Labour Market Dynamics in Germany: Hirings, Separations, and Job-to-Job Transitions over the Business Cycle

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Abstract

In this paper, we provide a comprehensive overview of labour market dynamics in Western Germany by looking at gross worker flows. To do so, we use a subsample of the registry data collected by the German social security system, the IAB employment sample, for the time period 1975-2001. The latter provides daily information on 2% of the German workforce covered by social security legislation. Using these data, we are able to exactly calculate the number of transitions between the different labour market states, and between different employers over time. We first provide an overview of the cross-section and time series properties of these flows. We then study the cyclical features of gross worker flows, accessions, and separations. We find that separations are relatively flat over the cycle, while accessions are markedly procyclical, and that the increased flow into unemployment in a recession is mainly due to reduced hirings, and hence lower job-to-job transitions, rather than increased match separations. Our findings have important implications both for the way we view recessions and for the role of the labour market as a propagation mechanism for productivity shocks.

JEL codes: J63, J64, J21, E24

Keywords: worker flows, accessions, separations, business cycle, job-to-job, employer-to-employer.

1 Introduction

There seems to have been a consensus among macroeconomists about the reason for increased unemployment inflows during a recession: a negative productivity shock leads to a burst in match break-ups, which in turn results in previously employed workers becoming unemployed. This mechanism features prominently in the standard search and matching model of the labour market as epitomised in Mortensen and Pissarides (1994). This conventional wisdom has however been challenged by recent empirical research on the US labour market. Fallick and Fleischman (2004) and Nagypál (2004a) provide direct evidence on gross worker flows, including job-to-job transitions, for the US for the time period 1994-2003. Both papers exploit the "dependent interviewing" techniques introduced in the Current Population Survey (CPS) in 1994. Fallick and Fleischman find that job-to-job transitions are large, that they are procyclical, and that they are centered around the recession. Nagypál, on the other hand, finds that, while separations are relatively flat over the business cycle, accessions are much more volatile, and puts this down to a decline in job-to-job transitions during recessions.

These findings have been formalised by Shimer (2005a). He shows that in a search model where unemployed workers accept any job and employed workers move to better jobs, the cyclicality of the job-to-job transition rate depends on the nature of the shock. While fluctuations in the separation rate lead to a countercyclical transition rate, fluctuations in the job finding rate lead to a procyclical job-to-job transition rate. Nagypál (2004b) shows that this has important implications for the propagation of shocks. Because workers who have been previously employed are less likely to continue search after moving to a new job, firms prefer hiring them to hiring the unemployed. During booms, a large fraction of job seekers is employed, which raises expected profits. Therefore, firms create more vacancies thus enhancing the effects of a positive productivity shock. Krause and Lubik (2004) also find important propagation effects in a multi-sector model with highly elastic on-the-job search. Workers switch sector in response to a positive productivity shock in another sector. This changes the marginal productivity in the sector that the worker has left, which in turn leads to firms creating vacancies in this sector, and more people moving. The ensuing vacancy chain propagates the initial productivity shock. These studies thus stress the importance of direct job-to-job transitions for the role of the labour market as a propagation mechanism of productivity shocks. Finally, Hall (2005) shows that the observed importance of hirings relative to separations is most likely to emerge from a model with efficient employment governance and rigid wages.

Direct job-to-job transitions also have an important impact on the way we view recessions. The traditional view is the Schumpeterian one which postulates that bad matches are weeded out during recessions. This conclusion follows from the standard search and matching model of the labour market. There, a negative aggregate shock leads to the destruction of matches featuring low idiosyncratic produc-

tivity. This cleansing effect of recessions has however been challenged by Barlevy (2002). He argues that on-the-job search usually leads to better matches, as otherwise workers would not search while employed. If recessions hamper job-to-job transitions, this can result in matches created during recessions being of lower quality. In this case, recessions could exert a sullying, rather than cleansing, effect by worsening the quality of newly created matches.

Despite this perceived importance of accessions, separations, and direct job-to-job transitions, empirical evidence for Germany is relatively scarce in this field. Erlinghagen (2005) uses a representative German household survey the German Socio-economic Panel (GSOEP) in order to analyse the evolution of lay-offs and job security for the time period 1985-2001. He finds that the business cycle is the most important determinant for the observed evolution, and that there is no discernible long-run trend. Schmidt (1999a, 1999b) also uses the GSOEP, stressing the heterogeneous experience of different demographic groups, especially with respect to their sensitivity to cyclical factors. Compared with the three above papers, our study differs in two respects. First, we stress the role of accessions and separations in order to account for the evolution of labour market flows and unemployment. Second, we use a different data source, which derives from registry data. Finally, Fitzenberger and Garloff (2005) use the same data source and calculate labour market transitions, without however specifically looking at accessions and separations.

The data set we use, the IAB employment sample, allows us to record worker transitions on the labour market, including job-to-job flows, on a daily basis. We are therefore able to exactly quantify worker flows, and to provide a comprehensive analysis of their cross-sectional and time series properties. We confirm many of the findings by the authors cited in the above paragraph. Furthermore, we can give a detailed picture of the cyclical response of labour market flows. It turns out that we corroborate the findings by Nagypál (2004a) for the US that worker flows into unemployment during a recession are mainly caused by a decline of job-to-job transitions, rather than by a burst in separations. This poses a major challenge to the way macroeconomists tend to view recessions. In general, our findings should be of interest to labour economists and macroeconomists alike.

The plan of the paper is as follows. In the next section, we describe the data set used and the theoretical concepts underlying the empirical analysis. Furthermore, we discuss measurement issues. In Section 3.1, we give an overview of gross worker flows in Western Germany. In particular, we study the relative importance of the different flows. Section 3.2 analyses which impact worker heterogeneity has on the cross-sectional properties of gross labour market flows. Finally, Section 3.3 investigates the cyclical properties of gross worker flows, as well as the question whether it is increased match separations or a reduced hiring activity which lead to increased worker flows into unemployment in a recession. The final section summarises and concludes the discussion.

2 The data, concepts, measurement

2.1 The data set

The data used come from the IAB employment subsample, which covers the period 1975-2001. The data source consists of notifications made by employers to the social security agencies, which include health insurances, statutory pension schemes and unemployment insurance.[1] These notifications are made on the behalf of workers, employees and trainees who pay contributions to the social insurance system. This means that, for example, civil servants and workers in marginal employment are not included. Notifications are made at the beginning and at the end of an employment or unemployment spell. Furthermore, there is an annual report which updates some of the information. The information provided is the following: sex, year of birth, and degree of education/training. Also, information on the occupation and the gross earnings of workers, an establishment number, and the economic sector is available on a daily basis.

Two states of the labour market can be directly derived from the data set: full-time employment covered by social security, and unemployment, if the worker is entitled to unemployment benefits. The third state considered, "non-participation", is not directly recorded but can be inferred. It is defined as: not paying social security contributions while full-time employed, and not receiving unemployment benefits. This means that non-participation can coincide with the state "out-of-the-labour-force". However, it can also mean self-employment, civil service, retirement, or marginal employment. Thus, for those ever registered with the social security system, "non-participation" provides an upper bound for "out-of-the-labour force".

The data base covers 2% of all the persons who, between the 1st January 1975 (for Western German employees) or the 1st January 1992 (for Eastern German employees) and the 31st December 2001, worked in an employment covered by social security. Overall, the subsample includes over 1.29 million people, of which 1.1 million people from Western Germany. For 1995, the employment statistics cover nearly 79.4% of the employed persons in Western Germany, and 86.2% of all employed persons in Eastern Germany. As for the unemployed, only those entitled to unemployment benefits are covered. This means that the unemployment stock is about one third lower compared to offical labour statistics.[2]

The advantages of the data set are thus as follows: first, it does not suffer from the problems inherent in most panel data sets, e.g. there is no sample attrition, and it follows workers over a long period of time because there is no need for rotation as in the CPS. Given the length of our times series, the evidence here is likely to be more conclusive than the US studies cited above, which observe only one episode of labour market tightening (1994-2000) and loosening (2000-2003). Our data set covers two decades and two full business cycle swings. Second, it offers observations at a very high frequency, which means that every

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[1] For a complete description of the data set, see Bender, Haas, and Klose (2000).
[2] See Bender et al. (1999).

actual transition is observed. Again, this is a distinct advantage over survey data like the CPS or the GSOEP, which does not record multiple transitions that take place between two interview dates and, in the case of the GSOEP, uses retrospective data. There are two disadvantages to the data set. On the one hand, it is representative for the working population covered by social security legislation, and not the entire working population. On the other hand, it only covers the unemployed who receive unemployment benefits. However, the share of workers covered by social security relative to total employment is large and relatively stable, at around 80 %. Furthermore, the overwhelming majority of job-to-job transitions takes place within the sector covered by social security.[3] Therefore, the data used cover the transitions we are interested in. The special structure of the data set has to be taken into account when interpreting the different flows however, especially the ones going to and from non-participation.

2.2 Theoretical concepts

Given the data on the employment state of workers, it is possible to calculate worker flows. There are two basic options. On the one hand, one can use point-in-time comparisons. This implies checking the labour force state of each individual at two given dates (e.g. at the beginning of two consecutive months), and infer the ensuing flow from this comparison. On the other hand, one can calculate flows cumulatively, i.e. take into account every change of state that takes place, even if there are several flows within a certain time period (e.g. a month). As our data record every single move on a daily basis, we opt for the latter approach. Abstracting from labour force growth, this concept yields the following stock-flow identities:

$$e_{t+\tau} = e_t + ue_{t+\tau} + ne_{t+\tau} - (eu_{t+\tau} + en_{t+\tau})$$
$$u_{t+\tau} = u_t + eu_{t+\tau} + nu_{t+\tau} - (ue_{t+\tau} + un_{t+\tau})$$

Here, e_t and u_t denote the stocks of employment and unemployment at the end of a given time period. Importantly, $xy_{t+\tau}$ indicates the *sum of all transitions* from state x to state y during time period $[t, t+\tau]$. Note that job-to-job transitions do not feature in these stock-flow identities, as they do not change the stocks. Also, it is worth emphasising that this cumulative calculation takes into account very short spells as well, which are usually not recorded in other data sets.

There are two basic choices for normalising the worker flows. On the one hand, one can normalise the flows by the labour force. This makes it possible to abstract from labour force growth and to facilitate international comparisons. Unfortunately, we do not record the stock of non-registered workers. We therefore restrict our definition of the labour force, l_t, to the sum of the stocks of the employed and of the unemployed, i.e. $l_t \equiv e_t + u_t$. Using the notation above, the normalised flows are then given by $xy_{t+\tau}/l_t$. This also yields the probability of a worker in the labour force to make exactly one such transition. This

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[3]We currently analyse the transitions between social security employment and other employment in a separate research project.

is our preferred normalisation and we use it in most of the analysis. The other option is to calculate hazard rates, i.e. the probability of a worker to make a certain transition, given the worker's state. For example, the hazard of an unemployed worker to make the transition to employment is given by $ue_{t+\tau}/u_t$, and the inverse of this ratio is the duration of unemployment. As this concept features prominently in the literature as well, we briefly touch on it in section 3.3.

2.3 Measurement

As it is possible to track the employment and unemployment history of every person in the sample, we can use these data in order to construct worker flows for the aggregate economy. We compute the flows between the three mentioned states and within the employment state in the cumulative way described above. It should be noted here that our notion of a job is establishment (not firm) based. This means that a change of establishment within the same firm will also be recorded as a job switch.

We have to take into account that there might be measurement errors in the data because of the way the data are collected. In particular, both firms' notifications of a new employment and workers' notifications of becoming unemployed or leaving the state of unemployment might not always correspond exactly to the actual change of labour market state. We correct for this latter potential measurement error in the following way: If the time interval between two records (employment or unemployment) is smaller than 30 days, we count it as a direct transition between the two states recorded.[4] If the gap between two notifications is larger than 30 days, we count this as an intervening spell of non-participation. As for job-to-job flows, records that are from the same person and the same establishment are counted as one single spell as long as the interruptions in notification are not longer than 7 days.

As we are interested in consistent time series that go as far back as possible, the empirical analysis only considers workers from Western Germany. As there is no information on the place of residence in the data set, we do not consider observations about employees that at some point have worked in Eastern Germany.

Finally, there are some worker groups, such as artists, who feature an implausibly high number of spells. As these observations are due to administrative rules, they are not interesting from an economic point of view. We therefore drop these observations from the data set by eliminating any person who features more than 200 employment spells over the time period considered.

Unfortunately, the number of people receiving unemployment benefits is unreliably measured before 1980. Therefore, the stock of those people, as well as the flows to and from that state, cannot be used for our analysis before 1980. As employment is correctly measured, we nevertheless obtain reliable estimates for direct job-to-job transitions, and for separations and accessions. However, we are not able to decompose the two latter time series into the components they are made up of. Therefore, we can tell

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[4]We did the calculation for smaller intervals as well. This does not change the results significantly.

neither the destination of a worker leaving the state of employment, nor the origin of a worker entering employment before 1980. We are however able to do so from 1980 onwards.

3 Gross worker flows in Western Germany

3.1 The overall picture

We consider seven different flows: six flows between the three labour market states, and job-to-job flows. We depict averages for the time period 1980:1 - 2000:12 for the flows normalised by the labour force in figure 1. "U" denotes unemployment, "N" non-participation as defined above, and "E" employment. This gives an indication of the magnitude and of the relative importance of the different flows.[5] Note that one can interpret the numbers in the figure as the probabilities of a worker in the labour force (i.e. employed or unemployed) of making a certain transition within a given month. As one can see, flows between employment and non-participation are most important quantitatively. Very close in order of magnitude are direct job-to-job transitions. Flows between employment and unemployment, on which much of the theoretical search and matching literature focuses, only come third. Finally, flows between unemployment and non-participation are relatively low. These figures are roughly in line with the ones reported in Burda and Wyplosz (1994). The main difference is that we find slightly higher flows between employment and non-participation. This is mainly due to the fact that our third state, non-participation, differs from the usual definition of "out of the labour force" (OLF).

Table 1 gives the probabilities, or hazards, of making a certain transition within a given month for the time period 1980-2000. The results show that nearly 98% of those employed full-time at the beginning of a given month stay with their old employer within that month. 0.82% of the employed switch directly to a new job, 0.63% become unemployed, and 0.82% leave the system of social security within a given month. As for the unemployed, 7.1% find a full-time job, 88.5% remain unemployed, and 4.4% leave the regular labour market within a month. These hazard rates reveal large differences to the US labour market, especially when looking at the unemployed. According to Fallick and Fleischman (2004), 93.4% of US employees stay with their employer in a given month, and 1.3% become unemployed. As for the unemployed, however, 28.3% of the unemployed find a new job within a given month, and only 48.4% remain unemployed. Clearly, the latter figure is much lower than the German one. While this is partly due to different definitions of who qualifies as unemployed, the lower dynamics of the German labour market are to be held responsible as well.

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[5]Inflows not equalling outflows for a given state are due to the fact that the stocks are not constant over time.

3.2 Cross-sectional features of hirings, separations, and gross worker flows

We start by looking at the cross-sectional features of separations and of the flows making up separations, namely the flows from employment to another job (EE flows), to unemployment (EU flows), and to non-participation (EN flows). We report monthly averages of separations and its underlying flows for the time period 1980-2000 and for different worker categories in table 5.[6] The categories considered are age, sex, and the industry and educational background of a worker. For each of these, separations are computed as share of employment, and the flows are computed as share of employment and of separations, respectively. Several features are worth noting. First, there is a general tendency of separations to decline with age. This can be justified by the accumulation of job-specific human capital on the one hand (cf. Pissarides, 1994), and learning about match quality on the other hand (cf. Jovanovic, 1984). The only exception is the oldest age group, where separations rise again. As this is mainly due to an increase in flows into non-participation, this is clearly linked to retirement decisions. The youngest age cohort features important inflows into non-participation as well. This is in all likelihood due to workers returning to the education sector. As our research here is not concerned with life-cycle choices linked with education and retirement, we restrict the following analysis to prime-age workers, defined as workers aged between 25 and 55.

The sex of a worker also has an impact on the likelihood of separation. A male worker is less likely to separate from his employer in a given month. This is mainly due to the fact that women experience less direct job-to-job movements, but instead transit more often from employment to non-participation. We put this down to the fact that women more often leave the labour market in order to raise children. Working in a specific industrial sector also influences the likelihood of separation. As one can see from the table, separations are highest in the construction sector, with the flows between employment and unemployment being of particular importance. The main reason for this is in all likelihood that workers in this sector are laid off during seasonal downturns, receive unemployment benefits during their spell of unemployment, and are reemployed again thereafter. Unsurprisingly, turnover is particularly low for government employees. Finally, the type of degree a worker holds plays an important role for the kind of separation she is likely to experience. Workers with relatively low skills, namely those without vocational training (with or without high-school degree) are very likely to experience a separation, in which case they face a high probability of becoming unemployed or flowing into non-participation. Workers who have accumulated more specific human capital through, e.g., a vocational training or a degree at a polytechnical university, are more likely to have a new job lined up upon separation.

Summarising the above results, it should be emphasised that worker characteristics play an important role in determining aggregate flows in the economy. As the composition of the workforce might change over the business cycle, these heterogeneities have to be taken into account when analysing the cyclical

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[6]The figures for accessions are very similar and are obtainable from the author upon request.

features of worker flows. This is explicitly done in section 3.4. First, however, we compute the stylised facts of worker flows in Western Germany. This is done by implicitly assuming that all workers are homogeneous.

3.3 Hirings, separations, and gross worker flows over the cycle

We now use the spell information we have about workers to construct time series for the different flows. As we show later, there is no clear trend in the data. The following analysis therefore focuses on the cyclical features of the flow series. We start by examining the evolution of separations and accessions over the cycle. The evolution of separations, accessions, and employer-to-employer flows for the time period 1975-2000 is depicted in figure 2 (note that these are now yearly rates). Separations are calculated as the sum of all matches separated in a given year, i.e. the flows going from employment to a new match, into unemployment, or into non-registration (EE+EU+EN). Accessions are calculated as the sum of the flows going to employment from any possible origin (EE+UE+NE). Again, we normalise all the flows by the labour force. The shaded areas in the graph mark the dates of the beginning (business cycle peak) and the end (business cycle trough) of a recession. The peaks of the German business cycle are in $80/I$ and $92/I$, and the troughs are in $82/IV$ and $93/IV$. As one can see, separations are much flatter than accessions. As expected, accessions decline during recessions. This is partly a consequence of the drop in direct job-to-job transitions shown in the graph. Surprisingly, however, separations *decline* during recessions as well, i.e. there is clearly no increase in match break-ups. The evolution of the three flows is thus consistent with a shift of job-to-job transitions to employment-to-unemployment transitions in a recession. The evidence therefore points to the hypothesis that recessions go along with a decline in hiring activity, rather than a burst in match separations. We investigate this hypothesis further by looking at the flows making up hirings and separations.

The worker flows for the time period 1980-2001 are depicted in figure 3.[7] First of all, it is worth noting that there is no clear trend in the data, i.e. worker turnover in the economy does not seem to have changed dramatically during the time period considered. In terms of volatility, there are marked differences between the flows. Table 2 contains the means, standard deviations, and the relative standard deviations of the different flows. Job-to-job flows turn out to be by far the most volatile ones, followed by the flow from non-participation to employment and the flows between employment and unemployment. As one can see, job-to-job flows are clearly procyclical, as are flows from non-participation to employment. With the exception of the flow from employment to non-participation, which is relatively flat over the business cycle, all the other flows are countercyclical. This is also confirmed by the contemporaneous correlations of these flows with a measure of the business cycle (growth of log GDP), which are presented

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[7]As noted above, we do not have reliable information on the origin and destination of workers entering or leaving the state of employment before 1980.

in table 3. These results are in line with other research (cf. Burda and Wyplosz, 1994). The figures also imply that one third of all new accessions (new employment relationships involving workers who come from either unemployment, non-participation, or another job) are made up of workers who make a direct job-to-job transition. Moreover, the latter transitions account for more than one third of all match separations.

It is worth having a closer look at the flows making up separations. We therefore depict these flows again in figure 5. From the graph and from table 3, it becomes apparent that the flow from employment to unemployment is strongly countercyclical, the flow from employment to non-registration is procyclical, and employer-to-employer flows are strongly procyclical. Summing over these flows (EU+EE+EN), we get a relatively acylical time series, namely separations. These flows are caused by very different mechanisms. It seems fair to say that the majority of workers transiting from employment to unemployment do so involuntarily - if this is true, then one can associate the EU flow with layoffs. On the other hand, EE flows are to a great extent caused by workers engaging in job-shopping - these flows are therefore in large part voluntary, and we can associate them with quits. The picture we get about separations and the underlying worker flows is thus consistent with the explanation that during a recession, the number of layoffs rises while the number of quits falls, leaving overall separations relatively unaffected. Davis, Faberman, and Haltiwanger (2005) present direct evidence that this is the case on the US labour market, as does Erlinghagen (2005) for Western Germany using the GSOEP data. Our indirect evidence confirms this statement for the German labour market.

Finally, note that the stylised facts computed above for worker flows normalised by the labour force are consistent with some well-known facts about different hazard rates - i.e. worker flows divided by the state of origin (cf. for example Machin and Manning, 1999). We depict the hazards of flowing from employment to unemployment and vice-versa in figures 6 and 7, respectively. Two observations are in order. First, the hazard of transiting from employment to unemployment is strongly influenced by the business cycle and does not show a trend. Second, the hazard of transiting from unemployment to employment is mainly dominated by the evolution of the unemployment rate. This can be seen from the fact that the hazard declines in recessions, while the normalised flow from unemployment to employment rises. Furthermore, one can observe a strong level effect. Unemployment rises in a stepwise way after the two recessions, while the absolute number of transitions from unemployment to employment is relatively stable. This implies a reduction in the probability of making such a transition, which in turn goes together with an increase in the overall duration of unemployment.

3.4 Worker heterogeneity, flows, and the cycle

While the above discussion implicitly assumed that workers are homogeneous, we now explicitly take into account worker heterogeneity. This is important because, given the cross-sectional features of separations and the underlying worker flows, the above results could derive from composition effects over the cycle. For example, young workers might be more likely to lose their job during a downturn than older workers, which would influence our aggregate results. We therefore follow Nagypál (2004) and decompose the process of becoming unemployed in the following way: denote the labour market state by s, let subscripts i and t denote a person and point in time, respectively, and let $P^j_{it+\tau}$ be the probability of event j happening to person i during time period $[t, t+\tau]$. Furthermore, let S be the event of a separation, LF the event of staying in the labour force conditional on having been employed, but having separated from the employer. Finally, let superscript U denote the event of becoming unemployed conditional on having been employed, having separated from the employer, and having stayed in the labour force upon separation. Then the transition from employment to unemployment, EU, can be expressed as follows:[8]

$$P^{EU}_{it+\tau} = P^S_{it+\tau} P^{LF}_{it+\tau} P^U_{it+\tau}$$

with

$$P^{EU}_{it+\tau} = P(s_{it+\tau} = U | s_{it} = E)$$
$$P^S_{it+\tau} = P(\text{separate from employer during period } [t, t+\tau] | s_{it} = E)$$
$$P^{LF}_{it+\tau} = P(\text{stay in LF} | \text{separate from employer in period } [t, t+\tau]|, s_{it} = E)$$
$$P^U_{it+\tau} = P(s_{it+\tau} = U | \text{stay in LF, separate from employer in period } [t, t+\tau], s_{it} = E),$$

with $\tau \in [0, 1]$. Note that these formulae respect the fact that transitions are recorded cumulatively. Also, it is important to realise that this decomposition does not imply a sequential timing of events. Instead, it applies the law of iterated expectations to the available flow data in order to calculate the different conditional probabilities involved in the process of becoming unemployed at any one moment in time. These probabilities can be estimated using a logit specification:

$$P^j_{it+\tau} = [1 + exp(X_{it}\beta^j_X)]^{-1}$$

where $j \in \{EU, S, LF, U\}$ and X_{it} includes indicators for age cohorts, industry, sex, marital status, and education. The ensuing equations are estimated using maximum likelihood. We use the regression results in order to compute expected transition probabilities for every year. We thus get a time series from 1980-2000 for each of the regression outcomes. Table 4 gives some descriptive statistics of the three time series, namely the mean, the variance, and the relative variance, i.e. the variance divided by the mean. For our purpose, the latter statistic is the most important one. It shows that the relative variability of the

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[8]A graphical representation of this decomposition can be found in figure 8 in the appendix.

conditional probability of becoming unemployed is about 50 times larger than the conditional probability of staying in the labour force, and about 19 times larger than the relative variability of the conditional probability of separating from one's employer. This shows two things: first, the business cycle response of movements into and out of the labour force can, to a certain extent, be neglected when analysing the business cycle features of worker flows. Second, the conditional probability of separating is much less variable that the conditional probability of becoming unemployed, which is our main point. The three different time series are depicted in figures 9, 12, and 13.

Figure 9 gives the expected probability of separation conditional on previous employment for every year, where the shaded areas again indicate times of recession. As this is the probability for the entire sample, naturally the results replicate the features of the separations in figure 2. Figures 10 and 11 repeat the same exercise for employees with different education levels and working in different industrial sectors, respectively. This shows that there is no burst in separations, neither for workers characterised by a specific education, nor for workers employed in a certain industrial sector. Thus, the results obtained from the aggregate evidence about separations do not appear to be due to composition effects.

The probability of staying in the labour force, conditional on having separated, is depicted in figure 12. This graph shows that there are more people leaving the labour force just after a recession (in 1983), or during a recession (in 1992). However, the effect is quantitatively small.

Figure 13 depicts the probability of flowing into unemployment, conditional on having separated and having stayed in the labour force upon separation. Here, the business cycle influence looks much more important, with the probability hitting lows at the time of business cycle peaks in 1980 and 1992, and hitting highs at the time of business cycle troughs in 1982/3 and 1993. The probability of becoming unemployed upon staying in the labour force jumps by nearly 50% in both recessions. This is a large effect, especially when compared with the business cycle responses of the other probabilities.

Taken together, these results give some evidence for the hypothesis that the traditional view of recessions, with more workers separating from their employer which then leads to higher unemployment, does not apply to the German labour market. If anything, separations are relatively flat over the business cycle, while accessions are procyclical. It seems like the decline in job-to-job transitions during a recession lies at the heart of this evolution. This decline emphasises the importance of hirings for the business cycle features of labour market flows.

4 Conclusion

In this paper, we have analysed the dynamics of the German labour market by looking at worker flows. First, we provided both time-series and cross-sectional evidence on these flows. This showed that the flows between employment and non-participation, as well as job-to-job flows, are most important quantitatively. Furthermore, worker characteristics play an important role for worker flows. In the main part of the paper, we analysed match separations and hirings, and their underlying flows. We found that, in the aggregate, accessions are more volatile over the cycle than separations. While the latter are relatively flat, the former are clearly pro-cyclical. Therefore, hirings seem to play a more important role for labour market dynamics than separations. This issue was further investigated by decomposing the process of becoming unemployed using a method proposed by Nagypál (2004a). This showed that separations are relatively flat over the business cycle also for different worker groups. Therefore, the aggregate results do not seem to be caused by composition effects. We concluded that the increased inflow into unemployment in a recession is mainly due to the decline in direct job-to-job transitions, and not to increased match break-ups.

The empirical evidence about the relative importance of hirings and separations over the cycle has important implications for the way labour market dynamics should be modelled. As Shimer (2005b) emphasises, the "conventional wisdom" posits that worker flow dynamics are driven by swings in match separations. This understanding of labour market dynamics lies at the heart of the search and matching-type of model as epitomised in Mortensen and Pissarides (1994). The evidence found both in this paper and for the US labour market (Nagypál, 2004a, Shimer, 2005b) points however to the role of hirings, rather than separations. It therefore seems like that, first, new modelling ideas that stress the role of hirings are called for, and second, that the (policy) conclusions emanating from the "conventional wisdom" might have to be rethought to an extent.

In sum, our results in this paper provide evidence that recessions do not lead to a burst in match separations. In fact, the increase in unemployment during a recession seems to be caused by a reduction in hirings, i.e. match formations. This reduction in hirings goes together with a drop in direct job-to-job transitions. As a consequence, recessions might not play a cleansing role in the labour market. This is a challenge to the conventional wisdom about the link between unemployment and recessions. Our results should therefore be of interest to labour economists and macroeconomists alike.

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Appendix

A   Tables

		Destination			
		Same employer	New employer	Unemployed	Not registered
Origin	Employed	97.73	0.82	0.63	0.82
	Unemployed	-	7.1	88.5	4.4

Table 1: Gross worker flows across labour market states in percent of the original state. Monthly figures for 1980-2000.

	Absolute figures		Normalised figures		
Flow	Mean	SD	Mean	SD	Mean/SD
EE	131	100	.76	.58	.76
EN	131	53	.76	.31	.40
EU	101	47	.59	.28	.47
UE	85	40	.50	.23	.46
NE	118	64	.69	.38	.55
NU	48	10	.28	.06	.21
UN	53	10	.31	.06	.18

Table 2: Mean and standard deviation of monthly worker flows for the time period 1980-2000. *Notes:* absolute figures in 1000s; normalisation by the labour force; figures for normalised flows in per cent.

EU	-0.152	UE	-0.223
EN	-0.035	NE	0.071
UN	0.395	NU	0.138
EE	0.120		

Table 3: Business cycle correlations of labour market flows, at monthly frequency, 1980-2000.

	P(S|.)	P(LF|.)	P(U|.)
$\overline{x}$	0.30	0.796	0.213
$var(x)$	0.0002	0.0004	0.0032
$\frac{var(x)}{\overline{x}}$	0.0008	0.0003	0.015

Table 4: Descriptive statistics for the conditional probabilities of separation, P(S|E), of staying in the labour force, P(LF|.), and of becoming unemployed, P(U|.).

	As share of employment				As share of separations		
	Sep.	EE flows	EU flows	EN flows	EE flows	EU flows	EN flows
All observations	2.28	0.82	0.63	0.82	36.08	27.81	36.11
By age							
16-19	7.06	1.58	1.40	4.08	22.41	19.79	57.80
20-29	3.48	1.30	0.92	1.26	37.37	26.45	36.18
30-39	2.09	0.88	0.56	0.66	41.83	26.52	31.65
40-49	1.28	0.41	0.45	0.41	41.07	30.82	28.11
50-59	1.51	0.40	0.56	0.56	26.44	36.85	36.71
60-69	2.06	0.35	0.43	1.29	16.79	20.72	62.49
By sex, age 25-55							
Male	1.90	0.83	0.55	0.52	43.64	29.14	27.22
Female	2.02	0.68	0.55	0.79	33.83	27.05	39.12
By industry, age 25-55							
Agr.. Energy. Mining	1.67	0.55	0.63	0.49	33.21	37.51	29.28
Production	1.37	0.58	0.39	0.40	42.53	28.51	28.96
Construction	3.19	0.95	1.50	0.74	29.80	47.10	23.10
Trade. transport	2.35	1.07	0.56	0.72	45.54	23.91	30.55
Services	2.30	0.91	0.53	0.86	39.48	23.24	37.28
State	1.23	0.49	0.35	0.40	39.50	28.10	32.40
By education, age 25-55							
no vt. no Abi	2.18	0.65	0.79	0.74	29.68	36.24	34.08
vt. no Abi	1.73	0.74	0.48	0.51	42.66	28.07	29.27
no vt. Abi	2.67	0.93	0.43	1.31	34.91	15.97	49.11
vt. Abi	2.00	0.99	0.33	0.67	49.62	16.67	33.71
polytec	1.41	0.83	0.22	0.37	58.65	15.32	26.03
university	1.96	0.96	0.27	0.73	48.83	13.90	37.27

Table 5: Separations, cross-sectional properties, monthly averages 1980-2000, in per cent. Notes: *vt* denotes *vocational training*, *Abi Abitur* (high-school degree), and *polytec* and *university* stand for a degree from a technical and a regular university, respectively.

B   Figures
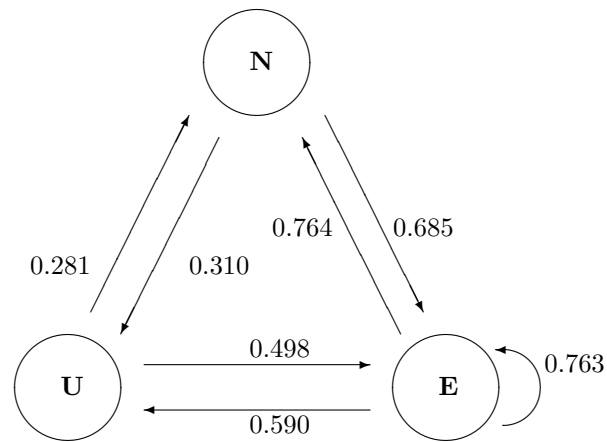
Figure 1: Normalised worker flows in Germany, monthly averages for 1980-2000, in percent.
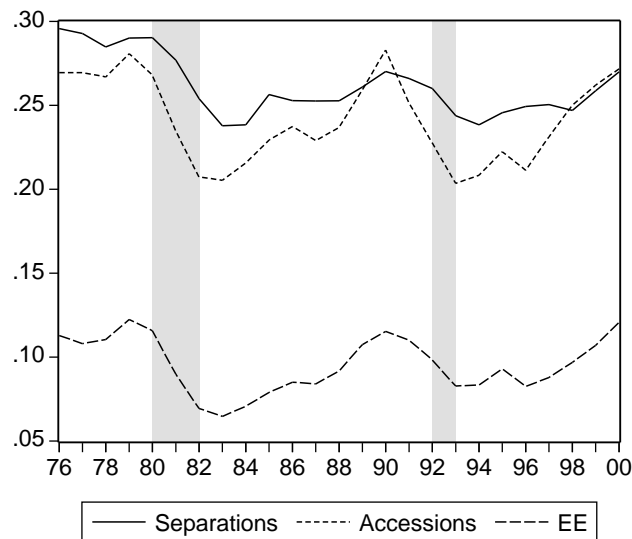
Figure 2: Separations, accessions, and job-to-job transitions, yearly rates. Shaded areas are times of recession.
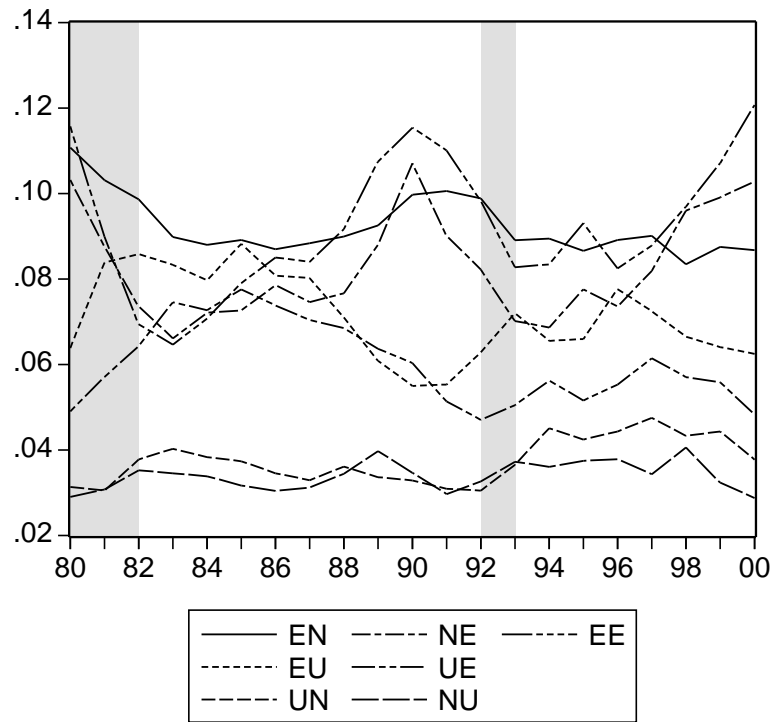
Figure 3: The evolution of worker flows, 1980-2000, yearly rates. Shaded areas are times of recession.
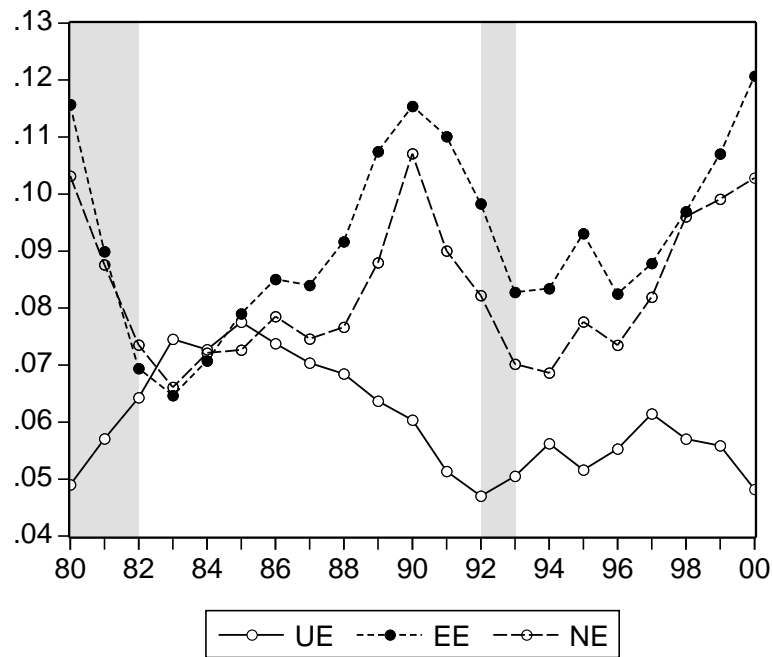
Figure 4: The evolution of the worker flows making up accessions, 1980-2000, yearly rates. Shaded areas are times of recession.
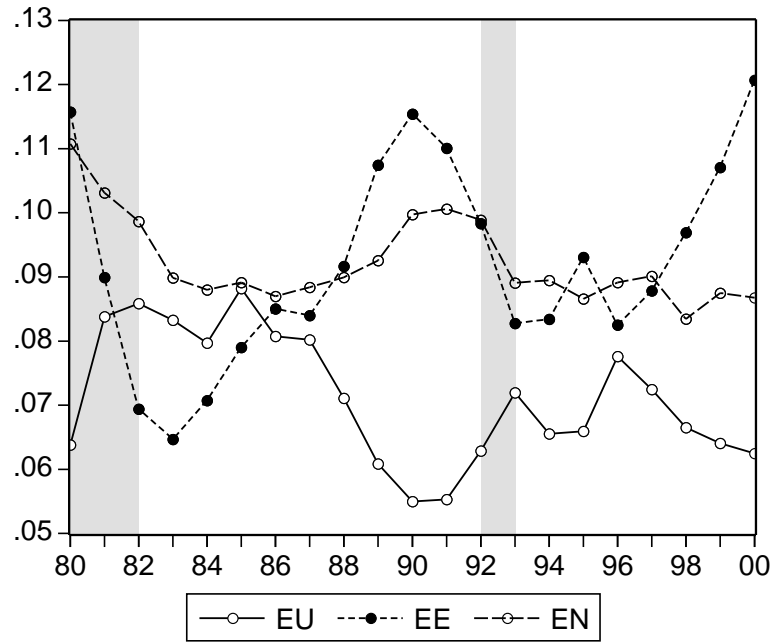
Figure 5: The evolution of the worker flows making up separations, 1980-2000, yearly rates. Shaded areas are times of recession.
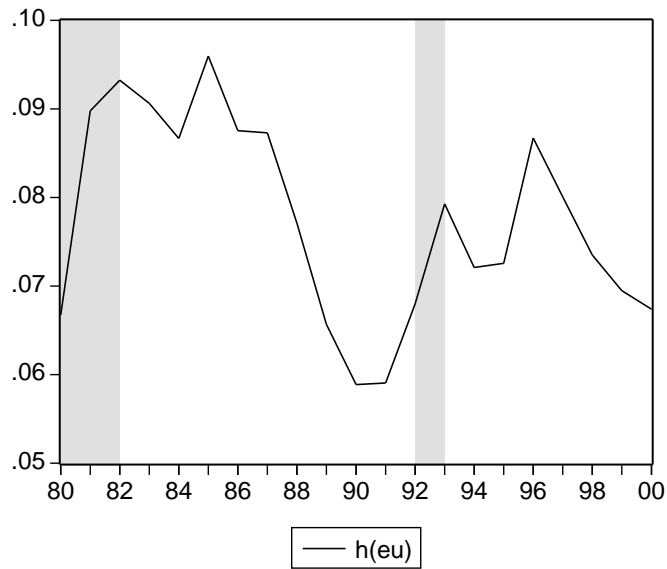
Figure 6: The hazard of flowing from employment to unemployment within a given year, 1980-2000. Shaded areas are times of recession.

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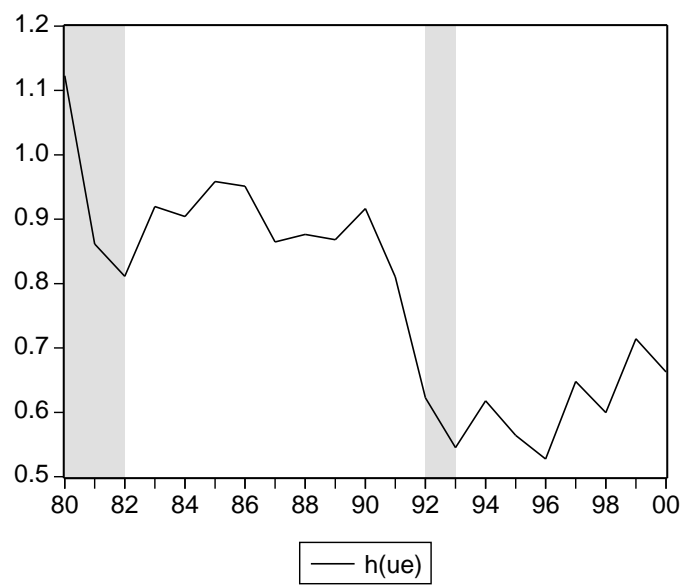
Figure 7: The hazard of flowing from unemployment to employment within a given year, 1980-2000. Shaded areas are times of recession.
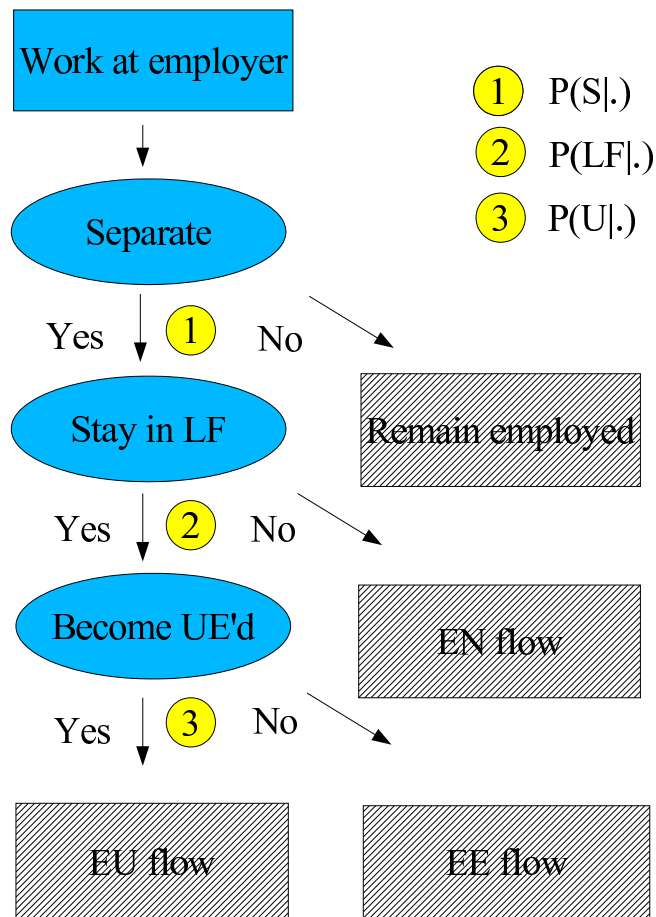
Figure 8: The Nagypal (2004) decomposition of becoming unemployed and ensuing worker flows.
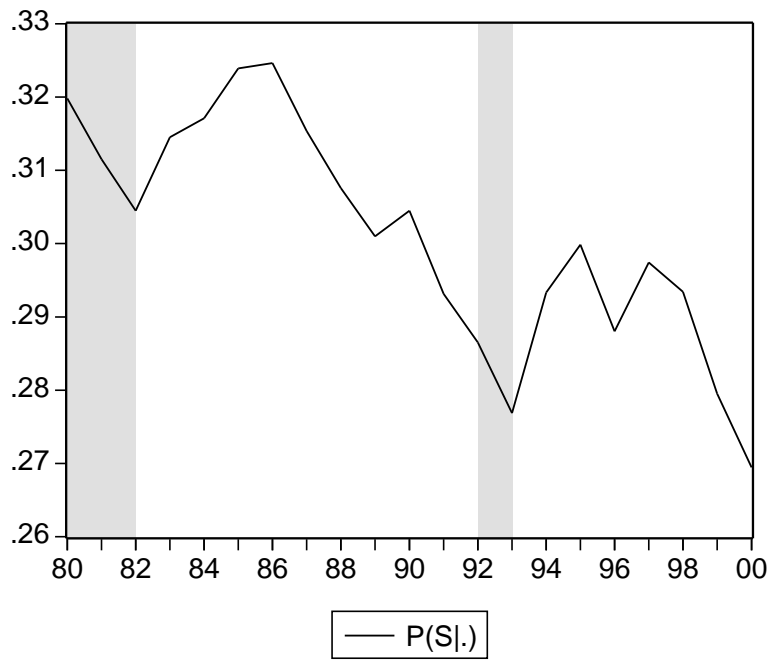
Figure 9: Conditional probability of separation. Shaded areas are times of recession.
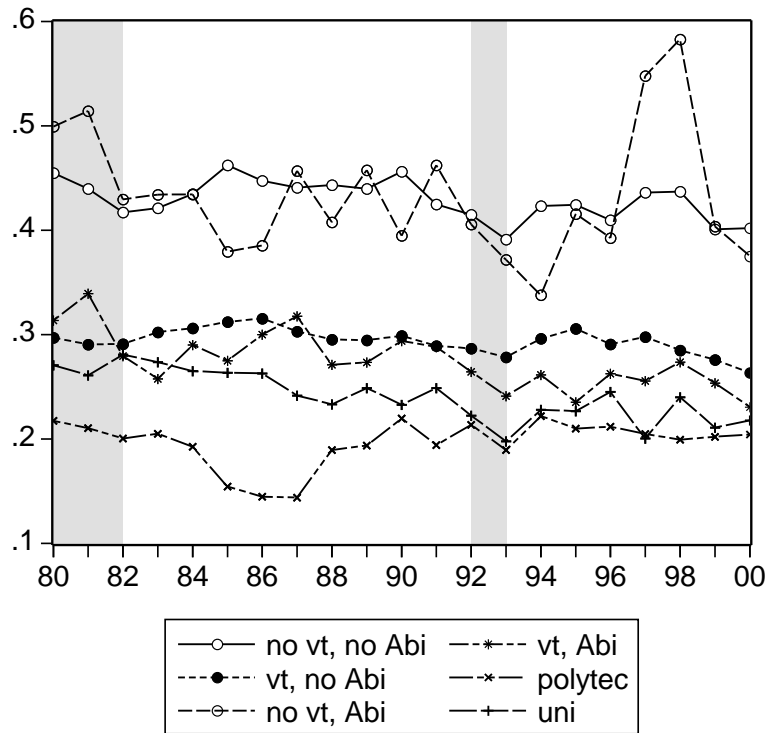
Figure 10: Conditional probability of separation for workers with different education. Shaded areas are times of recession.

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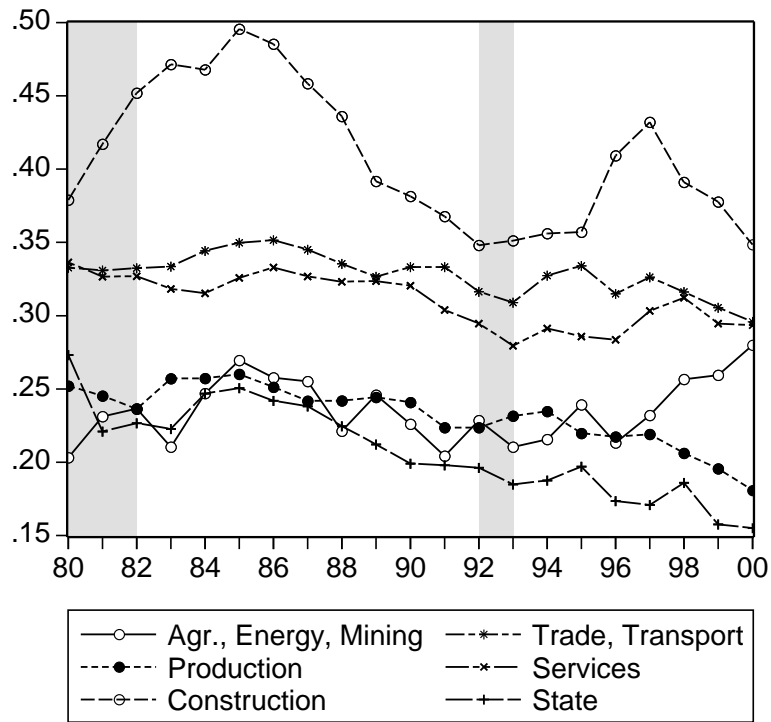
Figure 11: Conditional probability of separation for workers in different industrial sectors. Shaded areas are times of recession.
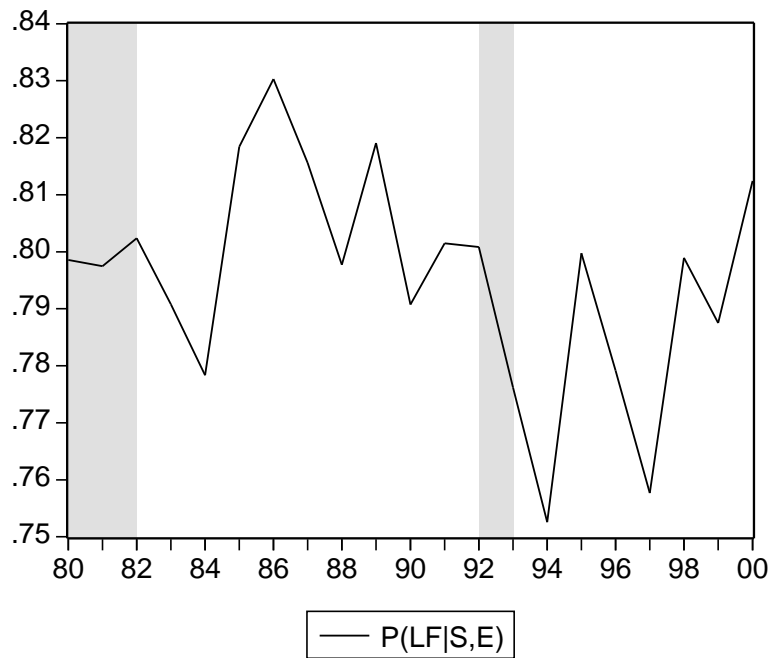
Figure 12: Conditional probability of staying in the labour force.

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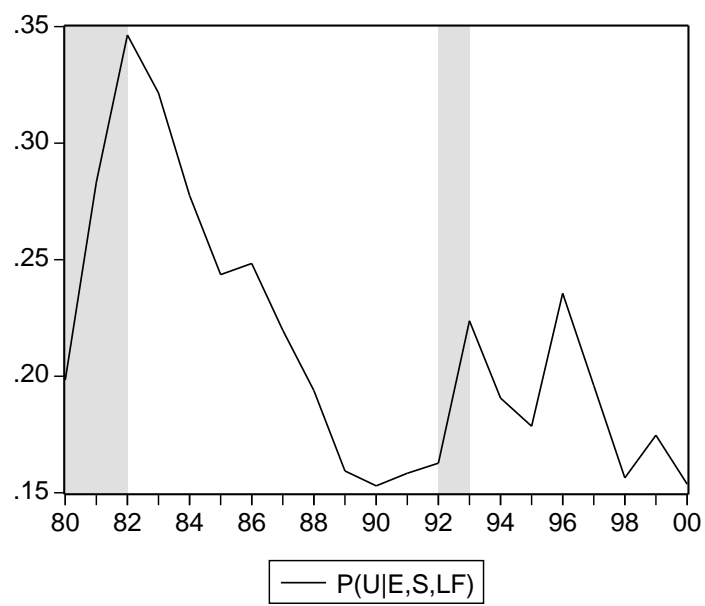
Figure 13: Conditional probability of unemployment. Shaded areas are times of recession.

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