (derived from every single Survivor Rate) does not result in one single figure but shows the time depending survival probability. But the characteristics of the results – figure or function – is only one aspect to differentiate the two methods. To go further on, it is necessary to answer the following questions and for this reason we have to visualise the meaning of the terms ‘elements’, ‘event’ and ‘state’ again:

- 1.) Which *reference time* is chosen? Should the elements of analysis be selected by a ‘state’ or by a state-restricting ‘event’?
- 2.) Which *measurement direction* is chosen? With regard to the reference time of analysis: Should the state duration be calculated for the ‘past’ or for the ‘future’?
- 3.) Should completed or uncompleted spells be analysed?

### ***Reference time***

In a methodical perspective, the measurement of the duration of a single episode is basically simple. Thus, duration describes the time between two event dates and is, therefore, calculated as the difference between end and starting time. However, the aim of any empirical sociological analysis is to aggregate a lot of individual durations to reach some general conclusions. Such an aggregation is quite complicated because real episodes (for example job spells) do not begin and end synchronously but asynchronously. Though, any general statement about episode duration requires its tight localisation within time. Therefore, an important methodical distinction criteria is the chosen selection category: Is the selection of the ‘elements’ under investigation (for example employees or jobs) founded on a specific *state* or on a specific *event*? Or with other words: Is it an important criteria that an individual is in a specific state or that an individual faces a specific event? Going back to our example of job spell duration, this means that we have to ask whether we want to calculate the duration for individuals within a certain employment state (for example all individuals employed December 31) or for individuals that face a specific labour market



event (for example all employees who have started a new job within one specific year).

The consequences that can be derived from such state- or event-related decisions are presented in figure 3 and 4. In both figures the exemplary employment spells of eight fictitious individuals are shown during an analysis time of 48 months. The horizontal lines are symbolising the duration of an employment spell whereas the beginning and the end of those lines mark the entry and exit events of the employment spell.

Please note that we first want to select employees by *state*, that is, for example, to be employed at the beginning of the 13<sup>th</sup> month. Therefore, in figure 3 we set off all those horizontal lines that symbolise job spells of individuals who were employed at the beginning of the 13<sup>th</sup> month (stressed vertical line).

– **Figure 3 about here** –

Principally, figure 4 describes the same set of employment spells: Length and position of the employment spells as well as the time-axis have remained unchanged. Although figure 4 covers the same employment spells, we now select employees by event, that is, for example, to start an employment spell between the 13<sup>th</sup> and 24<sup>th</sup> month. Therefore, in figure 4 we set off all those horizontal lines that symbolise the job spells of individuals who enter a (new) employment spell between the 13<sup>th</sup> and 24<sup>th</sup> month (grey rectangle). If we now compare figure 3 with figure 4, we can see that the set of employment spells that are included into analysis changed fundamentally if the criteria of sample definition is changed. Which employment spells will be chosen depends on whether the sample is defined by a certain *state* reached at a certain point in time (figure 3), or whether the sample is defined by a certain event that occurs within a certain time period (figure 4). It becomes obvious that there is no intersection between the employment spells that would be included in one of the two examples in figure 3 and 4.

– **Figure 4 about here** –

### ***Measurement direction***

The second difference between the two methods is the measurement direction. With regard to a certain *reference time* the duration of spells can be measured either in a ‘future’, or in a ‘past’

direction. The AAT concept refers to employment periods lying left of (or: ‘before’) the chosen reference time. Thus, the AAT is interested in periods that have gone by up to the reference time. In contrast, the Survivor Rate measures the ‘whereabouts’ of event cohorts in the ‘future’ (with regard to the chosen reference time). The Survivor Rate concept refers to employment periods lying right of (or: ‘after’) the chosen reference time. So it should be quite clear that the measurement direction is of decisive importance when interpreting the analysis results. The findings must be handled in different ways, depending on if they refer to periods ‘before’ or ‘after’ the reference time.

### ***Completed vs. uncompleted spells***

Only if the starting and ending time is known, spells can be calculated completely. But if we analyse employment spells, the used data sets commonly do not contain such complete information. There are spells that have already begun when a data set starts (‘left-censored’ spells) and/or there are spells that have not already been finished when a data set ends (‘right-censored’ spells). Especially if individuals are asked about their *current job*, a problem comes up because certainly they can remember (more or less exactly) the job entry date, but the exit date is understandably not known at the survey date. Therefore, to calculate completed spells requires longitudinal panel or event history data that covers both the starting and ending times of a sufficient number of analysed spells.

### ***Schematic classification of Average Actual Tenure (AAT) and Survivor Rate (SR) concepts***

Now we can try to classify the two measurement concepts by using the features that have been developed up to now:

The exemplary calculation of the Survivor Rates of newly started jobs in section 1.2

- (1) defines the reference time by a period in which a certain event happens. In our example the Survivor Rates are estimated for event cohorts (here: entry cohorts 1976-1980 and 1986-1990).
- (2) reports ‘future’ job stability (with regard to the reference time!). Although the event history data of the IABES is right censored it is nevertheless possible to calculate Survivor Rates by defining a maximum analysis time (here: five years). The Survivor Rate at the end of our analysis period reports the fraction of newly started jobs that have survived five years minimum.

(3) is based on the calculation of completed job spells.

The exemplary calculation of the Average Actual Tenure in section 1.1 proceeds diametrically opposed to the Survivor Rate because

- (1) a single date is chosen as the reference time (here: survey date in the GSOEP)
- (2) findings are related to past periods (with regard to the reference time!)
- (3) all sample members are employed at the survey date and, therefore, the AAT concept deals with uncompleted spells.

The AAT method is related to the past because its calculation is based upon uncompleted spells. In contrast the calculation of Survivor Rates contains information about the starting and ending time of the employment spells within a defined period (in our example within five years after the starting date of a new job spell). Now it becomes clear that both methods are providing fundamentally different indications although their findings have seemed to be very similar at first sight (see also Lancaster 1990: chapter 5).

#### **4. Interpretative comparison between Average Actual Tenure and Survivor Rate**

The gender-specific analysis of job stability in Germany has shown that the two presented empirical methods seem to lead to inconsistent results. On the one hand, the Average Actual Tenure refers to generally higher job stability for men. On the other hand, the Survivor Rates report higher job stability for women. And so the question arises: which method gives us the “true” information? However, it is not possible to answer this question because both methods are aimed at different targets and we should take them as complementary research instruments that both can mutually improve our understanding of complex social processes. But, therefore, it is necessary to discuss the advantages and weaknesses of both methods so that we can choose the right instrument for certain research questions and furthermore, to strengthen and improve the interpretation of our empirical findings.

##### ***Problems of the Average Actual Tenure method***

If we want to interpret the average actual tenure, the following problems occur that limit the validity of the results:

*Little evidence for interpreting the recent labour market situation*

It should be noted that the Average Actual Tenure documents especially a part of the past labour market situation. The older the interviewed employees are and the longer they have stayed already with their current employer, the stronger the measured AAT is influenced by the past labour market performance. If, for example, 60 years old employees were asked in 2000 how long they have already stayed with their current employer, it is possible that as a maximum, the labour market situation of the year 1955 is influencing the results.<sup>9</sup> It becomes obvious that, with regard to the current labour market situation, the validity of the Average Actual Tenure is strongly limited because of this historical component. At least, any interpretation has to take this strong historical bias into account.

*Interpretative difficulties because of social and demographic changes*

If the age distribution of a certain population is changing, the proportion between 'young' and 'old' is changing. If we imagine a period of increasing labour market participation of younger cohorts, Average Actual Tenure is influenced in a specific way, because, for example, 20 year old employees cannot report tenure of 40 years by definition. Another example is the labour participation of women: If the labour market participation of women increases, then, a lot of female employees are newcomers on the labour market and, therefore, have not had the chance to reach similar high tenure as men. Hence, shrinking Average Actual Tenure could be caused not only by general decreasing job stability, but also especially by social and demographic changes like social ageing or growing female labour market participation.

*Seasonal fluctuations were not considered*

When we calculated the average actual tenure, it should have become quite clear that unemployed individuals were not taken into account because they had no current employer at the time of the interview. As long as it would be plausible that the unemployment hazard is time-independent and equally distributed during the whole year, no problems would occur even if there would be different

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<sup>9</sup> If we assume that a teenager joins the labour market not before the age of 15, then, the year 1955 is the earliest year of labour market entry for employees who were 60 years old in 2000.

unemployment hazards for some groups of employees. In a statistical view a cross-sectional survey with only a single interview date should show an exact picture of the ratio of employed and unemployed that could be expected if we would calculate an Annual Average Ratio. But this is only true if the unemployment hazard does not vary over the year. However, on the real labour market we can find a strong seasonal variation of the unemployment risk, especially in such branches as construction or tourist industry. Depending on the timing of the interview, shorter employment spells were more or less covered by the average actual tenure. If we consider that in the seasonally influenced branches, employment chances are better in the summer and worse in the winter, we should expect a lower AAR if all (or most) interviews were held during the summertime because a relevant number of, let us say, construction workers or waitresses were only relatively short in employment at a summery interview date. During the winter, the AAR should be generally expected to increase – not because of a generally increasing job stability but because the seasonal jobs do not exist anymore. Researches should be aware of this phenomenon especially if they make international comparisons based on different national surveys.

### ***Problems of the Survivor Rate method***

*In fact only relatively short time-intervals can be presented*

With regard to people who show a particular event during a defined reference time, the Survivor Rates provide information about job duration in the ‘future’ (‘future’ means the periods ‘right’ from the *reference time* as shown in detail in *section 2*). In our example Survivor Rates are calculated for certain entry cohorts. To calculate Survivor Rates, event history data is necessary that provides information about the end of employment spells. However, with regard to the need for analyses of the present labour market, a right-censoring problem occurs when using such event history data.

It should be quite clear that no sample really can depict the future. At least on the day on which the analysis should be done, employment spells that have not ended up to this sample day, must be cut off. The data set we use in our example (IAB Employment Subsample) principally covers the end of employment spells, but only up to December 31 in 1995. Therefore, all employment spells that exist beyond this date are right-censored. Hence, the completed duration can only be ascertained for a specific group of job spells. For this reason, it is essential to define a maximum analysis time to

reach comparable results. In our example, this maximum analysis time is set to five years and, thus, the jobs belonging to the chosen entry cohort can be followed up for five years starting from their particularly unique starting date. Therefore, the calculated Survivor Rates say something about the stability of jobs only for a relatively short period. If we are interested in gender-specific differences of job stability, the results of our example can only be interpreted with regard to the maximum analysis time of five years. As shown by Knuth et al (2001:15) or Mertens (1999), at a maximum analysis time of 10 years the Survivor Rate for women lies under the Survivor Rate for men. A statement like “job stability is higher for women” holds only true for a time span of five years after starting a new job, but it must not be interpreted as a general rule. However, despite these right-censoring restrictions, the Survivor Rate is unequivocally superior to the Average Actual Tenure in providing information about the current labour market performance because the analysis is not influenced by any “historical ballast”. Social or demographic changes also cause no interpretative problems when working with Survivor Rates.

In addition it is necessary to refute a possible objection that could be raised to the Survivor Rate method. One could think that the Survivor Rate could underestimate especially long lasting job spells. If we think about the definition of the two entry cohorts in our example, only those job spells are included in the analysis that have started during a five year entry period (or better to say that have started at any time between the years 1976 up to 1980, or 1986 up to 1990 respectively). Individuals who are not able to start a new job, let us say between 1976 and 1980, because they have started their job before 1976 and are still with their employer after 1980, are not included into the 1976-1980 entry cohort by definition. There is no doubt about that. However, this is no real problem because it is a fact that even very stable jobs must have a starting date. Therefore, it is clear that a certain number of very stable jobs begin during the chosen entry period by chance and so they surely will be covered by our Survivor Rate estimation. The stability of those jobs is expressed by the Survivor Rate at the end of the maximum analysis time. For example, if 20 percent of all jobs that have been started at any time during the years 1976 to 1980 survive during the whole investigation period of five years, then this fraction contains the very stable jobs. Therefore, long-lasting jobs will influence the estimated Survivor Rates even if there is just a maximum analysis time of five years.

## 5. Conclusion

Measuring job stability is of certain interest for current labour market debates as well as for answering questions about work organisation and the innovative capabilities of firms. With the Average Actual Tenure and Survivor Rate, two methods are available that give us some information about the duration of employment spells. However, if we take a closer look, we can recognise that both methods are fundamentally different. Therefore, the results caused by both methods cannot be compared and require their own interpretation.

First of all, it belongs to the research interest which method should be used. The application of the Average Actual Tenure method is rather useful for answering industrial sociological questions, for example, of how the tenure structure in a certain branch has developed during the last decade. Such an analysis requires only cross-sectional data with retrospective employment information. However, if we interpret the findings, we have to be aware about the strong historical bias as well as about the seasonal fluctuations of hiring and firing that both strongly influence the outcomes. In addition, the analysis of tenure time series should be done with caution because of the strong influence of social and demographic changes on the results.

The calculation of Survivor Rates is more appropriate for answering questions about current labour market problems, for example, whether job stability is decreasing. Such analyses require event history data that makes it possible to measure completed job spells. Comparing with the AAT method, there is neither any kind of “historical ballast” that could distort the results, nor have social and demographic changes any influence when comparing estimations for different points in time. However, the main disadvantage of the Survivor Rate method is that in fact only relatively short time-intervals can be presented to ensure the topicality of the results.

Coming back to the main topic of our paper, we can say that the Average Actual Tenure method is not very well suited to say something about job stability. The AAT is more useful to provide information about the employment structure of firms. To make any statement about job stability, the analysis of completed job spells is indispensable and, therefore, the Survivor Rate method should be preferred in this case.

## 6. Comprehension Check

1. Define the terms element and event. What is the relationship between these terms within the methodology of event history?
2. What is the procedure of calculating actual tenure? What kind of data is required?
3. How do you calculate survivor rates? What are the data requirements for this calculation?
4. What is the relationship between survivor rate and survivor function?
5. There are several approaches that are used to measure tenure. Please name and explain the three main factors which are characteristic of these approaches.
6. Point out the advantages and disadvantages of measuring job duration via (a) average actual tenure; (b) survivor rate.
7. Please point out how to apply both average actual tenure and survivor rate to calculate durations of unemployment.

## 7. Recommended reading

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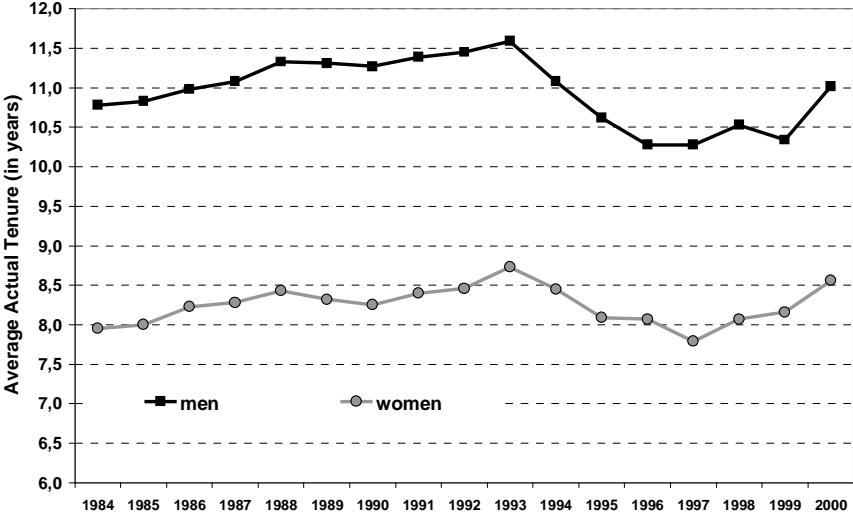


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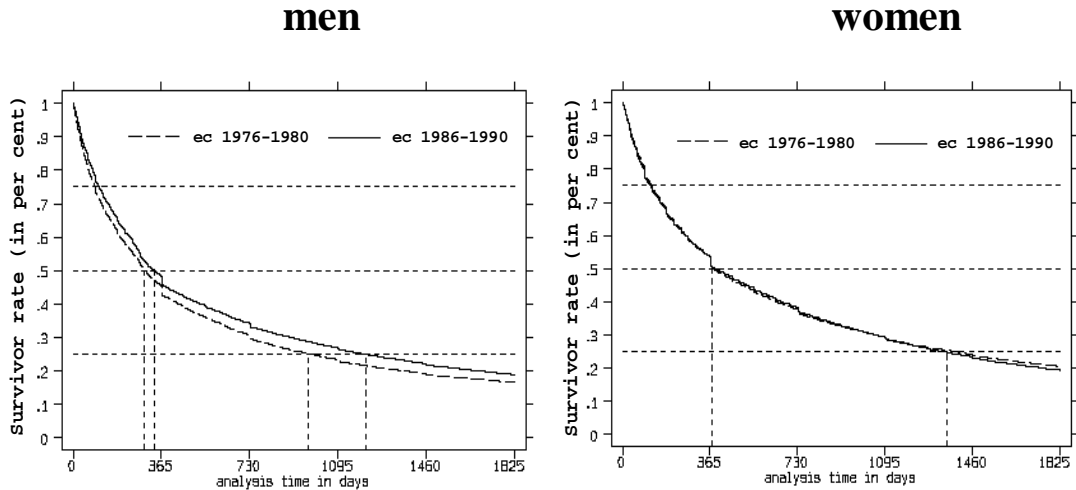
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Figure 1: Gender-specific Average Actual Tenure in years (gainfully employed, West Germany 1984-2000)



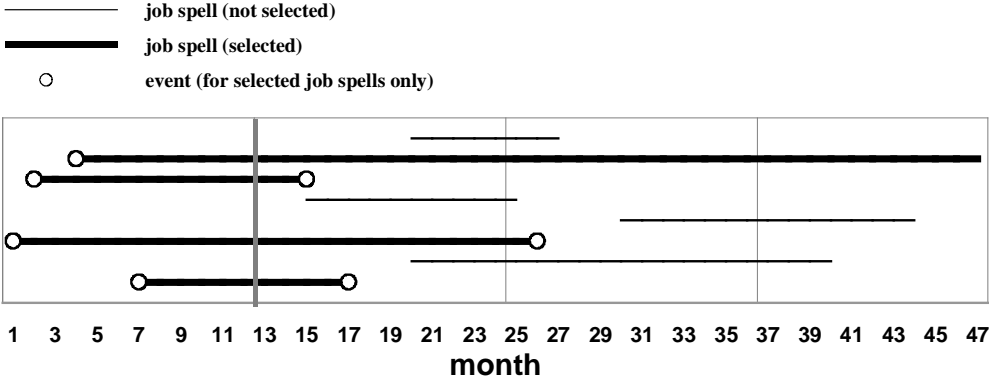
Source: GSOEP (own calculations)

Figure 2: Gender-specific survivor functions of new started jobs (West Germany), entry cohorts (ec) 1976-1980 and 1986-1990



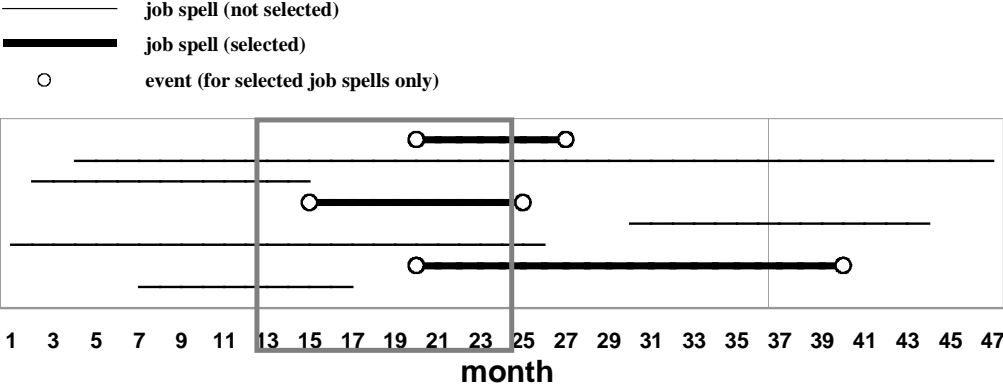
source: IAB Employment Subsample (own calculations)

Figure 3: Sampling of individuals by state



source: own presentation

Figure 4: Sampling of individuals by events



source: own presentation