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ÖSTERREICHISCHES INSTITUT FÜR WIRTSCHAFTSFORSCHUNG

Arbeitsplatzreallokation und Arbeitskräftemobilität

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Vorwort

Hedwig Lutz

Motivation – viel "überschüssige" Mobilität

Die moderne ökonomische Theorie betrachtet Arbeitsmärkte als dynamische Institutionen, welche die Reallokation von Arbeitskräften und Arbeitsplätzen ermöglichen. Die empirische Literatur verfolgt dabei zwei wesentliche Richtungen – die such- und matchingtheoretischen Ansätze, die bei Arbeitskräften als auch bei Unternehmen ansetzt[1]) und den Job Creation und Job Destruction Ansatz[2]) dessen Ausgangpunkt Firmen und deren Wachstumsdynamik darstellen.

Erst seit kurzem wird der Versuch unternommen diese beiden weitestgehend unabhängigen Literaturen zu verbinden. Dabei zeigen sich einige interessante stilisierte Fakten. So finden zum Beispiel Abowd et al.[3]), dass in Frankreich der Gewinn eines Arbeitsplatzes in einer Firma typischerweise mit drei Beschäftigungsaufnahmen und zwei Beschäftigungsbeendigungen einhergeht und der Verlust eines Arbeitsplatzes ebenfalls mit drei Beschäftigungsaufnahmen und vier Beschäftigungsverlusten verbunden ist. Ähnliche Befunde wurden für andere Länder gemacht.

Offensichtlich ist der Arbeitsmarkt nicht nur in den USA durch eine "überschüssige Mobilität" gekennzeichnet: Auch wachsende Firmen trennen sich von Arbeitskräften, umgekehrt verlassen Arbeitskräfte auch wachsende Unternehmen. Schrumpfende Firmen stellen auch bei einem Gesamtabbau neue Arbeitskräfte ein. Dabei zeigen empirische Untersuchungen eine große Heterogenität zwischen verschiedenen Unternehmen, die überdies noch durch eine hohe Persistenz gekennzeichnet ist.

Sowohl die Ursachen als auch die Struktur dieser über die Anpassung des Beschäftigtenstandes hinausgehenden Mobilität, die Heterogenität und Persistenz der Verhaltensmuster von Unternehmen und Arbeitskräften sind dabei bisher noch wenig erforscht.

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[1]) Siehe zum Beispiel: Farber, H.S. (1999) Mobility and Stability: The Dynamics of Job Change in Labor Markets, in Ashenfelter O. und D. Card (Hrsg.) Handbook of Labor Economics, North Holland, S. 2439-2483.

[2]) Vergleiche Davis, St.-J.; Haltiwanger, J.-C. (1999) Gross Job Flows. In: Ashenfelter, Orley C., Card, David (Hrsg.): Handbook of Labor Economics. Amsterdam. Elsevier. 1999. Chapter 41, 2711-2805.

[3]) Abowd, J. M.; Corbel P., und Kramarz F.; (1999) The Entry and Exit of Workers and the Growth of Employment: An Analysis of French Establishments, The review of Economics and Statistics, May 1999, S. 170-187.

Zur vorliegenden Studie

Die Beiträge der vorliegenden Studie beruhen auf "matched employer-employee" Datensätzen basierend auf den anonymisierten Individualdaten der Versicherungsdatei des Hauptverbandes der Österreichischen Sozialversicherungsträger (Vollerhebung). Dementsprechend große Bedeutung kam für jede einzelne Untersuchung einer adäquaten Datenaufbereitung zu, um aus den administrativen Informationen ökonomisch relevante Datengrundlagen zu erstellen. Marianne Schöberl geht in ihrem Beitrag auf diese Aspekte aus einer Datenverarbeitungssicht näher ein. Die im Rahmen der Studie gewonnenen edv-mäßigen und ökonomischen Erkenntnisse bilden einen wesentlichen Input für den weiteren Aufbau eines Systems zur Analyse des österreichischen Arbeitsmarktgeschehens.

Zu diesem Zweck hat sich während der Projektlaufzeit im WIFO für die Arbeit mit administrativen Massendaten ein Kern-Team für den Aufbau der Dateninfrastruktur und der projektspezifischen Bearbeitung etabliert. Dieses besteht aus den EDV-Fachkräften Birgit Novotny, Marianne Schöberl, Kristin Smeral und Peter Welzl sowie aus den ÖkonomInnen Peter Huber, Ulrike Huemer, Hedwig Lutz, Helmut Mahringer und Andrea Pöschl.

Im ersten Beitrag "Measuring Worker Flows" von Peter Huber und Kristin Smeral stehen die beiden unterschiedlichen Mess-Konzepte – Arbeitskräftereallokation einerseits, Arbeitskräfteturnover andererseits – im Mittelpunkt. Es wird gezeigt, dass kurze Beschäftigungsepisoden eine wichtige Rolle auf dem österreichischen Arbeitsmarkt spielen. Dementsprechend höher ist der Arbeitskräfteturnover im Vergleich zu dem Reallokationsmaß, das sehr kurze Beschäftigungsepisoden zwischen den betrachteten Stichtagen außer Acht lässt: Der Unterschied zwischen den beiden Messkonzepten beträgt rund 5% des durchschnittlichen Beschäftigungsstandes. Die Verwendung des Turnover-Konzeptes führt im Vergleich zum Arbeitskräftereallokations-Konzept zu einem höheren Einfluss von Unternehmensalter, -größe und Wirtschaftsklasse auf das betriebliche Churning, und es führt zu einem größeren Unterschied zwischen wachsenden und schrumpfenden Firmen. Als Ergebnis dieser Untersuchung zeigt sich daher erstens, dass die Anwendung des Arbeitskräftereallokations-Konzepts eine Unterschätzung des Einflusses von Firmengröße, -alter und Personalstandsentwicklung zur Folge hat. Zweitens ergibt sich, dass Turnover-Maße gegenüber Reallokationsmaßen bevorzugt werden sollten, wenn kurze Beschäftigungsepisoden als wichtige Größen des Umschlages am Arbeitsmarkt angesehen werden.

Einen genaueren Blick auf den Zusammenhang zwischen Churning und Firmenmerkmale wirft der zweite Beitrag "Firm Characteristics and Worker Flows" von Peter Huber. Selbst wenn firmenspezifisch auf fixe Effekte kontrolliert wird, verzeichnen größere, ältere und im Durchschnitt höher entlohnende Unternehmen geringere überschüssige Beschäftigungsfluktuation (Churning). Demgegenüber hängt der identifizierte Effekt von zwei weiteren potentiellen Faktoren – dem Ausmaß der Entlohnungsunterschiede innerhalb der Firma und dem Einsatz atypischer Beschäftigungsverhältnisse – stark von der gewählten Spezifikation ab. Es zeigt sich, dass die Arbeitskräftefluktuation auf Firmenebene höhere Persistenz aufweist als betriebliche Per-

sonalstandsänderungen, aber geringere Persistenz als die firmenspezifische Entlohnungs- und Beschäftigungspolitik. Nicht zuletzt weist die Untersuchung auf die Bedeutung von Nicht-Linearitäten in der Beziehung zwischen Unternehmenswachstum, Firmenalter und Firmengröße sowie der der betrieblichen Entlohnungspolitik und Arbeitskräftemobilität hin.

Im dritten Beitrag von Peter Huber wird die Rolle von Firmengründungen und -schließungen näher beleuchtet. Dabei zeigt sich, dass der Beitrag von neu gegründeten und schließenden Unternehmen zur Fluktuation von Arbeitskräften geringer ist als ihr Beitrag zur Arbeitsplatzreallokation.

Bei der Analyse von Turnover- und Reallokationsmaßen – wie sie in den vorherigen Beiträgen angestellt wird – stellt sich die Frage, inwieweit sich die Stabilität von Beschäftigungsbeziehungen am Arbeitsmarkt in den letzten Jahren verändert hat. Häufig wird von einer zunehmenden Flexibilisierung des Erwerbssystems gesprochen, das zu einer Zunahmen der Bewegung am Arbeitsmarkt und damit zu einer Abnahme der Stabilität führen würde. Ob eine derartige Entwicklung in den vergangenen 10 Jahren tatsächlich stattgefunden hat, untersucht Helmut Mahringer in dem Beitrag zur Entwicklung der Beschäftigungsstabilität in Österreich. Darin werden für unselbständige Beschäftigungsverhältnisse sowie für eine Reihe von Subgruppen (nach Alter, Geschlecht, Beschäftigungsdauer und Branchen) Beendigungs- bzw. Weiterführungsraten von Beschäftigungsverhältnissen für einen Zeitraum von 1993 bis 2002 ermittelt und auf Trends in deren Entwicklungen untersucht. Es zeigt sich zudem, dass Österreich nicht nur ein großes Arbeitsmarktsegment mit Kurzzeitjobs hat, sondern dieses Segment in den letzten Jahren auch gewachsen ist. Im Gegensatz dazu ist die Beschäftigungsstabilität in bereits länger aufrechten Beschäftigungsverhältnissen nicht gesunken, für Frauen in solchen längerfristigen Jobs sogar gestiegen. Trotz beschränkter Vergleichbarkeit der Datengrundlagen erscheint das österreichische Beschäftigungssystem im Vergleich zu jenem der USA insgesamt nicht besonders inflexibel. Markante Unterschiede in der Beschäftigungsstabilität nach Wirtschaftsbereichen und besonders die große Bedeutung von Bauwirtschaft und Tourismus in Österreich spielen dabei eine wesentliche Rolle.

Measuring Worker Flows

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Abstract

We explore differences between the turnover and reallocation concepts of measuring worker flows. We find that measuring worker flows by the turnover concept leads to substantially (about 5 percent of total employment) higher worker flow estimates and increases age, size and industry group effects on firm level worker flows as well as differences between growing and declining firms relative to the reallocation concept.

[1]) This research was financed by a research grant from the Austrian National Bank (Jubelfondsprojekt No. 8889) in the framework of a project entitled job flows, worker flows and churning in Austria.

Introduction

A substantial body of economic research in the tradition of the "job and worker flow" literature (see: Burgess, Lane and Stevens, 2000, Abowd, Corbel and Kramarz, 1998, Tsou, Lju and Hammitt, 2002, Atai and Heyman, 2000, Bingley et al., 1999) has shown that labour markets are characterised by substantial flows of workers in excess of what is needed to accommodate for firm growth. While in most economies around 10 percent of the jobs are destroyed within a year and an about equal amount is created, worker flows (i.e. hires and separations) exceed these job flows by a factor of 2 to 3 (see: Davis and Haltiwanger, 1995). Research into worker flows has also documented a number of further stylized facts. Burgess, Lane and Stevens (1996 and 2000) show that worker flows as a percentage of average employment decrease with firm size and age and are lower in manufacturing than in services. Furthermore, they show that worker flows are highly idiosyncratic to firms and persist over time. Abowd, Corbel and Kramarz (1999) show that growing firms have higher worker flows than declining firms.

Despite this high interest in worker flows the potential issues involved in measuring hires and separations have so far received little attention[2]). This seems somewhat surprising, since as pointed out by Davis and Haltiwanger (1995) two different measuring concepts of worker flows co-exist in the literature. In the first – referred to as worker reallocation measures by Davis and Haltiwanger (1995) – worker flows are defined as "the number of persons whose place of employment differs between t-1 and t". This concept has been used by inter alia Burgess, Lane, and Stevens (1996, 2000). The second concept – referred to as turnover measures by Davis and Haltiwanger (1995) – defines worker flows as "the number of accessions plus the number of separations that occur during the interval from t-1 to t". This concept has been used amongst others by Anderson and Mayer (1994), Haltiwanger and Vodopivec (2002) and Lane, Isaac and Stevens (1993).

Clearly differences between these two measuring concepts will arise due to the treatment of short term spells which both start and end between t and t-1. These will be missing in reallocation measures, but are included in turnover measures of worker flows. Thus turnover measures will in general generate higher figures than reallocation measures and differences between the two can be interpreted as a measure of the importance of short term employment in the labour market (Davis and Haltiwanger, 1999).

This paper measures separations and hires in both ways for one and the same data set. After an exposition of the two measuring concepts and a description of our data in the next section, in section three we gauge the impact of different measuring concepts on estimates of hiring and separation rates. We find that turnover measures lead to estimates of worker

[2]) For exceptions see: Davis and Haltiwanger, 1995 and Dale-Olsen and Roningen, 2000.

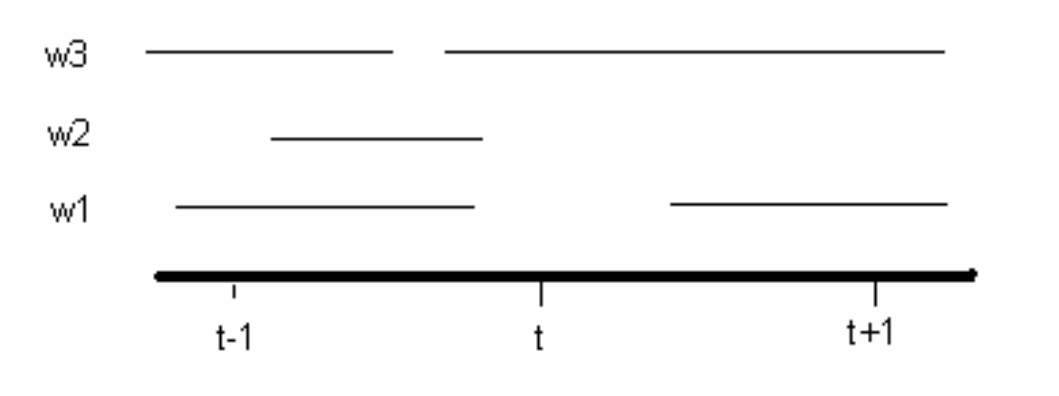
flows that exceed reallocation measures by 5 percent of average employment. Furthermore, we find that turnover measures lead to stronger differences in worker flow estimates across industries as well as size and age groups than reallocation measures. Running regressions of the impact of firm size, age and growth on worker flows for both measuring concepts, we also find that reallocation measures of worker flows will in general yield lower firm size age and growth effects on worker flows than turnover measures.

Measuring Job and Worker Flows

We measure worker flows as separations (S_{it}) and hires (H_{it}), but use two concepts of hires and separations. The concept follows the turnover definition. In this hires (H_{it}^T) are all persons, who start employment at firm i in the time period between t and t-1, and separations (S_{it}^T) are all persons, who terminate their employment at a particular firm i in the same time period. The second considers a reallocation measure. In this hires (H_{it}^R) are all persons employed at a firm in time period t+1 but not at t, while separations (S_{it}^R) are all persons employed at a firm at time t but not at t+1. These two concepts differ with respect to the treatment of short term employment spells which both start and end in the time period between t and t-1. To see this consider Figure 1, in which we show the career of three exemplary workers (w1, w2 and w3) at a particular firm, for three time period (t-1, t and t+1). In this figure the lines denote time periods in which the respective worker was employed at a particular firm. For instance w1 starts working at the firm after t-1 and ends the employment relationship before t. Thus he/she both starts and ends employment at the firm in the time period between t-1 and t, according to the turnover concept of worker flows this would imply counting a hire and a separation. The worker is, however, neither employed at t and t-1, in consequence in the reallocation concept neither hires nor separations would be counted.

Similar arguments apply to short term interruptions of employment spells. To see this consider worker w3. This worker interrupts his/her employment spell at the firm for a short period between t-1 and t but is employed at the same firm at both t-1 and t. this implies that according to the turnover concept both a hire and a separation would be registered, while according to the reallocation concept no worker flows are measured. Thus the two measuring concepts differ in the treatment of both short term employment spells and short term interruptions of such spells. As noticed in Haltiwanger and Davis (1999) turnover measures of worker flows should in general be higher than reallocation measures, and the difference between the two can be interpreted as a measure of the importance of such short term spells in an economy.

Figure 1: Illustrations of the differences in measuring Concepts



There are, however, other differences between the two concepts. In particular turnover measures are additive over time periods, while turnover measures are not. To see this, consider worker w2 in Figure 1. This worker is employed the firm at time t-1 and t+1 but not at t. If we measure worker flows between all time periods according to the reallocation concept we would register a separation between t-1 and t and a hire between t and t+1. If we however measure worker flows according to the reallocation concept between t-1 and t+1, we would find neither hires nor separations according to the reallocation concept (since the worker is employed at both points in time). By contrast according to the turnover concept a hire and a separation will be measured irrespective of the frequency of measurement. This suggests that differences between the two measuring concepts increase with the frequency of measurement.

Based on the two measuring concepts we can derive the usual indicators used in the literature on job and worker flows. In particular, since net employment changes at firm i are the difference between hires and separations at the firm level[3]), job creation (JC_t) can be measured as the difference between hires and separations in growing or newly founded firms:

(1) $$JC_t = \sum_{i \in S^+} H_{it}^{\ k} - S_{it}^k$$

where S^+ is the set of all newly created or growing firms and $k \in \{T, R\}$ is an indicator for whether hires or separations are measured according to the turnover or reallocation concept. Similarly, defining S^- as the set of all closing or declining firms, job destruction (JD_t) can be defined as:

(2) $$JD_t = -\sum_{i \in S^-} H_{it}^{\ k} - S_{it}^k$$

[3]) Note that this definition holds irrespective of how worker flows are measured.

Furthermore, total worker flows (WR_{it}) at firm i in period t can be presented as:

(3) $$WR_t = \sum_i (H_{it}^{\ k} + S_{it}^k)$$

and excess worker flows, which are referred to as churning (CH_{it}) as:

(4) $$CH_t = \sum_i (H_{it}^{\ k} + S_{it}^k) - JC_t - JD_t$$

Finally, it has become customary in the literature to measure all the above indices relative to average employment in a particular firm. This is given as:

(5) $$N_{it} = \frac{E_{it} + E_{it-1}}{2}$$

Where N_{it} is average employment at time t and E_{it} is the employment level at point in time t. This has the advantage that growth rates of employment are defined for closing and newly created firms, where newly created firms have an employment growth rate of 2 and closed firms of -2 as well as approximating the logarithm of employment growth. Thus we define a relative indicator X^r of any of the above defined measures X as:

(6) $$X^r{}_t = X_t / BD_t$$

Data

The data we use stem from the Austrian Social Security files. This data includes all employees in Austria in the time period from the first quarter of 1996 to the fourth quarter 2002. They contain a daily calendar of the starting date of an employment relationship of any individual at a particular firm and the end date (if employment spells are terminated before the end of 2002). Furthermore, the data contain information on the industry and regional affiliation of the firm providing the employment relationship.

Before processing, the data were cleaned of a number of features, which could increase labour market dynamics for purely administrative reasons. In particular this applies to interruptions of the employment relationship, which arise from short sickness leaves and fictitious firm turnover stemming from the fact that firms are given a new identification number when a firm changes location[4]).

Relative to many of the data sets used in the literature, our data have the advantage of a wide coverage. We focus on the entire information in the time period from the first quarter 1995 to the fourth quarter 2002 thus covering employees of business units of all sectors except

[4]) For detailed descriptions of the data set and the steps involved in the processing see: Stiglbauer, 2003, Schöberl et al, 2004.

for public services and agriculture[5]) and all sizes (starting from one employee upwards) and construct quarterly series of firm level employment, separations and hires. This wide coverage comes at the price of relatively limited information on the firms and persons included. We lack human capital variables and information on the working time of the employed and all information on firms other than industry affiliation, region of operation and indicators, which can be calculated from analysing employment relationships at a firm (such as firm size and employment growth). Finally, it is not entirely clear whether the business units reporting are enterprises or establishments, since the anonymous firm numbers listed are administrative accounts only, and it is left up to the individual firm, whether it chooses to report at the enterprise or establishment level (or a mixture of both)[6]). Unfortunately, since data are provided anonymously only, we have no way to correct these deficiencies.

Table 1 presents descriptive Statistics of the data. As can be seen we have a total of over 6.5 million (over 200,000 per quarter) firm level observations in our data. The average firm has just over 10 employees and average firm growth was about zero in the time period considered. Firms, however, vary considerably both in size and employment. The smallest firm had one employee while the largest had 51,160 and firm growth ranges from +11,000 to –7,000 within one quarter. Finally, we also have available an indicator on firm birth, which measures the first time a firm appears in our data set. Since recording started in 1971 this variable is left censored and the mean year of birth of a firm is 1983.

Table 1: Descriptive Statistics

Variable	Observations	Mean	Standard. Deviation	Minimum	Maximum
Employment	6541181	10.4	129.2	1	51160
Employment Growth	6541181	0.0	9.7	-7016	11407
Year of Birth	6541181	1984.08	10.88255	1971	2002

Results

Table 2 shows the average quarterly job and worker flow rates in the time period from 1996 to 2001. Relative to other countries, this table suggests comparable job creation and destruction figures in Austria. For instance, Haltiwanger and Davis (1999) in their survey of the job flows suggest that in the US roughly 1 in 10 jobs are created and another 1 in 10 jobs are destroyed every year. Our figures approach these levels and are also well within the range of the European studies cited in Haltiwanger and Davis (1999). Furthermore, the figures on job creation and destruction are also broadly consistent with the findings of Stiglbauer et al. (2003), who analyze job creation and Destruction for the period from 1978 to 1998 in Austria

[5]) We exclude public services because we lack information on tenured public sector employees. We exclude agriculture because of the high share of self-employment, on which we have no information.
[6]) Stiglbauer (2003) argues that in all likelihood the data are enterprise level, because few enterprises have an incentive to increase their administrative reporting burden by reporting at the establishment level.

and report annual job creation and Destruction rates of between 9.6 percent and 8.9 percent for the entire economy in the 20 year period[7]).

Worker flow rates in Austria, however, seem to be somewhat lower than in the US. Anderson and Mayer (1994) using the turnover concept find quarterly hires in the manufacturing sector of 13.0 percent and separations of 13.3 percent comparable figures for Austria are 9.0 percent and 9.4 percent according to our data. Lane et al. (1996) using the reallocation concept by contrast report quarterly separation rates in the private sector of 18.7 percent and 18.4 percent, as compared to 14.6 percent for both hires and separations in Austria. Relative to European studies, however, worker flow rates are somewhat higher in Austria . For instance Dale-Olsen and Ronningen (2000) find hiring rates of between 5.7 percent and 6.8 percent and between 4.9 percent and 5.9 percent for the total Norwegian economy using the reallocation concept.

Table 2: Job Creation, Job Destruction, Hires and Separations in Austria, Quarterly Averages 1996-2002

	Job	Job	Turnover Concept		Reallocation Concept		Differences	
	Creation	Destruction	Hires	Separations	Hires	Separations	Hires	Separations
Total	5.51	5.52	14.56	14.58	9.39	9.40	5.18	5.18
Manufacturing	3.03	3.41	9.01	9.38	5.77	6.14	3.24	3.24
Construction	8.94	9.46	19.19	19.71	12.84	13.36	6.35	6.35
Market Services	6.12	5.83	16.58	16.29	10.61	10.32	5.97	5.97
less than 5 years	13.87	9.11	27.63	22.88	19.43	14.67	8.21	8.21
5 to 11	5.21	6.07	15.38	16.23	9.58	10.43	5.80	5.80
12 to 24	4.28	5.12	12.62	13.46	7.90	8.74	4.72	4.72
more than 24	3.81	4.35	11.28	11.82	7.06	7.60	4.22	4.22
<50	8.23	6.98	17.58	16.33	12.15	10.90	5.43	5.43
50-249	4.42	2.94	14.44	12.95	8.87	7.39	5.56	5.56
250-499	3.07	2.02	12.19	11.14	7.13	6.09	5.05	5.05
500+	1.93	1.52	8.30	7.90	4.88	4.48	3.42	3.42
stagnating	0.00	0.00	6.79	6.79	3.51	3.51	3.28	3.28
growing	13.82	0.00	24.58	10.76	18.16	4.33	6.43	6.43
declining	0.00	14.44	8.54	22.98	3.59	18.03	4.94	4.94

[7]) The finding of about equal job creation and destruction as in the U.S., however, does not take account of the substantial structural differences between the U.S. economy and Austria. In particular Stiglbauer et al. (2003) show that when considering individual size categories of firms Austrian Job Creation and destruction rates are substantially lower than those of the U.S.

The differences between turnover and reallocation measures are sizeable, however, and exceed the differences found in comparison to other countries. Overall Table 2 suggests that turnover measures of quarterly worker flows are 5 percent of average employment higher than reallocation measures. Interpreting the differences between turnover and reallocation concepts of worker flows as an indicators of the importance of short term spells this suggests that around 5 percent of the average stock of employment relationships last or are interrupted for only a quarter. To the degree that such short term spells are considered important, reallocation measures would thus underestimate worker flows substantially.

Furthermore, differences between the two measuring concepts seem large relative to the effects of other issues in measuring worker flows. For instance Dale-Olsen and Roningen (2000) report that differences between measuring worker flows according to the reallocation measures at the establishment and firm level are around 1 percentage point for both hires and separation. Furthermore focusing only on firms with more than 5 employees reduces both hiring rates and separation rates by at most 1 percentage point.

Table 3: Estimation Results

Dependent Variables	Size (1000 employees)	Growth Rate	10*Age	R^2	Number of Observations
			Turnover Measure		
Hires	-0.045	0.580	-0.040	0.16	259086
	(0.015)	(0.005)	(0.001)		
Separations	-0.045	-0.420	-0.040	0.26	259086
	(0.015)	(0.005)	(0.001)		
Churning	0.001	0.045	-0.020	0.10	259086
	(0.002)	(0.008)	(0.002)		
			Reallocation Measures		
Hires	-0.040	0.556	-0.033	0.61	259086
	(0.014)	(0.002)	(0.001)		
Separations	-0.040	-0.404	-0.033	0.48	259086
	(0.014)	(0.002)	(0.001)		
Churning	0.011	-0.003	-0.006	0.20	259086
	(0.004)	(0.000)	(0.001)		

Notes: Results report cross section estimation for the 2nd quarter of 2002. Specifications include a constant which is not reported in Table 3. Values in bracket are heteroskedasticity robust standard errors.

Finally, both turnover and reallocation measures produce similar results concerning worker flows in firms of different industry, age growth and size groups. Smaller, younger and growing firms as well as firms outside manufacturing have higher hiring and separation rates according to both measuring firms. Differences between firms are, however, more pronounced when applying the turnover concept relative to the reallocation concept. Firms with higher worker flows thus also have a higher share of short term spells.

Clearly this could have effects on the size of firm size, growth and age effects on firm level worker flow rates. Thus we run regressions on hiring, separation and churning rates on firm size, age and growth for both measuring concepts focusing on the cross-section of the second quarter of 2002. Table 3 shows results and shows that the estimated marginal effects of employer size, growth rates and age of separation and employment rates are slightly higher when measuring worker flows by the turnover concept that when measuring worker flows by the reallocation concept. According to our estimates increasing firm size by 1000 employees reduces separation and hiring rates by 0.05 percentage point when measured according to the turnover concept but by 0.04 percentage point in the reallocation concept.

Furthermore increasing firm growth rates by 1 percentage point increases hiring rates by 0.58 percentage point and reduces hiring rates by 0.42 percentage point when worker flows are measured according to the turnover concept, the respective figure for the reallocation concept are 0.56 and –0.40 percentage point. Similarly, a ten year older firm has hiring and separation rates which are by 0.04 percentage point lower in the turnover concept and by 0.03 percentage point in the reallocation concept.

While these differences may seem small, they have important implications on the findings on churning rates. When measuring churning rates according to the reallocation concept both firm age and growth rates have only a modest (although highly significant impact) on churning rates and firm size has a relatively large impact. By contrast when measuring churning rates according to the turnover concept the opposite applies. Firm size has a small and insignificant impact, while firm growth and age become more important.

In addition, Table 3, shows that the fit of the equations as measured by R^2 values decreases substantially when applying the turnover concept relative to the reallocation concept. This in turn implies substantially higher unexplained variance in worker flows when they are measured according to the turnover concept as opposed to the reallocation concept.

Conclusions

This paper explores the differences between two measuring concepts of worker flows. Differences between these concepts are threefold: First measuring worker flows by the reallocation concept leads to substantially higher figures than when measuring worker flows by the turnover concept. In Austria the differences between these two concepts are around 5 percent of average employment per quarter. Second and relatedely short term spells, which account for the difference between the two concepts are an important aspect of the Austrian labour market for all groups of firms considered. Third, measuring worker flows by the turnover concept increases age, size and industry group effects on firm level churning and increases differences between growing and declining firms relative to the reallocation concept. Thus firms with high worker flows according to the turnover concept also tend to be firms with a high share of short term employment spells.

There are a number of reasons why these findings may be important to researchers. First, and probably most importantly our results suggest that short term employment spells are an important aspect of worker flows. Thus to the degree that such short term spells are also considered an important aspect in labour market reallocations, turnover measures should be given preference to reallocation measures. Related to this our findings also suggest that in research focusing on the determinants of firm level worker flows using reallocation measures of worker flows may lead to an underestimation of the effect of firm size, age and growth on worker flows. Finally, our results imply that differences between these two measuring concepts may be an important impediment to the comparison of estimates of worker flows across studies.

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Firm Characteristics and Worker Flows

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Abstract

This paper explores the relationship between firm characteristics and churning for a matched employer and employee data set from Austria. We present evidence that non-linearities in the relationship between firm growth, age and size as well as between firm wage policies and worker flows may be important, that firm level worker flows are more persistent than firm employment growth rates but less persistent than firm wage and employment policy, that even after controlling for firm fixed effects, larger and older firms have lower churning rates, and that higher average wage levels reduce firm level churning. Evidence of the role of firm level wage inequality and the potential insulating role of atypical employment is ambiguous and depends strongly on the specification chosen and wage level and within firm wage inequality Granger cause churning, while dynamic interactions with firm growth are more complicated.

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Introduction

A substantial body of economic research in the tradition of the "job and worker flow" literature has recently shown that, even in steady state, labour markets are characterised by substantial flows of workers in excess of what is needed to accommodate firm growth. While in most mature market economies around 10 percent of the jobs existing at any given point in time are destroyed within a year and an about equal amount is created, worker flows (hires and separations) exceed these job flows by a factor of 2 to 3 (see: Davis and Haltiwanger, 1995). These excess worker flows are larger in young firms and firms about to exit the market as well as in smaller and growing firms (Burgess, Lane and Stevens, 2000, Abowd, Corbel and Kramarz, 1998, Tsou, Lju and Hammitt, 2002, Burgess, Lane and Stevens, 2000a). They are also higher for temporary contracts, in the service sector than in the manufacturing sector and in non-unionised enterprises and are highly idiosyncratic to firms and persistent over time periods (Bingley et al., 1999, Atai and Heyman, 2000, Lucifora, 1998, Haltiwanger, Lane and Spletzer, 2000).

While a formal theory of worker flows which can account for all these stylised facts is still to be developed, a number of authors have proposed explanations to account for some of them. In general these explanations build upon the view that churning is the consequence of a re-evaluation of a particular job match, initiated either by the employer or the employee. If some aspects of match quality are experience goods for either of these two actors, the value of the match both to an employer and an employee will evolve as they learn about match quality (Burgess, Lane and Stevens, 2000). Churning is thus linked to differences in personnel policies of firms, which may arise from firm specific differences in turnover costs, technologies, skill requirements and managerial matching abilities.

Haltiwanger, Lane and Spletzer (2000) formalise this idea in a model, in which firms differ with respect to productivity and workers with respect to skills, productivity levels of firms are complements to the optimal skill composition of the workforce and firms are imperfectly informed about own productivity levels but learn about it as they age. This model predicts higher worker flows for younger firms. Alternatively, as argued by (Burgess, Lane and Stevens, 1996), excess worker flows could be explained by imperfections in screening of workers in their assignment to jobs. If there are fixed costs associated with screening workers, this explanation predicts that larger firms – investing more in screening – have lower worker flow rates than smaller firms.

These explanations put the emphasis on the heterogeneity of firms' ability to find workers matching their requirements. It is, however, equally conceivable that churning flows may arise from the workers' incapability to find adequate jobs. If, for instance, firms differ with respect to wage offers and workers learn about their productivity level (and the attainable wages) only on the job, this may lead to worker induced churning flows, as more productive workers move to better paid jobs. This suggests that firm wages should be negatively

correlated with churning flows as a higher average wage level provides fewer incentives for their workers to quit their job.

As recently pointed out by Haltiwanger and Vodopivec (2002) there may, however, also be more complicated interactions between a firm's wage policy and turnover. If a firm's internal wage dispersion is a measure for its possibility to react to new information on match productivity through changes in compensation, wage dispersion within a firm may be a substitute for quantity adjustments, which cause churning. This idea has been formalised in Bertola and Rogerson (1998). Alternatively, however, internal wage dispersion may also increase churning if it is seen as unfair discrimination between equal workers and thus increases incentives for quitting an employment position. Haltiwanger and Vodopivec (2002) present evidence that higher internal wage flexibility as measured by the coefficient of variation of wages in the firm reduces churning in Slovenia.

Finally, Cappelli and Neumark (2001) have recently argued that certain forms of atypical employment relationships are used to insulate the primary workforce from match specific productivity shocks in order to economise on adjustment costs. This explanation would thus predict a negative relationship between the share of atypical employment relationships and worker turnover may arise.

This paper explores the relationship between firm characteristics (such as firm size and age as well as wage and personnel policies) and churning for a matched employer and employee data set from Austria. We are particularly interested in determining which aspects of firm wage and personnel policy are substitutes for or complements of firm level worker turnover. Focusing on the "within variance" (i.e. that part of the variation of worker flows that cannot be explained by firm fixed effects), we present evidence that the most robust relationship is between firm size and age and churning. Larger and older firms have lower churning rates. In addition higher average wage levels reduce firm level churning. Evidence on the role of firm level wage inequality and the potential insulating role of atypical employment is ambiguous and depends strongly on the choice of specification.

Aside from this we find a number of further "stylised facts" which may be of interest in a wider context. We show that there is substantial evidence of non-linearities in the relationship between firm growth, age and size as well as in the relationship between firm wage policies and worker flows. Also, we find that worker flow rates are more persistent than firm employment growth rates at the firm level but substantially less auto correlated than other aspects of wage and employment policy. Finally there is also some evidence that wage level and within firm wage inequality Granger cause churning, while dynamic interactions with firm growth are more complicated.

In the next section we discuss measurement issues. Section three describes the features of the data used, while section four continues to look at the static as well as dynamic relationships between firm characteristics and worker flows. Section five finally presents the conclusions drawn from the above.

Measurement

In measuring worker flows we consider separations (S_{it}) and hires (H_{it}), where separations are all those persons, who start employment at firm i in the time period between t and t-1, and hires are all persons, who terminate their employment at a particular firm i in the same time period.[2] Given this definition, net employment changes at firm i are given by the differences between hires and separations at the firm level, job creation (JC_t) and destruction (JD_t) can be defined as:

$$JC_t = \sum_{i \in S^+} (H_{i,t} - S_{i,t}) \quad (1)$$

$$JD_t = \sum_{i \in S^-} \left| H_{i,t} - S_{i,t-1} \right| \quad (2)$$

where S^+ is the set of all firms, whose employment was higher at t than at t-1 (including those newly created), and S^- is the set of all firms, which had a lower employment at time t than at t-1 (including closed firms). Furthermore, worker reallocation (WR_{it}) at firm i in period t can be presented as:

$$WR_{it} = H_{it} + S_{it} \quad (3)$$

and excess worker reallocation, which is referred to as churning (CH_{it}) as:

$$CH_{it} = WR_{it} - \left| H_{it} - S_{it} \right| \quad (4)$$

Finally it has become customary in the literature to measure all the above indices relative to average employment in a particular firm. This is given as:

$$BD_{t,i} = \frac{B_{t,i} + B_{t-1,i}}{2} \quad (5)$$

This has the advantage that growth rates of employment are defined even for both closing and newly created firms, where newly created firms have an employment growth rate of 2 and closed firms have a rate of -2 as well as approximating the logarithm of employment growth. Thus we define a relative indicator X^r of any of the above defined measures as
$X_{it}^r = X_{it} / BD_{it}$

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[2]) Note that there are two definitions of separations and hires used in the literature. The first used by for instance Burgess, Lane and Stevens (2000) defines as a hire all persons employed *at a point in time* (t) but not employed at t-1, and as a separation all persons employed at t-1 but not at time t, while the second definition, applied by for example Anderson and Meyer (1994) and Haltiwanger and Vodopivec (2002), measures all accessions and separation between t and t-1. Davis and Haltiwanger (1995) refer to the later definition as turnover and the second as reallocation measures of churning (see Huber and Smeral 2004 for a comparison of these two measurement concepts). In this terminology we thus focus on turnover. We give preference to our definition, because we consider short spells (of less than one year) an important aspect of personnel policies in firms.

Data and Univariate Analysis

Churning and its Components

The data we use to measure both job and worker flows in Austria stem from an administrative data set drawn from the Austrian Social Security files. This data includes all employees employed in Austria in the time period from 1996 to 2001. They contain a daily calendar of the starting date of an employment relationship of any individual at a particular firm and the end date (if employment spells are terminated before the end of 2002). Furthermore, the data contain information on the compensation received in a particular employment relationship (this is top coded at the maximum compensation eligible for social security benefits) and information on the age and gender of the person in the employment relationship as well as the industry and regional affiliation of the firm providing the employment relationship. This data or subsamples of it have been used in a number of studies on the Austrian labour market focusing on matched employer – employee data such as Winter-Ebmer and Zweimüller, 1997 and Winter-Ebmer, 1996.

Before processing, the data were cleaned of a number of factors which could increase labour market dynamics for purely administrative reasons. In particular this applies to potential interruptions of the employment relationship which may arise from short sickness leaves and fictitious firm turnover, which stems from the fact that firms are given a new identification number when a firm changes location[3]).

Relative to many of the data sets used in the literature, these data have the advantage of a wide coverage. We focus on the entire information in the time period from 1995 to 2001 thus covering employees of business units of all sectors (manufacturing, services and non-tenured public sector employees) and all sizes (starting from one employee upwards). This wide coverage, however, comes at the price of relatively limited information on the firms and persons included. We lack human capital variables and information on the working time of the employed and all information on firms other than industry affiliation, region of operation and indicators, which can be calculated from analysing employment relationships at a firm (such as firm size and employment growth). In particular, we have no information on productivity, sales or other product market indicators. Finally, in our data it is not entirely clear whether the business units reporting are enterprises or establishments, since the anonymous firm numbers listed are administrative accounts only, and it is left up to the individual firm,

[3]) For detailed descriptions of the data set and the purification steps involved in the data processing and the effects of these changes see: Stiglbauer, 2003, Schöberl et al, 2004.

whether it chooses to report at the enterprise or establishment level (or a mixture of both)[4]). Unfortunately, since data are provided anonymously only, we have no way to correct these deficiencies.

Furthermore, the fact that our data are constructed for administrative purposes implies that a number of public sector firms exist, engaging solely in the payment of short term social security payments. These firms are characterised by low average employment of mostly 2 to 3 employees and high churning (in excess of 1000 workers per year) and affiliation with the public sector. Since we have no way to identify these firms separately and their inclusion would induce substantial bias to churning figures, we exclude all observation of public sector firms with an average employment of 3 or less employees.

Aside from being interested in the variance of firm level turnover in Austria, we also want to determine which firm level characteristics are correlated with this turnover. Following the theoretical considerations mentioned in the introduction and the literature on worker flows, we concentrate on four groups of variables of particular interest:

- Firm age and firm size – we calculate the firm age as the difference between the founding date of a firm and the current year, where the founding date is defined as the first time of appearance of the relevant firm in our data set. Since records of the social security files start in 1970, any firm that was founded before or in 1970 enters our sample as founded in 1970. Thus the maximum observable age in our sample is 31 years. The firm size is measured as the number of employees at any point of time and firm growth as the change in firm size relative to average employment in the time period. Thus our firm growth measure attains a value of –2 when a firm is closed and a value of +2 when the firm under consideration is newly founded. The theoretical models described in the introduction would lead us to expect that churning rates will fall with both firm age and size.
- Measures of wage policies at a firm – to measure firm level wage policies we use the average wage level paid at a particular firm as well as the standard deviation of wages within firms. To measure firm internal pay inequality. For both these measures, we use two definitions of the average wage. First, we use the (log of the) median wage at a particular firm and its standard deviation in levels. Second since there is substantial evidence of inter-industry wage differentials in Austria (see Hofer, 1996), and since the alternative wages of employees may also depend on the wages typically paid in the industry, we also include the (log of the) median wage (and its standard deviation) relative to the median wage (or wage dispersion) of the four digit industry in which the firm operates. Again the theoretical considerations in the introduction lead us to conclude that churning rates should fall with higher median wage levels in a firm. The

[4]) Stiglbauer (2003) argues that in all likelihood the data are enterprise level data, because few enterprises have an incentive to increase their administrative reporting burden by reporting at the establishment level.

correlation with wage inequality at the firm, by contrast, level may be either positive or negative depending on whether it is seen primarily as a potential for wage flexibility or as unfair discrimination increasing worker discontent.

- The share of persons employed in non-standard employment in the firm – Finally, as a measure of aspects of personnel policies, we also look at the share of persons with non-standard employment relationships employed at a particular firm as a further explanatory variable[5]). In particular we consider the sum of persons marginally employed[6]) and people working on a fixed term contract. If such atypical employment works as an insulation of the primary workforce against match specific shocks, we would expect falling churning rates among standard employment with increasing shares of atypical employment.

Table 1 displays descriptive statistics of churning rates and explanatory variables and suggests substantial variation in both wage and personnel policies among the firms in our sample. In particular, aside from pronounced firm size wage differentials, larger firms are also characterized by a smaller share of atypically employed and higher wage inequality after correcting for industry affiliation.

Differences between younger and older firms by contrast seem to apply primarily to the share of atypical employment, with younger firms having a higher share of atypical employment. Growing firms are slightly younger than both stagnating and shrinking firms and have a lower share of atypical employment as well as larger wage disparities after correcting for sector differences. Finally, differences between different sectors apply primarily to the behaviour of private services. Firms in the private services are younger and have a higher share of atypical unemployment.

Furthermore, the stylised facts concerning the distribution of churning rates across firms displayed in Table 1 are broadly consistent with the literature. For instance, as Burgess, Lane and Stevens (2000) we find substantially higher worker flow rates in non-manufacturing than in manufacturing industries as well as decreasing churning rates with firm size and age. Also Bingley et al. (1999), find that both job and worker flows are higher in the private service sector than in manufacturing sector, as is also the case in our data.

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[5]) These atypically unemployed are not included in the measures of job and worker flows presented above.

[6]) In Austria persons below a certain (minimal) income level (which is defined annually) have a special social security status. In practice these are part time workers, working few hours only (see Mühlberger, 1998).

Table 1: Summary Statistics for Dependent Variables

	Churning Rate	Employ-ment	Average wage[a)]	Wage disparities [a)]	age	Atypically employed[a)]	wage rel. to ind. average[a)]	Wage differential rel. to ind.average[a)]
Total	107.35	29.27	9.78	8.75	17.03	8.2	0	0
		(263.36)	(0.35)	(0.57)	(9.93)	(26.58)	(0.27)	(0.52)
Manufacturing	91.77	30.95	9.84	8.8	18.25	5.29	0	0
Public Services	92.09	50.56	9.61	8.69	18.02	8.87	0	0
Private Services	124.65	21.01	9.79	8.74	15.74	10	0	0
Others	101.25	18.16	9.76	8.73	18.18	6.67	0	0
Stagnating Firms	81.51	9.77	9.75	8.73	17.71	8.9	0	-0.02
Growing Firms	121.21	38.59	9.78	8.77	15.94	6.71	-0.01	0.02
Shrinking Firms	112.58	34.44	9.79	8.74	17.65	9.44	0.01	0
Firm size								
<50	108.11	10.63	9.76	8.73	16.7	8.99	-0.01	-0.01
51-100	104.73	69.16	9.95	8.91	19.7	4.28	0.07	0.11
101-500	96.02	200.46	9.99	8.94	21.25	3.35	0.09	0.13
501-1000	7.54	678.14	10.04	8.98	23.34	1.76	0.11	0.17
1000+	47.42	2955.89	10.03	8.97	23.38	0.09	0.14	0.16
Firm Age								
less than 6 years	140.86	15.64	9.78	8.69	2.93	10.2	-0.01	-0.04
6 to 12 years	109.32	19.82	9.78	8.75	8.76	8.87	0	0.01
13 to 25 years	99.23	26.48	9.76	8.76	20	8.07	0	0.01
more than 25 years	95.6	44.14	9.78	8.77	27.88	7	0.01	0.02

Note: the table reports (unweighted) average annual firm level rates from 1996 to 2001. Figures for public services (defined as all NACE two digit industries from NACE 75 to NACE 99 i.e. Public Administration, Education, Health, Waste disposal, Culture and Sports as well as NGOs) exclude tenured employees (Beamte). Private Services are NACE two digit industries from NACE 50 to NACE 74. Manufacturing are NACE two digit Industries from NACE 14 to NACE 37. Other Industries include Agriculture and Forestry (NACE 1 to NACE 5), Mining (NACE 10 to 13) as well as construction (NACE 45) Energy and water supplies (NACE 40 and 41).[a)] Variable measured in logs

Firm wage and personnel policies as well as churning rates are highly persistent. To illustrate this we estimates equations of the form:

(6) $y_{it} = \eta_i + \alpha y_{it-1} + \xi_{it}$

where y_{it} is the dependent variable under consideration (employment growth rates, hiring rate and separation rate) in firm i at point in time t, n_i is a firm fixed effect and ξ_{it} is an innovation to the dependent variable[7]). The coefficient α in this equation is a measure of the

[7]) Since the least squares dummy variable method is biased in the case of panel data as ours due to the correlation of the repressors with the error term, we use the GMM estimator proposed by Arellano and Bond (1991). This is an appropriate technique for applications such as this, since simulation studies (Judson and Owen, 1996) show that this

speed with which the variable returns to its long run (firm specific) value after an unforeseen deviation.

The results (reported in Table 2) indicate that that there is significant persistence in the churning rate but negative autocorrelation of firm level employment growth rates – a result which is also consistent with Burgess, Lane and Stevens (2000). Furthermore, this persistence differs among sectors and size categories of firms. In particular public sector firms have a higher persistence in turnover figures than private sector firms.

Table 2: Autocorrelation of dependent variables

	Churnin Rate	*Firm Growth*	*average wage*	*Wage disparities*	*Atypically employed*	*Average wage rel. to industry average*	*wage differentials rel. to industry averages*
Total	*0.34***	-0.12***	*0.53***	*0.39***	*0.58***	*0.55***	*0.35***
Manufacturing	*0.23***	-0.14***	*0.55***	*0.39***	*0.47***	*0.56***	*0.30***
Private Services	*0.19***	-0.10***	*0.51***	*0.34***	*0.34***	*0.48***	*0.35***
Public Services	*0.56***	-0.11**	*0.49***	*0.48***	*0.68***	*0.56***	*0.30***
Others	*0.07***	-0.18***	*0.59***	*0.09***	*0.50***	*0.61***	*0.50***
Found 90+			*0.44***	*0.52***	*0.67***	*0.54***	*0.44***
Founded 1985-1990	*0.34***	-0.07***	*0.56***	*0.51***0.*	*0.50***	*0.56***	*0.45***
Founded 1973-1984	*-0.12***	-0.16***	*0.53***	*0.27***	*0.24***	*0.56***	*0.20***
Founded 1973-	*0.56***	-0.19	*0.48***	*0.35***	*0.55***	*0.54***	*0.25***
	*0.38***	-0.17					

Note: the table reports Arellano – Bond estimates of the Autoregressive co-efficient in equation (13) in the text. Figures for public services (defined as all NACE two digit industries from NACE 75 to NACE 99 i.e. Public Administration, Education, Health, Waste disposal, Culture and Sports as well as NGOs) exclude tenured employees (Beamte). Private Services are NACE two digit industries from NACE 50 to NACE 74. Manufacturing are NACE two digit Industries from NACE 14 to NACE 37. Other Industries include Agriculture and Forestry (NACE 1 to NACE 5), Mining (NACE 10 to 13) as well as construction (NACE 45) Energy and water supplies (NACE 40 and 41).

Furthermore, dependent variables are highly persistent over time. In contrast to turnover, the persistence concerning relative wages is, however, higher both in absolute terms and relative to the industry average and the persistence in firm internal wage disparities is of comparative magnitude. Also concerning these indicators, the higher persistence in the public sector seems to be less pronounced for these indicators than for labour turnover. This may be important, since it gives indication as to with which relative speed different aspects of firm policy adjust to unforeseen events (i.e. where firm level flexibility is highest). Our results thus suggest that quantity adjustment via hiring and separations are more flexible than wage policies Austria.

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estimator converges even for short time series as the number of cross-sectional observations becomes large as in our case.

Multivariate Analysis

Cross Section Relationships

There are a number of theoretical possibilities which suggest that the relationship between the dependent variables presented and the churning rate as a measure of excess labour mobility may be non-linear. For instance, if learning curves of firms are not linear, a non-linear relationship between firm age and churning may arise, or if access to screening technologies is not linear with respect to firm size, this may lead to non-linearities between firm size and churning.

For this reason we start our multivariate analyses by plotting conditional distributions of the churning rate given the independent variables in Figure 1[8]). This figure first suggests that indeed non-linearities between the various dependent variables and the churning rate may apply. In particular, churning rates decline with an increasing rate as firm size increases, and at a decreasing rate with firm age. Furthermore, there is a u-shaped relationship between churning and firm growth. Rapidly growing and shrinking firms have higher churning rates than do firms with intermediate growth rates.

Second, the figure casts some doubt on a strong relationship between wage policies and churning rates as hypothesized above and on the insulation hypothesis concerning atypical employment. The relationship between wage policies and churning seems to be rather complicated. When looking at the marginal distribution of churning with respect to firm wage levels and the standard deviation of wages, both oscillate strongly, even when taking the respective variables relative to four digit industry averages. The graph also suggests a complicated relationship between the share of atypically unemployed and churning rates.

Furthermore, in contrast to our hypotheses above, firms with higher average wage levels, higher internal wage differentiation and a higher share of atypically unemployed also have a higher churning rate. This applies particularly strongly to wage differentials within a firm and the share of atypical employed. The increase of churning rates with increasing wage disparities and atypical unemployment could arise for instance if wage inequality at the workplace does not reflect individual wage flexibility and atypical unemployment does not serve insulation of the primary workforce, but rather that both variables increase discontent of workers at the firms, who may then choose to move to other employers thus inducing churning.

An alternative explanation for these unexpected results may be that the use of only a single conditioning variable may mask interactions with other variables. For instance, an

[8]) We use kernel estimation techniques presented in some detail in Ullah, 1998: The figure presents results using use a quartic kernel and a bandwidth of 2. Results are, however, by and large robust to using smaller bandwidths and different kernels.

explanation of the highly nonlinear appearance of the relationship between the share of the atypically employed and churning could be an interaction with firm size effects. Since larger firms have lower churning rates but also a lower share of atypical employment, this may lead to a fictitious correlation between churning and the share of atypical employed reported in Figure 1.

To deal with this potential shortcoming we perform a series of parametric panel regressions attempting to explain the firm level churning rate. By estimating specifications of the for

(7) $CH_{it} = \gamma_i + \beta X_{it} + \zeta_{it}$

where γ_i are firm level fixed effects, which are included to control for any time invariant firm heterogeneity, which we cannot measure through our dependent variables, β a coefficient vector, X_{it} are dependent variables and ζ_{it} is a disturbance term. Since Figure 1 suggests some potential of non linear effects of individual variables we start by entering term linearly (see column 1 of Table 3) and add higher order terms up to a cubic term successively (see columns 2 and 3 in Table 3).

In line with our previous results, the base line specification, where only linear terms are included suggests that smaller and younger firms have higher churning rates. All else equal increasing firm size by 1 percent reduces the churning rate by 0.5 percentage point, while an additional year of age reduces the churning rate by 0.005 percentage point. In contrast to Figure 1, however, these results also suggest that higher average wages reduce firm level churning rates and higher wage variation within a firm increases churning significantly. An increase in the average wage level relative to the industry average by 1 percent reduces churning by 0.27 percentage point while an increase in firm level wage differentials by 1 percent increases churning by 0.03 percent. Finally, in this specification the share of atypical employment remains insignificant, indicating that the insulation of the primary workforce suggested in Capelli and Newmark, 2001 is not an important determinant of firm level churning rates.

When adding quadratic terms to the baseline specification (in column 2 of Table 3) we find that they are significant at the five percent significance level for each and every variable and that the linear share of atypical employment becomes significant at the 10 percent level. The inclusion of quadratic terms removes significance of the average wage variation, however.

Finally, when including the cubic term firm age becomes an insignificant determinant of firm level churning rates and the share of atypically employed becomes a significant determinant of churning rates, with higher shares of atypical employment implying lower churning rate as predicted in our theoretical considerations above (and the quadratic term for the share of atypically employed loosing significance). Furthermore, the coefficient on the quadratic term for the average wage variation becomes significantly negative, suggesting a negative relationship between firm level wage variation and churning.

In general thus the results reported in Table 3 suggest that even after controlling for firm level fixed effects, which can be considered as variables measuring unobserved time invariant firm characteristics, smaller and older firms have lower churning rates, and that higher average wage levels reduce firm level churning and that the role of wage inequality and the potential insulating role of atypical employment is ambiguous and depends strongly on the number of higher order terms included. Finally, these results suggest substantial potential for nonlinear relationships in the specifications.

Table 3: Cross Sectional Regression Results (dependent variable churning rate)

	(1)	(2)	(3)
Ln(average employment)	-0.549***	-1.013***	-1.301***
	0.009	0.025	0.060
growth rate	0.024***	0.012**	0.048***
	0.005	0.006	0.008
Share of atypically employed	.007	-0.030*	-0.036**
	0.012	0.015	0.018
ln (average wage) rel. to ind. average	-0.271***	-0.317***	-0.315***
	0.019	0.020	0.021
ln (average wage variation)	0.027***	0.013	-0.064***
	0.006	0.008	0.009
firm Age	-0.005***	0.007***	0.005
	0.001	0.002	0.004
	squared terms		
ln(average employment)		0.083***	0.184***
		0.004	0.020
growth rate		-0.043***	-0.057***
		0.005	0.006
share of atypically employed		0.002**	0.007
		0.001	0.004
ln (average wage) rel. to ind. average		-0.075***	-0.226***
		0.011	0.025
ln (average wage variation)		-0.002***	-0.070***
		0.001	0.004
firm age		-0.0003***	0.00003
		0.00005	0.0003
	cubed terms		
ln(average employment)			-0.010***
			0.002
growth rate			-0.026***
			0.004
share of atypically employed			-0.0002
			0.0001
ln (average wage) rel. to ind. average			-0.023***
			0.003
ln (average wage variation)			-0.004
			0.0003
firm age			0.000007
			0.000006
Firm fixed effects	Yes	Yes	Yes

Note: Table reports coefficients of the panel regression in equation (14). Firm fixed effects are not reported. *** (**) (*) indicates significance at the 1 percent (5 percent) and (10 percent) level respectively.

Causality

While the regression results in Table 4 are indicative of some of the determinants of firm level churning, they do not contain any indication of the causality running between firm characteristics and churning. To uncover the potential role played by various factors in causing changes in firm level churning rates, we ran a 5 variable panel vector autoregression including lagged variables for the churning rate, firm growth rate and the share of atypical unemployed average wage level and the wage deviation[9]).

Table 4: Dynamic Revelations between Firm level Churning Rates and Firm Characteristics

	Churning Rate	Growth Rate	Atypical employed	Average Wage	Wage Deviation
Churning Rate (-1)	-0.197***	0.028***	0.0006**	-0.0002	0.00007
	(0.002)	(0.001)	(0.0002)	(0.0002)	(0.0005)
Growth Rate (-1)	-0.170***	-0.400***	-0.0003	-0.007***	0.012***
	(0.007)	(0.002)	(0.0009)	(0.001)	(0.002)
Atypical Share (-1)	-0.003	0.233***	-0.110***	-0.0005	-0.004
	(0.015)	(0.005)	(0.002)	(0.001)	(0.004)
Average Wage (-1)	-0.452***	0.201***	0.009***	-0.185***	0.065***
	(0.025)	(0.007)	(0.003)	(0.002)	(0.007)
Wage deviation (-1)	0.042***	-0.043***	-0.001	-0.002***	-0.319***
	(0.007)	(0.003)	(0.001)	(0.001)	(0.002)
Sargan Test of Overidentifying restriction	0.00	0.00	0.00	0.00	0.00
Autocorrelation order 1	0.00	0.00	0.00	0.00	0.00
Autocorrelation order 1	0.00	0.00	0.00	0.00	0.00

Note: Table reports coefficients of a dynamic panel regression using the Arellano Bond estimator. *** (**) (*) indicates significance at the 1 percent (5 percent) and (10 percent) level respectively.

The results reported in Table 4 suggest substantial dynamic interaction among churning flows and other firm characteristics. In particular, the evidence implies that average firm level wages as well as firm level wage disparities Granger cause churning rates, while churning rates do not Granger cause either of these two variables. This suggests the causality running from the former variables to the later. Furthermore, the results also suggest that churning causes increases in atypical employment shares but not vice versa while, as also reported by Burgess, Lane and Stevens (2000), the dynamic interaction between Churning and employment growth is more complicated with both variables granger causing each other. In particular a higher employment growth rate of a firm causes lower churning in subsequent periods and an increased churning in previous periods leads to higher firm growth rates subsequently.

[9]) We do this by single equation estimation based on the Arellano-Bond estimator.

Conclusions

This paper explores the relationship between firm characteristics as well as wage and employment policy and churning for a matched employer and employee data set from Austria. Our main finding is that the most robust relationship is between firm size and age and churning. Larger and older firms have lower churning rates. In addition higher average wage levels reduce firm level churning. Evidence on the role of firm level wage inequality and the potential insulating role of atypical employment is ambiguous and depends strongly on the choice of specification. This lends support to the view that firm level variations in churning is a result of firm level differences in turnover costs, technologies, skill requirements and managerial matching abilities.

Aside from this we find a number of "stylised facts", which may also be of interest in a wider context. We show that:

1. There is substantial evidence of non-linearities in the relationship among firm growth, age and size as well as in the relationship between firm wage policies and worker flows.
2. Worker flow rates at the firm level are more persistent than firm employment growth rates but substantially less autocorrelated than other aspects of wage and employment policy.
3. There is some evidence that wage level and within firm wage inequality Granger cause churning, while dynamic interactions with firm growth are more complicated.

Although our results are preliminary and some further research is needed, they do suggest that both the search of workers for better matches as well as differences of firms of different ages and sizes in finding such workes is an important determinant of churning, while evidence for complementarities with other aspects of firm wage and personnel policies seem limited. In future research, however, this last finding will have to be addressed by including variables concerning the recruiting behaviour of firms. Furthermore, it may be worth while to analyse in more depth issues of nonlinearity.

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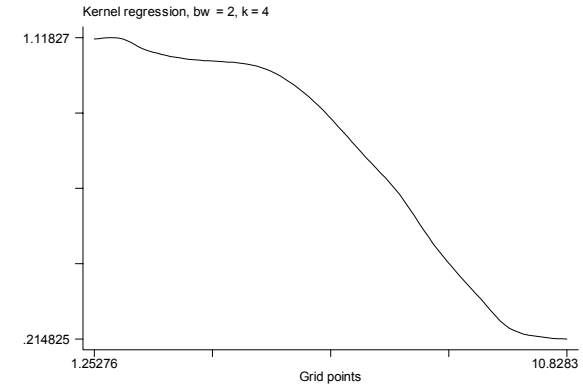
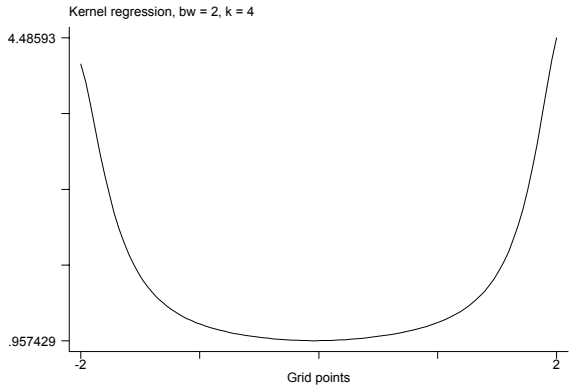
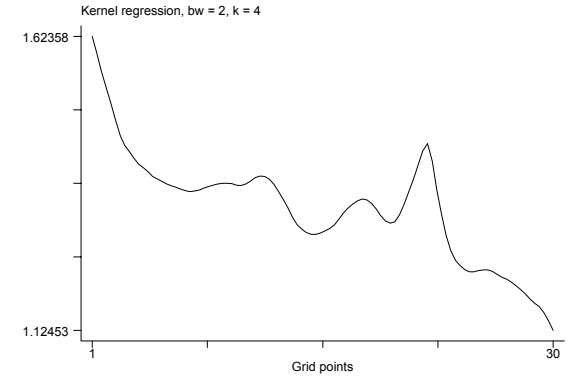
Figure 1: Marginal Distribution of Churning Rates

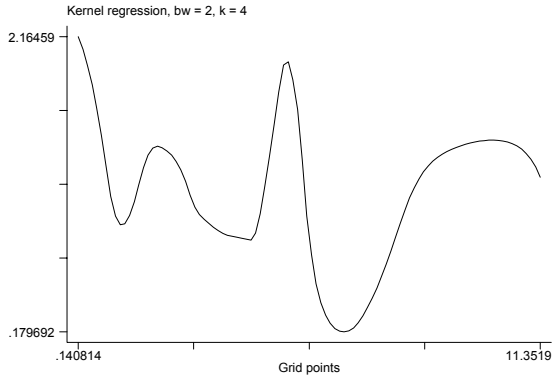




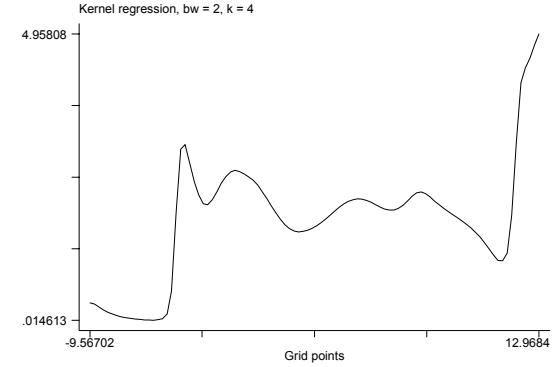
Firm Size



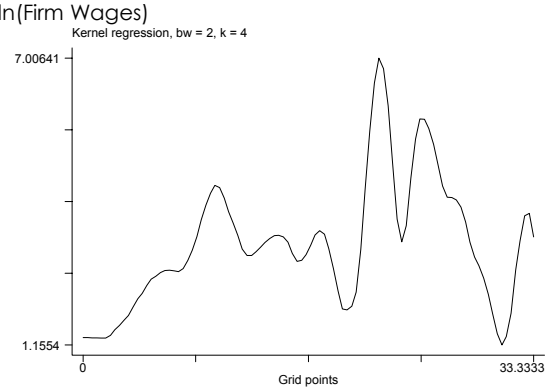
Firm Growth



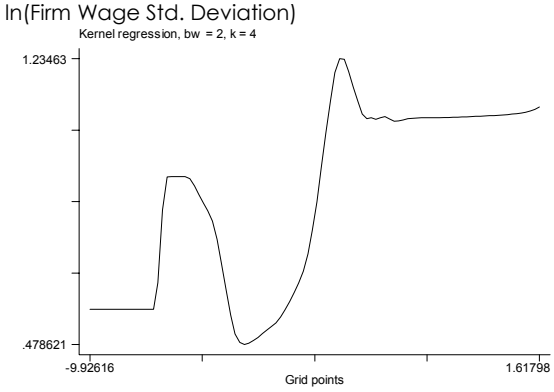
Firm Age



ln(Firm Wages)

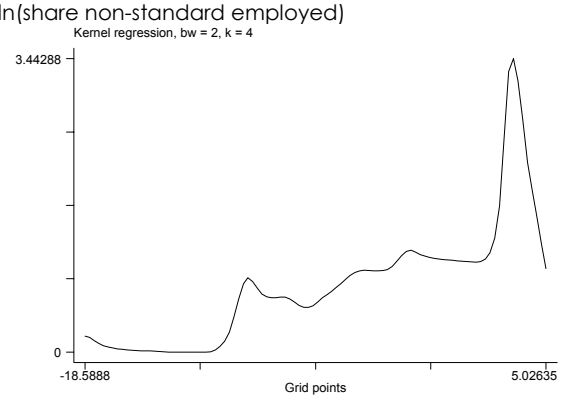


ln(Firm Wage Std. Deviation)



wage relative to industry average

ln(share non-standard employed)



wage inequality relative to industry average

Note: Figures present kernel estimates of the marginal distribution of firm level churning rates with respect to the individual variables using a quartic kernel and a bandwidth of 2.

Firm Birth and Closure and Job and Worker Flows

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Abstract

We extend the literature on job and worker flows by measuring the contribution of firm births and closures to worker flows. We show that their contribution to worker flows is low relative to their contribution to job flows. Successful policies to increase firm births should have only minor effects on worker flows.

JEL-Code: J60, J63, L2

Keywords: Job and Worker Flows, Firm Birth and Closure

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Introduction

If firm births and closures contribute substantially to worker flows, higher labour market churning may be a consequence of successful policies to increase firm birth. Indeed recent literature suggests that this link may be close. Burgess, Lane and Stevens (2000) show that firm births and closures have high worker flow rates. Spletzer (2000) concludes that the high share of job destruction due to firm closure may cause large costs for affected workers. This note extends this literature by measuring directly the contribution of firm birth and closures to worker flows (i.e. hires and separations). Furthermore, in contrast to previous European research, which focuses on countries where entry regulation is lenient, such as the UK (Hart and Oulten, 1998) and Demark (Davis and Haltiwanger, 1999), we analyze a typical continental European labour market, with more severe entry regulation[2]). Since our data are highly comparable to a recent study of West Virginia by Spletzer (2000) this allows a calculation of the potential effects of increasing firm birth and closure rates to US levels in Europe.

Data and Method

Our data stem from the Austrian Social Security files. They report annual employment as well as hires and separations for all firms of all sectors with at least one employee for the time period 1995 to 2000[3]). We follow Spletzer's definitions closely, but extend on his analysis by including hires and separations: we omit private households, agriculture, and public sector employment and encode a closure if a given firm reports zero employment for a year running. Birth occurs at the time a firm appears in the data for the first time. All measures refer to annual flows. The contributions of firm births and closures refer to the first (respectively last) year of their existence.

We follow the literature (Burgess, Lane and Stevens, 2000a, Abowd, Kramarz and Corbel, 1999) and measure job creation (JC_t) as the sum of all employment changes in growing or newly created firms and job destruction (JD_t) as the sum of all employment changes in declining or closed firms. Worker flows (WF_t) are separations and hires, where separations are persons, who terminate employment, and hires are persons, who start employment at a firm within a year.

We assign firms to five groups namely, births (denoted by b), closures (c), growing firms (g), declining firms (d) and firms with no change in employment (k). Spletzter (2000) shows that job creation and destruction can be decomposed by:

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[2]) Djankov et al. (2001) show that Austria ranks 9th among 14 EU countries in terms of costs of setting up new enterprises and is comparable to larger member states such as Germany, France, Italy and Spain.

[3]) It is left to enterprises whether they report on enterprise or establishment level, Stiglbauer (2003) suggests that data are mostly enterprise level. Schöberl et al. (2004) provide a detailed description of the data.

$$JC_t = (s_{bt} * AvSize_{bt} + s_{gt} * AvGrowth_{gt})N_t \quad (1)$$

$$JD_t = (s_{ct} * AvSize_{ct} + s_{dt} * AvGrowth_{dt})N_t \quad (2)$$

with s_{it} the share of firms of type i, $AvSize_{it}$ their average size and $AvGrowth_{it}$ their average expansion. N_t is the total number of firms.

Similarly worker flows (WF_t) can be decomposed by:

$$WF_t = (s_{bt} * AvWF_{bt} + s_{ct} * AvWF_{ct} + s_{gt} * AvWF_{gt} + s_{dt} * AvWF_{dt} + s_{kt} * AvWF_{kt})N_t \quad (3)$$

where and $AvWF_{it}$ is the average number of worker flows in the respective firm.

Results

Table 1 presents results concerning job creation and destruction as well as comparable results from Spletzer (2000). The share of job creation attributable to firm birth is substantially lower in Austria than in the US. Only around a quarter of annual job creation (as compared to around 40 percent in the US) is due to firm birth. This difference is due both to lower firm birth rates as well as a smaller the average size of firm births. Both are at about 55 percent of the US level. The share of firm closures in job destruction is also lower, but here firm size accounts for a larger part of the difference, Austrian closure rates are around 20 percent below the US level, but closing firms are only half the size of the US. Finally, in accordance with the literature, worker flows are substantially lower in manufacturing than in services and construction.

Table 2 presents results on the share in worker flows of different firm types. The top panel displays turnover rates (relative to average employment) as suggested by Burgess, Lane and Stevens (2000). In accordance with them we find higher turnover rates for firm births and closures than for existing firms. When we measure hires relative to the number of jobs created or destroyed as suggested by Abowd, Kramarz and Corbel (1999) in panel 2, firm births and closures hire and separate less per job created or destroyed. In average growing firms hire 3.6 (and separate from 2.6) workers per newly created job, births hire 1.3 (and separate from 0.3) in their first year. Similarly, closing firms hire 0.1 workers (and separate from 1.1) for each job destroyed in their last year while shrinking firms hire 2.5 (and separate from 3.5).

The third panel in Table 2 displays the contribution of various types of firms to worker flows. Relative to the contribution of firm births and closures to job flows, their impact on worker flows is modest. It amounts to around 8.5 percent and varies among industries from 7.2 percent (manufacturing) to 11.8 percent (construction). Growing firms account for almost 50 percent of all worker flows, although their share in total firms is 27 percent.

Table 1: The Contribution of Firm Births and Closures to Job Flows

	Job Creation /Destruction Rate [1]	Birth/ Closure Rate[2]	Size of Average Birth/Closure[3]	Expansion/ Contraction Rate[2]	Growth of Growing/ Declining firms [3]	Share of Job Creation/ Destruction in Births/Closures [4]
			Job Creation			
Manufacturing	0.070	4.71	6.68	25.32	4.32	22.33
Construction	0.122	8.43	5.18	28.47	3.78	28.87
Services	0.080	7.26	2.78	18.16	3.34	25.00
Total	0.082	6.98	3.50	20.36	3.59	25.02
Spletzer, 2000	14.60	12.17	6.54	27.87	4.33	39.75
			Job Destruction			
Manufacturing	0.080	7.32	5.94	25.02	4.73	26.83
Construction	0.134	8.76	6.44	26.05	4.24	33.82
Services	0.069	9.13	2.66	14.31	3.13	35.20
Total	0.079	8.81	3.48	17.21	3.67	32.67
Spletzer, 2000	0.132	10.66	7.04	25.71	4.27	40.62

Notes: Table displays the decomposition in equations 1 and 2. – [1]) In percent of average employment. – 2) In percent of total firms. – [3]) Average number of employees per firm. – [4]) In percent of total Job destruction/creation.

Table 2: The Contribution of Firm Births and Closures to Worker Flows

	Growing	Shrinking	Stagnating	Births	Deaths
			Turnover Rate[1]		
Manufacturing	0.761	0.633	0.623	3.275	2.523
Construction	1.471	1.397	1.118	5.590	3.550
Services	0.855	0.786	0.655	3.561	2.708
Total	0.891	0.812	0.696	3.881	2.828
			Worker Flows in percent of Job Flows		
Manufacturing	3.57	-1.93		1.32	-0.13
Construction	4.02	-2.87		1.90	-0.39
Services	3.89	-2.68		1.39	-0.18
Total	3.83	-2.49		1.47	-0.21
			Share of firm type in total Worker Flows		
Manufacturing	42.62	39.11	8.05	3.50	3.72
Construction	40.07	39.43	8.72	6.46	5.30
Services	47.92	33.24	10.80	4.20	3.84
Total	44.97	35.67	9.81	4.47	4.09

Notes: [1]) In percent of average employment.

Table 3 presents results of increasing firm birth and closure rates by using equations 1 through 3. Since higher firm births may also have an effect on closures, as many firms close early, we increase both firm birth and closure rates to US levels, while keeping firm size constant. This guarantees a combination of births and closures that can be supported in an economy. We thus almost double firm birth rates. This increases job creation by 1.5 percentage points and the share of firm births in job creation by 11.7 percentage points. Job destruction and the share of closing firms in job destruction increase more modestly (by 0.5 and 3.3 percentage points, respectively). Finally, total worker flows increase by 3.3 percentage points and the share of births and closures in worker flows by 3.7 percentage points. This is primarily due an increase in the share of births in worker flows.

Table 3: Simulated Job and Worker Flows after increasing birth and closure rates to US levels

	Total flow rate (relative to average employment)	Share due to births	Share due to closures
Job Creation Rate	0.097	36.76	0.00
Job Destruction Rate	0.084	0.00	37.01
Worker Flows	0.928	7.47	4.75

Conclusions

Although the contribution of firm births to job flows is sizeable their contribution to worker flows is more modest. Our calculations also suggest that policies successful at increasing firm births (and closures) contribute only modestly to increasing worker flows.

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Recent Trends in Job Stability: Evidence from Austrian Social Security Records

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Abstract

It is often argued that job stability decreased during the recent years. The rising significance of the New Economy, structural changes within the economy, globalisation and the opening of previously protected markets to international competition are possible reasons for this development as well as the rising labour market participation rates, which create a need for more flexible employment arrangements.

Research done for the US labour market shows that job stability did not change significantly during the 1980s and 1990s, while for some groups of employees instability increased slightly. For Austria similar studies are not available. This paper intends to measure changes in job stability since 1993 in Austria using administrative data from the Austrian social security records. Measuring the continuation and separation of employment relationships for a ten years period and analysing linear trends we find some decrease in job stability and consequently a rising number of jobs in a low job tenure segment of the labour market. Results indicate a decrease in job stability for younger employees and in the real estate, renting and business activities sector. For women in high tenure employment relationships job stability increased over the last ten years, while stability decreased for women in low tenure jobs.

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Introduction

Job stability measures job tenure with an employer or the probability of separation (or retention) of an employment relationship. It does not distinguish between different reasons for a separation (e.g., voluntary vs. involuntary termination of a job).

Studies for the US labour market indicate that there has been little overall change in job stability while some increase in subpopulations has occurred. Jaeger and Huff Stevens (1999) measure stability in job tenure during the 1970s and 1980s until 1991 by evaluating the probability of job tenure less than 18 months. Greater instability has occurred among blacks and low-educated workers. Neumark et al. (1999) find some decline in retention rates during the early 1990s, especially for more educated workers. Gottschalk and Moffitt (1999) find no increase in instability during the 1980s and 1990s. Steward (2002) presents results for the 1975 to 2000 period that indicate constant job stability measured by separation rates.

For Australia Borland (2000) finds no permanent changes in job stability between the 1980s and 1990s. A slightly increase in job tenure is due to an increase of the proportion of female workers with tenure of more than 10 years.

In this paper we will analyse how job stability in Austria changed from 1993 to 2002 using social security record data from the Federation of Austrian Social Insurance Institutions. This data provide full longitudinal information on employment spells for more than 90 percent of the employees (only some of the civil servants are missing). It allows the calculation of different indicators of job stability. Following Neumark et al. (1999) we calculate retention rates for one reporting day for each year[2]). This measure will be broken down to subgroups of employees with regard to age, sex, industry, and job tenure. Using this yearly information we try to identify changes in job stability over time by estimating simple trend regressions.

In contrast to Neumark et al. we have the advantage to make use of real longitudinal information and do not have to deal with a series of surveys.

Dataset

A common problem in the discussion of job stability especially in the United States concerns the availability of appropriate datasets for the analysis of long term trends. Survey data often have the drawback that questionnaires or sampling change over time, causing difficulties in interpreting trends over longer time periods. Very careful treatment of the information content and comparison of results using different surveys has to be used to overcome this drawback (see e.g., Jaeger and Huff Stevens (1999) for a discussion of data problems).

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[2]) Reporting day is the 7th of September each year.

The social security records used for this paper contain information on employment spells back until 1992. As the Austrian social insurance data are recorded on a daily basis, they offer very detailed longitudinal information. In addition to the information on the insurance spells, individual characteristics like age, sex, nationality and employer characteristics such as industry affiliation and location (not for public sector employment) are directly observable. Contrary to the data used in the United States, the social insurance data provide full longitudinal information on employment spells for most employees; moreover they are generated by the administration of the public pension system and therefore do not show the problems of survey data.

Administrative data usually exhibit high reliability as long as the information collected is relevant for administrative purposes (e.g., they are comprehensive for all spells that cause insurance liability). If this is not the case, information might become less reliable (e.g., there is only a crude definition of establishment, employment spells can be broken into sub-spells without changing the information relevant for administrative purposes). Since the data are not collected for labour market monitoring or for scientific use, there are a lot of variables missing which would be of interest for these applications. A major drawback of the social insurance data (compared for instance to the survey data used in the United States) is that they contain very few individual characteristics: e.g., there is no information about the education level or the place of residence.

A further problem is that due to the administrative character of the database employment spells can not directly be taken as employment relationships. Administrative processes cause a lot of changes in the registration of employment spells which may easily be misinterpreted as worker flows between different jobs when they do not reflect real discontinuity in employment relationships. Therefore the dataset is adjusted in two ways to reflect labour market flows in an appropriate way:

- Changes in employer registration are corrected for recodings of enterprises which operate largely with the same personnel and at the same location or in the same industry as before (identification of continuity in employer position). An often used convention is to define continuation of an enterprise if at least two of three of the following characteristics stays unchanged:
    - Name
    - Location
    - Production activity (NACE code)

  Since we use anonymised individual data, we do not observe the name of enterprises. We substitute this characteristic by a definition of continued employment of a large (60 percent) fraction of the personnel. So if an enterprise is closed and another is opened within one month and keeps at least 60 percent of the former personnel employed and

the location or the NACE code stay unchanged, a continued operation is assumed. This correction is only done for the years after1995 because data do not contain NACE codes for closed enterprises before.[3]

- Employment spells in the raw social security data often show artificial fluctuation (e.g., change from employment into (temporary) sickness benefit while staying employed with the same employer). These fluctuations often cause small interruptions of insurance registration. The databases is corrected for this artificial fluctuation as long as registration with the firm is continued or interruptions of registration are shorter than a week.

These two adaptations of the dataset reduce the problem of discontinuities caused only by administrative reasons.

We restrict the analysis to employees with full social insurance liability (standard employment). To save computing time we use a 10 percent sample of all employment episodes (still roughly 2.2 million episodes).

Measuring job stability over time

Flow data for Austria show features which are often found in modern labour markets. Most new employment relations are short; most employment relationships are stable and consequently further job tenure increases with previous tenure in the job (see Faber, 1999). Short term employment is of particular importance in seasonal industries like hotels and restaurants and construction which are relatively important with respect to their employment shares. These structural characteristics of the Austrian labour market will be treated by calculating industry-specific measures for job stability.

As mentioned above we measure job stability using retention rates (the share of employment relationships that continue from a date Y at least until a date Y+t) calculated on a reporting day each year.

Yearly retention rates

The retention rate Q measures the share of employees *N* with characteristics *X* and job tenure *c* (until the reporting day) on a reporting day in year *Y*, which stay continuously employed by the same employer at least until *Y+t*. That means in year *Y+t* he or she has tenure of *c+t*. Therefore, t is the time span of additional (open) job tenure measured from a reporting day in *Y*.

(1) $$Q^{Y}_{X,c}(t) = \frac{N^{Y,t}_{X,c+t}}{N^{Y}_{X,c}}$$

[3]) Since a 60 percent criterion of personnel continuity does not make sense for micro-enterprises, this definition is only used for enterprises with more than 5 employees.

This share will be calculated for

- every year from 1993 to at most 2002,
- for three time spans of additional job tenure *t*=1, 2, 3 years
- for three age groups and for women and men
- for employees in 11 different groups of industries
- for previous tenure *c*>=1 and *c*<1 years.

To identify a change in job stability regressions on a linear trend are estimated. Since retention rates for subsequent periods of job tenure are influenced by the retention rates of previous periods, we calculate the conditional probability of job termination in subsequent one year periods. If, for instance, 75 percent of the 1995 jobs are continued for at least one more year and 60 percent for at least two years, the probability for 1995 jobs being terminated in 1997 conditional on their continuation in 1996 is 20 percent. The (conditional) probability for a job termination (conditional separation rate *S*) of the 1995 jobs in 1996 is of course 25 percent.

In a first version we just regress the conditional separation rate *S* on a trend variable *Y*

$$(2) \qquad S^{Y}_{X,c}(t) = \frac{Q^{Y}_{X,c}(t-1) - Q^{Y}_{X,c}(t)}{Q^{Y}_{X,c}(t-1)} = \alpha + \beta_1 Y + \varepsilon_Y$$

Since changes in employment growth might influence the job stability (especially within external labour market segments, which react more directly to the business cycle and where usually younger and less experienced employees find their jobs) we use employment growth rates as an additional independent variable. Furthermore we use dummy variables to take into account that an adjustment for administratively caused recoding of enterprises was only possible for the years 1996 and after.

$$(3) \qquad S^{Y}_{X,c}(t) = \frac{Q^{Y}_{X,c}(t-1) - Q^{Y}_{X,c}(t)}{Q^{Y}_{X,c}(t-1)} = \alpha + \beta_1 Y + \beta_3 Empl_Y + \beta_2 d_c + \varepsilon_Y$$

Y is the time trend variable, Empl*Y* is the percentage change of employment in each year and dc is a dummy variable which takes on the value of 1 in the years 1993 to 1995 if *t*=1, in the years 1993 to 1996 if t=2 and 1993 to 1997 if t=3 to account for the fact that there is no adjustment for administratively caused recoding of enterprises before 1996 (see above)[4]).

[4]) $Empl_Y$ is calculated for every subgroup of employees except fort he tenure subgroups (*c*<1 and *c*>=1). For the tenure subgroups I use the total Employment growth for the subgroup characterised by *X*, because I do not intend to filter out the change in the composition of employment, which could be part of the trend I want to observe.

We estimate both versions for all subgroups of employees; it turns out that the additional independent variables are helpful only in very few cases.

Results

In this chapter we will give a short overview over the levels of retention rates (the probability of those who had a job at Y to stay in this job at least until Y+t). Job stability shows remarkable differences between groups of employee. We will point out the most striking results, compare these – where possible – to results for the United States and have a first look at changes over time. Since the main focus of this paper is on the question if and for whom job stability changed during the last decade or if and for whom it stayed unchanged, we present the results of the trend regressions in the second part of this chapter. There are a number of reasons that might lead to changed or unchanged job stability and a causal analysis of these reasons is beyond the focus of this paper and is up to further research. We will give some interpretation of the results where possible. It is often claimed based on anecdotic evidence that careers tend to get more discontinuous. The objective of this analysis is to examine if there has actually occurred any change (decrease) in job stability.

Aggregated job stability in Austria

Austria often serves as an example for a strongly regulated labour market (see e.g., Stiglbauer et al. (2003)). One aspect of labour market regulation is a limitation of the possibility to terminate employment contracts. Such a regulation would reduce the risk for employees to lose a job and impose additional labour reallocation costs to enterprises and so reduce labour market flexibility and probably increase job stability. Since the regulation of termination of employment relationships is not very restrictive in Austria for most of the employees in private contracts, we would not expect jobs to be more stable than in comparable countries. The relative importance of tourism and the construction sector in the Austrian economy and the highly seasonal employment behaviour of this industries might even result in a relatively large share of short term employment relationships and therefore in a low level of job stability. Indeed Austria seems to have relatively high fluctuation and consequently low job stability in those parts of the labour market where employers predominately hire on a short term job basis, while in other parts of the labour market job stability is very high. As we will see below, sectors such as construction and the hotel and restaurant industry play an important role explaining this fact.

Job-retention rates for all employees

Roughly three quarters of the employment relationships registered on a reporting day continue for at least one more year while one quarter ends during this year. Around 61 percent of the jobs still exist two years later and slightly more than a half 3 years later. Compared to figures from the United States, this appears as an indication for high instability

on the Austrian labour market. Neumark et al. (1999) find similar retention rates for a 4 years time span (*t*=4) as we find for the 3 years span. But these results are of limited comparability since the analysis is based on very different types of data. Most importantly administrative data tend to show more discontinuation than survey data, because in surveys subjective ex-post assessment might smooth career paths with short interruptions and because in administrative data changes in registration might, in spite of the adjustments done, still contain some only administratively caused changes in employment relationships. Further and more detailed comparison between the datasets would be necessary to be able to compare results more adequately.

Jager and Stevens (1999) use a different concept of measuring job stability: They look at tenure with an employer and observe the duration of an employment relationship from a reporting day back to the beginning date of a job. In many instances retention rates and rates of employees with higher tenure than a certain time span produce similar results. Jager and Stevens find a share of short term employed (tenure not more than one year) men of about 20 percent and women of about 25 percent. Comparing these results to the Austrian figures, job stability of women is similar and that of men is higher than that in United States. It has to be emphasized again that the figures for the United States are based on survey data and, as mentioned above, different methods for measuring job stability are used. Both factors limit the comparability of stability measures.

In contrast to the results for the United States, in Austria retention rates for women are higher than those of men. High short term employment shares of men are the reason for this discrepancy, while retention rates conditional on being in the same job one year after the reporting day are similar for women and men, with slightly growing advantage in job stability for men with growing tenure (see also Huber et al. 2000). A first glance on the time series does not show very obvious changes in job stability for the overall figures and for women. Employment relationships of men seem to get slightly more instable: for example the higher stability in the three year span for men compared to women over the period until 1996 disappeared and men show lower retention rates afterwards. The difference between men and women job stability increased most in the one year span, which indicates that the probability of men to lose their jobs within a year (after the reporting day) increased (see below the discussion of trend regressions).

Table 1: Retention rates: full sample, women and men

	c: all values X: all values			c: all values X: women			c: all values X: men		
Y:\t:	1 year	2 years	3 years	1 year	2 years	3 years	1 year	2 years	3 years
1993	73.82	61.17	51.85	74.42	61.02	51.38	73.41	61.28	52.17
1994	73.66	61.08	52.55	74.59	61.71	52.23	73.01	60.64	52.77
1995	73.62	61.95	52.80	74.98	62.25	52.72	72.66	61.74	52.86
1996	74.67	62.26	53.02	75.46	62.70	53.00	74.11	61.94	53.03
1997	74.38	61.99	52.80	75.87	62.95	53.27	73.32	61.31	52.46
1998	73.98	61.65	52.21	75.05	62.25	52.47	73.19	61.20	52.03
1999	73.64	60.94	52.03	74.78	61.63	52.41	72.79	60.43	51.75
2000	72.84	60.70	51.82	74.11	61.52	52.83	71.88	60.07	51.39
2001	73.45	61.32	-	74.71	62.09	-	72.47	60.71	-
2002	74.02	-	-	75.36	-	-	72.96	-	-

S.: Own calculations on the basis of the social insurance records database of the Austrian Federation of Social Insurance Institutions. Note: retention rates mean that … percent of the employees on the reporting day in year Y keep their job for at least t (t= 1, 2, 3) more years.

Retention Rates for subgroups of employees

In the following part of this chapter we will show retention rates for subgroups of employees: for three age-groups and sex, for two tenure groups and sex and for 9 industries. It will turn out that retention rates differ considerably between these groups and even though overall job stability has not changed a lot it certainly did so in certain subgroups.

Age groups

The retention rates are calculated for three age-groups: young employees under 25 years, employees aged 25 to 44 years and employees 45 or more years old. Consistent with other studies (see e.g., Farber 1999, Neumark et al. 1999, Huber et al. 2000) job stability grows with age. Integration into internal labour markets, implicit contracts, accumulation of firm or job specific human capital and work experience increase the opportunity costs of separation for employers and for employees. These factors like further individual characteristics that reduce mobility (home ownership, family foundation etc.) are more likely to apply to older employees or are usually becoming more important with age.

About 40 percent of the under 25 years old workers registered as employed at a reporting day lose their job within a year, another 18 percent between one and two years and another 12 percent between two and three years. Three years after the reporting day only about 30 percent of the employment relationships registered on this day have still continued. As in the overall figures job stability for women is slightly higher than for men under the age of 25 years. Looking at the development over time there seems to be a trend to lower retention rates (lower job stability) for men and even stronger for women at least since 1996 (see below the discussion of trend regressions).

The retention rates for employees between 25 and 44 years of age are slightly above the overall rates. Men are evidently more often in very short term jobs than women (see the lower retention rates of men in the one year span), while they show slightly higher job stability once they have kept their job more than one year. No apparent trend is observed throughout the 10 years period. From 1997 or 1998 onward a reduction in retention rates seems to occur; however, due to the short time period the evidence is still too weak to claim this to be a longer term development; figures for 2001 and 2002 show already slightly increasing rates.

Job stability for older employees is higher than that of the younger age groups. 80 percent of the jobs registered on a reporting day continue at least for one year, about 68 percent for two years and 58 percent for three years. Women again show higher job stability than men. Job terminations in this age group often imply the end of labour market participation. They are often followed by retirement, by receipt of sick-benefits or – usually in the case of involuntary job loss – by (long term) unemployment. As reintegration in the labour market is especially difficult for older workers, the share of voluntary job suspensions will be lower than for younger workers. Since flows into retirement play an important role for job terminations in this age group, changes of the regulation of the pension system and demographic factors (changes in the size of age cohorts by year of birth) and change in the employment rates (e.g., raising employment participation of women in younger age classes of the over 44 years but under 55 years old) may have influenced the job retention rates. Since the probability of job termination rises as people reach retirement age the job stability in the highest age group is very heterogeneous because stability is very high for people below this age and of course very low for older ones.

Jobs for female employees older than 44 years seem to have grown more stable during the 10 year period we observe while jobs for male employees show decreasing stability. Overall this implies fairly unchanged job stability for the over 44 years old employees.

The fact that female cohort-size in the average retirement age of 59 years (ASVG pension) reached their maximum in 1999 and decreased in the following years, after a rather constant development and a rise from 1996 to 1999, partly explains the pattern of stabilising employment situation of women over the age of 44; still, further explanations are needed. The employment rates of women in the age of 45 to 54 went up by 9 percentage points from 1993 to 2002 while that of women at the age of 55 and older rose "only" 7 percentage points. Since the group of employees below the retirement age, which is usually in rather stable employment situations, grew faster then the one of employees 55 years and older, job stability should rise[5]).

[5]) Average retirement age of employees under the regulation of ASVG are taken from the Federal Ministry of Social Affairs which takes it from the Federation of Austrian Social Insurance Institutions (HV). The source of demographic data is Statistic Austria and the Employment rates are calculated by WIFO using data from HV and Statistics Austria.

Table 2a: Retention rates: under 25 years old, women and men

	c: all values X: under 25 years old			c: all values X: under 25 years old women			c: all values X: under 25 years old men		
Y:	t=1 year	2 years	3 years	1 year	2 years	3 years	1 year	2 years	3 years
1993	61.28	43.57	31.26	63.60	46.04	34.17	59.31	41.46	28.78
1994	61.10	44.15	32.28	63.64	47.38	35.17	58.98	41.46	29.86
1995	61.96	45.55	32.97	65.24	48.31	35.84	59.25	43.26	30.59
1996	63.00	45.81	32.51	64.52	47.77	34.83	61.73	44.16	30.57
1997	62.68	44.75	31.25	64.90	47.17	33.79	60.89	42.79	29.19
1998	60.80	43.10	29.49	62.18	44.61	30.95	59.69	41.89	28.31
1999	59.99	41.58	29.29	61.22	42.50	30.62	58.99	40.82	28.22
2000	58.48	41.35	29.43	59.20	42.38	30.82	57.89	40.50	28.29
2001	59.29	42.45	-	60.55	43.78	-	58.24	41.35	-
2002	60.61	-	-	61.66	-	-	59.72	-	-

Table 2b: Retention rates: 25 to under 45 years old, women and men

	c: all values X: 25 to under 45 years old			c: all values X: 25 to under 45 years old women			c: all values X: 25 to under 45 years old men		
Y:	t=1 year	2 years	3 years	1 year	2 years	3 years	1 year	2 years	3 years
1993	75.33	64.32	56.60	76.20	64.46	56.26	74.74	64.24	56.83
1994	75.08	63.91	56.85	76.37	64.63	56.56	74.21	63.43	57.04
1995	74.89	64.49	56.88	76.33	64.81	56.67	73.88	64.27	57.03
1996	75.74	64.68	57.11	76.89	65.28	57.02	74.93	64.27	57.18
1997	75.51	64.64	57.24	77.20	65.47	57.29	74.30	64.03	57.21
1998	75.43	64.64	56.37	76.54	64.84	56.02	74.60	64.49	56.63
1999	75.22	63.52	55.61	76.22	63.82	55.28	74.46	63.29	55.85
2000	74.00	62.76	54.98	75.32	63.61	54.89	72.98	62.45	54.98
2001	74.47	63.31	-	75.44	63.53	-	73.71	63.14	-
2002	75.03	-	-	76.40	-	-	73.95	-	-

Table 2c: Retention rates: 45 years and older, women and men

	c: all values X: 45 years and older			c: all values X: 45 years and older women			c: all values X: 45 years and older men		
Y:	t=1 year	2 years	3 years	1 year	2 years	3 years	1 year	2 years	3 years
1993	80.34	68.03	57.51	80.42	67.10	56.24	80.30	68.63	58.32
1994	79.69	67.18	57.83	79.85	67.20	56.82	79.59	67.16	58.48
1995	78.83	67.59	57.36	79.59	67.36	56.93	78.34	67.74	57.64
1996	79.93	67.61	57.31	80.38	67.99	57.38	79.63	67.37	57.26
1997	79.19	66.93	56.43	80.50	68.19	57.65	78.33	66.11	55.63
1998	78.92	66.50	57.10	80.43	68.35	59.00	77.92	65.28	55.84
1999	78.40	66.96	57.90	80.52	69.36	60.34	76.97	65.34	56.25
2000	78.98	67.83	58.39	81.19	70.39	60.64	77.44	66.06	56.82
2001	79.36	67.88	-	81.84	70.27	-	77.58	66.16	-
2002	79.18	-	-	81.14	-	-	77.72	-	-

S.: Own calculations on the basis of the social insurance records database of the Austrian Federation of Social Insurance Institutions. Note: retention rates mean that … percent of the employees on the reporting day in year Y keep their job for at least t (t= 1, 2, 3) more years.

The situation of men changed in a different way compared with women. Until 1998 with respect to men greater changes in the size of age-cohorts occurred; since then it rose and reached about 70 percent higher values in 2002 for the average male retirement age (ASVG

pension) of around 62. Changing public pension regulations concerned retirement age as well: in 1993 the average retirement age was 62.5; it fell to just below 61 years in 1994, stayed around that age until 2000 and rose, as a consequence of the pension reform 2000, back to 62.2 percent in 2001 and 62.8 percent 2002. The employment rates of men between the age of 45 and 54 fell by about 3 percentage points between 1993 and 2002 and that of men at the age of 55 or more rose by about 5 percentage points. The developments in demography and employment rates make the negative trend in job stability more plausible since both resulted in a reduced importance of the group with high job stability within the group of the men over the age of 44. Changes in retirement age and the introduction of a pension scheme for workers with reduced employability due to health handicaps during the year 1993 and its abolition in 2000 might be responsible for the high retention rates 1993 and 2002.

All together the diversity in the development of employment rates between age-cohorts within the highest age-group seems to have a considerable influence on the measures of job stability.

Job tenure groups

Job tenure prior to the registration as employed on the reporting day is an important factor explaining differences in the probability of a job termination. This variable could be interpreted as an indication of segmentation of the labour market into hire and fire segments and stable segments with longer term employment expectations. Huber et al. (2002) show that instable employment relationships concentrate both, on certain employees, and on certain employers. While job durations for already stable employed do not differ very much across types of enterprises, the application of hire and fire policies in the short term employment segment differs a lot. Since it turns out that after the first year in a job the probability of a job termination decreases significantly we use this bound for dividing two tenure groups. At the same time using only two tenure groups makes the presentation less complex. As expected, it turns out that higher job tenure at a reporting day corresponds with lower probability of a job loss in the following periods.

More than 50 percent of the employees who started their job in the year before the reporting day lose or terminate their job in the following year, men again more often than women.[6] Only 25 percent of the male and 30 percent of the female employees keep their job for at least three years. The age group composition of the two tenure groups of course is partly responsible for the difference in retention rates, but only about 10 percent of the difference is due to this composition effect. Huber et al. (2002) show that the positive correlation between age and job stability nearly disappears within the low tenure group. At the same time there seems to be a clear trend to even more instability for this group of employees: Retention rates go down about 4 percentage points from 1993 to 2002, both for women and men.

[6]) Note that separation rates in percent are 100 minus retention rates.

Employees with job tenure of at least one year on the reporting day show significantly different figures. About 83 percent of the employees of this group keep their jobs for at least one other year, more than 70 percent for at least two more years and over 60 percent more than three additional years. Interestingly – and consistent with our observation of retention rates for men and women in the age-group between 25 and 44 years – retention rates for women are below those of men in the higher tenure group. This means that while men have lower job stability in the low tenure segment, they are more stably employed in the more stable labour market segments than women. When looking at the time series, there seems to be some growth of job stability among women in the higher tenure group.

Table 3a: Retention rates: previous job tenure less than a year, women and men

	c: <1			c: <1			c: <1		
	X: all values			X: women			X: men		
Y:	t=1 year	2 years	3 years	1 year	2 years	3 years	1 year	2 years	3 years
1993	50.85	38.88	31.29	55.08	42.25	33.60	48.04	36.63	29.76
1994	49.33	36.88	29.33	54.47	41.75	32.62	45.87	33.61	27.11
1995	47.47	35.56	27.90	52.62	39.79	30.93	43.96	32.68	25.84
1996	47.53	35.16	27.10	52.72	39.83	30.47	44.06	32.05	24.85
1997	47.89	35.47	27.32	53.98	40.87	31.57	43.69	31.75	24.39
1998	47.99	35.76	25.81	52.58	39.66	29.18	44.72	32.98	23.41
1999	46.99	34.44	26.65	51.79	38.30	29.40	43.53	31.66	24.66
2000	46.61	34.33	26.82	51.84	38.54	29.85	42.72	31.20	24.57
2001	47.06	35.08	-	53.17	38.77	-	43.18	32.27	-
2002	46.97	-	-	52.18	-	-	43.13	-	-

Table 3b: Retention rates: previous job tenure a year or more, women and men

	c: >=1			c: >=1			c: >=1		
	X: all values			X: women			X: men		
Y:	t=1 year	2 years	3 years	1 year	2 years	3 years	1 year	2 years	3 years
1993	82.81	69.89	59.89	81.70	68.09	58.08	83.59	71.17	61.17
1994	82.87	70.24	61.33	82.00	69.05	59.44	83.48	71.07	62.67
1995	82.92	71.34	61.65	82.72	70.02	60.26	83.06	72.27	62.64
1996	84.15	71.72	62.07	83.10	70.31	60.50	84.97	72.74	63.21
1997	83.38	71.00	61.45	83.38	70.25	60.45	83.58	71.55	62.18
1998	83.35	70.98	61.74	82.97	70.22	60.68	83.63	71.55	62.51
1999	83.33	70.58	61.27	82.95	69.92	60.58	83.62	71.08	61.78
2000	82.76	70.66	61.26	82.41	70.09	60.78	83.02	71.10	61.36
2001	83.32	71.13	-	83.01	70.68	-	83.57	71.49	-
2002	83.48	-	-	83.11	-	-	83.78	-	-

S.: Own calculations on the basis of the social insurance records database of the Austrian Federation of Social Insurance Institutions. Note: retention rates mean that … percent of the employees on the reporting day in year Y keep their job for at least t (t= 1, 2, 3) more years.

Industry affiliation

Job stability varies strongly between industries. Industries like construction or hotels and restaurants are partly exposed to seasonal changes in demand and therefore adjust the size of their staff to these patterns. Albeit the extent to which personnel change is practiced is not only explainable by seasonality. Not many more than 20 percent of the employees in hotels

and restaurants on the reporting day keep their job for three or more years, in the construction sector only 30 percent.

Table 4a: Retention rates: industry affiliation

	c: all values X: manufacturing			c: all values X: construction			c: all values X: wholesale and retail trade		
Y:	t=1 year	2 years	3 years	1 year	2 years	3 years	1 year	2 years	3 years
1993	78.55	65.50	54.92	55.57	41.53	31.31	75.08	59.10	47.37
1994	78.26	64.80	55.63	54.08	38.73	31.03	73.19	57.57	46.89
1995	77.27	65.17	56.43	51.64	39.79	31.43	72.43	57.72	46.92
1996	79.35	67.53	57.91	54.24	41.05	32.08	73.77	58.54	47.13
1997	80.00	67.60	57.91	55.15	41.25	31.87	73.82	58.29	47.16
1998	79.04	66.80	57.34	54.51	40.38	31.33	73.06	57.79	46.81
1999	79.19	67.01	56.88	53.51	40.02	30.91	72.95	57.55	47.79
2000	78.96	65.90	57.45	53.58	39.87	31.35	72.60	58.81	48.50
2001	78.23	67.22	-	53.68	40.82	-	74.70	60.14	-
2002	80.56	-	-	54.10	-	-	74.70	-	-

Table 4b: Retention rates: industry affiliation

	c: all values X: hotels and restaurants			c: all values X: transport, storage and communication			c: all values X: financial intermediation		
Y:	t=1 year	2 years	3 years	1 year	2 years	3 years	1 year	2 years	3 years
1993	41.83	28.89	21.25	80.62	70.33	63.38	86.90	78.73	71.88
1994	41.08	28.71	21.16	79.70	70.36	63.98	87.16	79.55	71.97
1995	42.03	29.56	21.96	80.89	72.22	57.20	87.49	79.51	72.42
1996	42.30	29.98	21.35	81.12	63.44	57.24	88.51	77.49	65.03
1997	42.70	29.17	21.35	71.87	63.52	56.56	87.20	72.42	65.42
1998	41.51	28.89	20.75	79.70	69.49	56.09	86.97	73.02	64.27
1999	41.91	28.80	21.61	78.39	61.89	53.79	81.54	75.85	64.88
2000	41.53	29.41	21.85	71.62	60.83	53.26	85.00	71.79	64.64
2001	43.19	30.09	-	75.66	64.87	-	82.28	73.20	-
2002	42.12	-	-	77.35	-	-	87.01	-	-

Table 4c: Retention rates: industry affiliation

	c: all values X: Real estate, renting and business activities			c: all values X: public sector			c: all values X: other personal service activities		
Y:	t=1 year	2 years	3 years	1 year	2 years	3 years	1 year	2 years	3 years
1993	74.62	58.58	48.71	85.58	75.96	68.63	72.79	58.82	49.60
1994	71.22	57.26	48.56	84.98	76.01	69.22	73.55	58.08	48.52
1995	71.50	58.37	48.97	85.72	77.31	70.39	70.86	59.63	50.50
1996	72.29	58.03	48.65	86.82	78.38	70.96	72.23	58.97	49.43
1997	70.76	56.73	46.85	86.99	78.11	69.98	72.30	59.02	49.25
1998	69.09	54.59	43.71	86.32	76.78	69.89	72.44	59.10	48.91
1999	68.00	52.09	42.93	85.00	76.69	69.38	71.28	57.35	48.61
2000	65.13	51.09	42.45	86.35	77.38	67.14	69.72	57.38	48.89
2001	66.26	52.47	-	85.32	73.54	-	71.50	59.40	-
2002	67.85	-	-	82.83	-	-	73.51	-	-

S.: Own calculations on the basis of the social insurance records database of the Austrian Federation of Social Insurance Institutions. Note: retention rates mean that … percent of the employees on the reporting day in year Y keep their job for at least t (t= 1, 2, 3) more years.

Public services and (former) protected sectors show the greatest job stability. Less than 20 percent of the employees on a reporting day leave or lose their job within the following year in the public service sector, the transport, storage and communication sector (which includes postal services and telecommunication) and the financial intermediation sector.

More than two thirds of the employees in the public service sector are still in the job after three years, in the financial intermediation sector nearly as much. On the opposite, in wholesale and retail trade as well as in business or private personal services less than half of the employees keep their job for three years or more. The manufacturing sector lies between these sectors with job stability somewhat above the average.

The real estate, renting and business activities sector shows a clear trend to less stable employment relationships. Here retention rates went down from 65 to 58 percent in the one year span. In wholesale and retail trade the development of the retention rates in the 2 or 3 years span suggests a slight increase in the stability of employment relationships. However, low hours jobs whose rising share should be taken into account (see Huber, Huemer 2004), could not be included in our dataset since they are not covered by full social insurance liability. These jobs are usually very instable. In other industries trends seem to be less obvious, if any.

Trends in job stability

The question whether or not job stability changes over time will be analysed in more detail In the now following part. As mentioned above two specifications of (linear) trend regressions were estimated for all the subgroups under investigation (see equations (2) and (3)). The dependent variable is the probability of a job termination until t conditional on job continuation until t-1. Since there are only 10 observations in the time series for the one year span, 9 for the two year and 8 for the three year span, degrees of freedom and therefore the potential for using further independent variables are limited. It will turn out that the second specification with a dummy variable and a variable for employment growth is useful mainly for subgroups and time spans with rather low levels of job stability. This is reasonable, since external labour markets are expected to react to the business cycle. Our correction for administrative changes in enterprise codes links two (shorter) parts of an employment relationship. Without such a correction two shorter episodes remain in the data, eventually influencing the values of the retention rates in the shorter spans negatively (and separation rates positively). This problems occurs in the data until 1995, for the correction could only be done since 1996. The longer spans of conditional separation rates should be affected less, because the likelihood of falling in groups with higher tenure is lower for split (and therefore shorter) episodes.

Confirming the picture that appeared when looking at the retention rates, the trend regressions further strengthen the following theses:

- There is no trend to lower job stability in stable labour market segments, neither for women nor for men.
- Job stability decreased and the short term job segment rose for young employees and employees with job tenure less than one year.
- Women with longer job tenure show a trend to higher job stability
- Enterprises in the industry that shows the highest employment growth during the period considered, the real estate, renting and business activities, offer a growing share of low stability jobs while conditional on job continuation for one year, stability does not change over time.

Trends in overall job stability

Trend regressions on separation probabilities in *t* conditional on continuation until *t*-1 as defined above show no significant trend in the first specification for none of the three time spans observed. In the second specification there is a significant increase in separation rates for the one year span[7] and no significant trend for the spans reflecting longer continuation of jobs (see Table 5 for the trend coefficients or the appendix for detailed estimation results). As it will turn out in the subgroup results for the one year span the second specification seems most relevant and especially the 1993 to 1995 dummy is often significant with positive coefficients reflecting higher separation rates in this years.

Separate estimations for women and men of the trend regression in its second specification reflect that jobs of male employees get slightly more instable within the one year span.[8] The one year span covers a high fraction of short term jobs, because jobs with high job tenure on the reporting day show also high stability afterwards. For jobs lasting longer than a year counted from the yearly reporting day no significant change in stability occurs for men. For women job stability seems to change in the high tenure segment9, there the stability increases while no change occurs in the one year span.

[7]) Results presented in table 5 and the appendix show a point estimate for the coefficient of 0.002, which means an increase in separation rates within the first year after the reporting day by 0.2 percentage point each year. The coefficient is significant on the 5 percent level and the estimated equation passes the F-test.

[8]) Table 5 shows a point estimate for the trend variable in the second specification of 0.003, significant on the 5 percent level.

[9]) Table 5 shows in the first specification the coefficient (–0.002) is significant only on the 10 percent level, in the second specification the trend coefficient is insignificant but similar to that of the first specification.

Decreasing job stability for young employees

Trend estimations for employees under the age of 25 years reflect a significant trend towards lower job stability in the one year span[10]). Coefficients for the two and three year span are also positive but insignificant. Interestingly this result is even clearer for women than for men: women have higher and in both specifications significant trend coefficients in the one year span, and point estimates are also positive and are significant on the 10 percent level for the following time spans (see Table 5). For men the coefficient of the trend variable is significant only in the second specification and for the one year span.[11]

At most slightly decreasing job stability for employees between 25 and 44 years

Results of the trend regressions for (conditional) separation rates for the middle age-group are somehow similar to that of the younger group but trends are not as strong and clear as in the younger age-group and concentrate more on the short term job segment. For women, men, and the whole age-group the trend coefficients in the second specification for the one year span are positive and significant on the 5 percent level (point estimate: 0.002 for all three estimations, see Table 5) but F-tests are insignificant (see estimation results in the appendix). In the first specification there are positive but insignificant coefficients. This result can be interpreted at most as an indication for a slight reduction in job stability since 1996 in the one year span.

There is no significant change in job stability for men in the two and three years span, which means that for more stable jobs the probability of job termination did not change. For women there is in the first specification a significant trend to less stable jobs in the three years span which is caused by an increase in (conditional) separation rates from 1998 to 2000. In the second specification the dummy variable covers this effect and the trend variable stays insignificant. In the full sample estimate for the middle age-group the trend variables in the two specifications are contradicting and it is more useful to interpret the differing results for the two sexes.

No overall change in job stability of employees older than 44 years

As argued above job stability of the highest age-group depends strongly on factors like change in employment participation, regulation of old age pension, and demography. The obvious trend to higher job stability for women of this age-group is confirmed by the trend regressions. As significant reductions in separation rates are observed in the first specification for all three time spans and estimates for the second specification at least do not contradict

[10]) Point estimate: 0.004 in the second specification (5 percent significance level) and 0.003 in the first specification (10 percent significance level).

[11]) Again it turns out that the second specification is not very useful for the two and three year time span.

these results, increasing stability for women of this age group can be concluded. The over average increase in employment rates of younger subgroups of this age-group and higher retirement age since 2000 might be partly responsible for this results.

Table 5: Linear trend coefficients for separation rates 1993-2002

Group	Time span: one year		Time span: one to two years		Time span: two to three years	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Full sample	0.000	0.002**	0.000	-0.001	0.000	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Women	0.000	0.001	-0.001	-0.001	-0.002*	-0.003
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)
Men	0.001	0.003**	0.000	0.000	0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
under 25	0.003*	0.004**	0.002	-0.002	0.004	0.001
	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)	(0.005)
Women	0.005**	0.005*	0.003*	-0.002	0.004*	-0.004
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.004)
Men	0.001	0.004**	0.001	-0.003	0.003	0.002
	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.005)
Age-group: 25 to under 45	0.001	0.002**	0.001	0.002	0.001*	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Women	0.001	0.002**	0.001	0.001	0.002**	0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Men	0.001	0.002**	0.001	0.002	0.002	-0.003
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Age-group: 45 and older	0.001	0.001	-0.001	-0.003	-0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Women	-0.002***	-0.001	-0.003***	-0.004**	-0.004***	-0.001
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Men	0.003***	0.002*	0.000	-0.001	0.000	-0.003
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)

Note: Coefficients are taken from estimations presented in detail in the appendix. Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

For men the result is similar to that of the other age groups: significant change in job stability appears only in the one year span, confirming the conclusion that short term jobs of men got even less stable during the last decade. The trend coefficient of the first specification is significant on the 1 percent level (point estimate 0.003) that of the second specification only on the 10 percent level (point estimate: 0.002).

Concluding the results for women and men in the age-groups, female employees have overall constant job stability with some increase in stability for higher tenure jobs. While job stability for younger women decreases significantly and also hat of women between 25 and 44 years decreases slightly that in the age-group over 44 years increases considerably. Higher

job stability in the later careers of women compensates the trend to lower stability in the younger age-groups.

In contrast men's job stability decreased in the short term job segment (in the one year span estimates), which means that this segment grew larger. No significant change occurred in longer tenure jobs, as soon as job duration (measured from the reporting day) exceeds one year.

Increasing instability in new jobs

Looking at the job tenure at the reporting day, those jobs started within a year before this day are by far less stable than those with longer tenure and their job stability even decreased during the 10 year period.

Trend coefficients in the first specification are significant at the 5 percent level in the first specification for the one and the two year span (point estimate: 0.003 for the one year span, and 0.002 for the two year span, see Table 6 for the trend coefficients and the appendix for the detailed estimation results). In the second specification coefficients are of the same size but insignificant. Also coefficients for the three year span are insignificant. This means that the separation rate for job started in the last year before the reporting day increased. Only if jobs survive from for another two years from the reporting day, the chance to keep the job for one year more did not change.

Similar to results shown before, jobs for men get less stable when only looking at the one year span, while for jobs filled by women separation rates increase also in the two year span.

No change in job stability of higher tenure jobs for men, increasing stability for women

While no significant trend occurs in overall job stability of jobs with at least one year tenure on the reporting days, for women stability in this higher tenure jobs increased: In the first specification of the trend regression for women trend coefficients are negative and significant for all time spans and in the second only the trend coefficient for the one year span is insignificant. This strongly supports the hypothesis that job stability for women increased in the higher tenure job segment. For men job stability did not change, only in the one year span there is a positive trend coefficient significant on the 10 percent level in the second specification.

Taking into account that job stability decreases for short tenure jobs of women, the heterogeneity in stability of female employment is apparently growing: more stability in long term jobs and rising instability in the short term segment. Overall job stability in higher tenure jobs did not increase significantly.

Table 6: Linear trend coefficients for separation rates 1993-2002

Group	Time span: one year		Time span: one to two years		Time span: two to three years	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Tenure less than a year	0.003***	0.003	0.002**	0.002	0.005	-0.001
	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.009)
Women	0.003**	0.002	0.004***	0.006**	0.004	0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.006)
Men	0.004***	0.003	0.001	0.001	0.007	-0.002
	(0.001)	(0.002)	(0.002)	(0.004)	(0.005)	(0.011)
Tenure one year or more	0.000	0.001*	-0.001	-0.001	-0.001	-0.002
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)
Women	-0.001*	0.000	-0.002**	-0.003**	-0.002***	-0.002*
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Men	0.000	0.002*	0.000	0.000	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)

Note: Coefficients are taken from estimations presented in detail in the appendix. Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Growing instability of short term jobs in Real estate, renting and business activities

In the following we will add results of the linear trend regression for different groups of industries. In most industries the coefficient of the linear trend variable is insignificant (see Table 7 for the trend coefficients and the appendix for the detailed estimation results). A clearly positive trend in separation rates (increasing instability) can be recorded for the one year span in jobs of the Real estate, renting and business activities, the sector with the most dynamic employment growth during recent years. The probability of job termination increased around 1 percentage point each year. This dramatic increase in instability affects only jobs, ending before the first year after a reporting day, which means that the share of short term jobs is rising.

In none of the other industries significant trends to more job instability are identified. The estimations for transport, storage and communication and public services report positive trend coefficients for all time spans and specifications but none of them is significant because the spread of the separation rates is high. In these sectors structural changes have taken place during the period we observed (e.g., the liberalisation of postal services and telecommunication, or privatisation of public services). In consequence it is incalculable (to some extent) how these changes are reflected in the administrative social security data.

Table 7: Linear trend coefficients for separation rates 1993-2002

Group	Time span: one year		Time span: one to two years		Time span: two to three years	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Production	-0.002	0.000	-0.002	-0.003	-0.002	-0.006
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)
Construction	0.001	0.000	-0.001	0.003	0.000	-0.003
	(0.001)	(0.002)	(0.002)	(0.004)	(0.002)	(0.008)
Wholesale and retail trade	0.000	-0.001	-0.002**	-0.004**	-0.003**	-0.004
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.004)
Hotels and restaurants	-0.001	0.000	0.000	-0.005**	-0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.006)
Transport, storage and communication	0.006	0.002	0.005	0.023	0.004	-0.046*
	(0.004)	(0.009)	(0.005)	(0.013)	(0.007)	(0.019)
Financial intermediation	0.004	0.005	0.004	-0.005	0.004	0.003
	(0.002)	(0.004)	(0.005)	(0.010)	(0.004)	(0.009)
Real estate, renting and business activities	0.009***	0.010***	0.002	0.001	0.003	-0.001
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.004)
Public services	0.002	0.006***	0.002	0.005	0.003	0.009
	(0.001)	(0.002)	(0.002)	(0.004)	(0.002)	(0.006)
Other personal service activities	0.001	0.000	-0.002	-0.002	-0.001	-0.002
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.003)

Note: Coefficients are taken from estimations presented in detail in the appendix. Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Significant linear trends to higher job stability can be identified only for jobs lasting longer than one year (from the reporting day) in the wholesale and retail trade sector[12]). This result suggests increasing segmentation between high tenure jobs and short term employment contracts in this sector, since results from Huber and Huemer (2004) show that the number of small hour jobs has been increasing rapidly in wholesale and retail trade in recent years.

Conclusions

A trend to more flexibility on the labour market is often stated but rarely analysed in detail. Results of a broad discussion of job stability in the United States in the end of the 1990s suggest that overall job stability did not change significantly during the last decades, while decreasing stability could be found for some subgroups of employees.

[12]) The single significant trend coefficient in the second specification for the two year span in hotels and restaurants should not be interpreted, since not even the F-test is passed and the other estimations for this sector do not show similar results.

Using administrative data from social security records from 1993 to 2003 this paper tries to answer the question if job stability changed in recent years and if so for whom. Similar to Studies in the United States we calculate in a first step retention rates and separation rates for employment relationships. We do this for each year from 1993 to 2002 and employ a longitudinal dataset. In a second step we use this measure of job stability to identify significant linear trends.

Results suggest that there is a slight increase in job instability that concentrates on the very short term job segment of the Austrian labour market. As soon as employment relationships last longer than one year, their stability does not change measured on average.

Trends in job stability are quite diverse looking at subgroups of employees. For women segmentation between stable employment relationships and short term jobs seems to increase, since for young women and low tenure jobs stability decreases, starting from already low levels of stability. For women over the age of 44 and for women in higher tenure jobs job stability increases.

For men the short term job segment increases, which means that job stability decreases. However, for jobs that continue for more than a year job stability does not change significantly.

Looking at industries the decrease in job stability in real estate, renting and business activities, which is the fastest growing industry in Austria, is most striking.

The discussion of job stability in the economic literature lacks causal interpretability since job termination may have very different reasons: quits, lay offs, retirement etc. The aim of these studies is to investigate the changes that occurred over time. Further research is needed to find how changes in job stability come about. Such studies will have to concentrate on certain subgroups and on certain types of job termination. As it turns out that change in job stability mainly affect new jobs, further research on job stability could also concentrate on a more detailed analysis of trends in the stability of new jobs.

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Appendix

Trend regressions: Full sample and for women and men

Table A1: Trend regression for the full sample

Dependent variable: Separation Rate *S(t)*	c: all values X: all values t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	0.56	6.86	0.07	0.84	0.01	1.43
Prob > F	0.474	0.023	0.804	0.526	0.916	0.358
R-squared	0.066	0.774	0.009	0.336	0.002	0.518
Adj. R-squared	-0.051	0.662	-0.132	-0.062	-0.164	0.157
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.000	0.002**	0.000	-0.001	0.000	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Dummy (d_c)		0.009**		-0.003		-0.013
		(0.003)		(0.006)		(0.007)
Employment growth (*Empl*$_Y$)		0.004**		0.002		-0.005
		(0.001)		(0.002)		(0.002)
Constant	0.260***	0.248***	0.168***	0.170***	0.147***	0.167***
	(0.004)	(0.004)	(0.003)	(0.009)	(0.003)	(0.011)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A2: Trend regression for women

Dependent variable: Separation Rate *S(t)*	c: all values X: women t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	0.04	4.91	2.08	1.03	5.71	1.98
Prob > F	0.841	0.047	0.192	0.456	0.054	0.259
R-squared	0.005	0.711	0.229	0.381	0.488	0.598
Adj. R-squared	-0.119	0.566	0.119	0.010	0.402	0.296
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.000	0.001	-0.001	-0.001	-0.002*	-0.003
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)
Dummy (d_c)		0.009*		-0.004		-0.011
		(0.004)		(0.005)		(0.010)
Employment growth (*Empl*$_Y$)		0.003**		0.001		-0.003
		(0.001)		(0.002)		(0.003)
Constant	0.251***	0.239***	0.175***	0.179***	0.159***	0.176***
	(0.004)	(0.005)	(0.003)	(0.008)	(0.003)	(0.016)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A3: Trend regression for men

Dependent variable: Separation Rate *S(t)*	c: all values X: men t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	2.45	4.87	0.06	0.99	0.52	2.28
Prob > F	0.156	0.048	0.814	0.470	0.498	0.222
R-squared	0.235	0.709	0.009	0.372	0.080	0.631
Adj. R-squared	0.139	0.564	-0.133	-0.005	-0.074	0.354
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.001	0.003**	0.000	0.000	0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Dummy (d_c)		0.010*		-0.002		-0.014
		(0.005)		(0.008)		(0.008)
Employment growth (*Empl*$_Y$)		0.003		0.004		-0.006*
		(0.002)		(0.003)		(0.003)
Constant	0.265***	0.253***	0.163***	0.163***	0.140***	0.162***
	(0.004)	(0.005)	(0.004)	(0.012)	(0.005)	(0.012)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Trend regressions: Under 25 years old, women and men

Table A4: Trend regression under 25 years old

Dependent variable: Separation Rate *S(t)*	c: all values X: age < 25 t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	4.64	6.08	2.08	2.33	3.37	1.07
Prob > F	0.064	0.030	0.192	0.191	0.116	0.455
R-squared	0.367	0.752	0.229	0.583	0.360	0.446
Adj. R-squared	0.288	0.629	0.119	0.334	0.253	0.030
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.003*	0.004**	0.002	-0.002	0.004	0.001
	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)	(0.005)
Dummy (d_c)		0.027**		-0.015		0.007
		(0.011)*		(0.020)		(0.026)
Employment growth (*Empl*$_Y$)		0.004		0.002		0.004
		(0.002)		(0.003)		(0.006)
Constant	0.375***	0.363***	0.274***	0.305***	0.274***	0.286***
	(0.008)	(0.012)	(0.008)	(0.019)	(0.010)	(0.031)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I mean a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A5: Trend regression under 25 years old women

Dependent variable: Separation Rate *S(t)*	c: all values X: age < 25, women					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	9.93	7.9	3.9	2.84	4.35	4.69
Prob > F	0.014	0.017	0.089	0.145	0.082	0.085
R-squared	0.554	0.798	0.358	0.631	0.420	0.779
Adj. R-squared	0.498	0.697	0.266	0.409	0.323	0.613
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.005**	0.005*	0.003*	-0.002	0.004*	-0.004
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.004)
Dummy (d_c)		0.022		-0.015		0.066
		(0.014)		(0.019)		(0.034)
Employment growth (*Empl*$_Y$)		0.006**		0.004		0.020*
		(0.002)		(0.004)		(0.008)
Constant	0.346***	0.350***	0.258***	0.297***	0.253***	0.282***
	(0.010)	(0.016)	(0.010)	(0.023)	(0.011)	(0.023)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A6: Trend regression under 25 years old men

Dependent variable: Separation Rate *S(t)*	c: all values X: age < 25, men					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	0.7	5.88	0.38	1.41	1.59	0.36
Prob > F	0.427	0.032	0.555	0.343	0.254	0.784
R-squared	0.081	0.746	0.052	0.458	0.210	0.214
Adj. R-squared	-0.034	0.619	-0.084	0.133	0.078	-0.375
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.001	0.004**	0.001	-0.003	0.003	0.002
	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.005)
Dummy (d_c)		0.032***		-0.014		0.001
		(0.008)		(0.024)		(0.024)
Employment growth (*Empl*$_Y$)		0.003*		0.002		0.001
		(0.001)		(0.003)		(0.004)
Constant	0.399***	0.376***	0.289***	0.315***	0.293***	0.295***
	(0.008)	(0.009)	(0.008)	(0.023)	(0.010)	(0.035)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Trend regressions: 25 to 44 years old, women and men

Table A7: Trend regression 25 to 44 years old

Dependent variable: Separation Rate *S(t)*	c: all values X: age >= 25 and < 45					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	2.19	3.8	2.29	1.58	4.04	12.39
Prob > F	0.177	0.077	0.174	0.305	0.091	0.017
R-squared	0.215	0.655	0.247	0.487	0.402	0.903
Adj. R-squared	0.117	0.483	0.139	0.179	0.303	0.830
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.001	0.002**	0.001	0.002	0.001*	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Dummy (d_c)		0.009*		0.004		-0.022**
		(0.004)		(0.007)		(0.005)
Employment growth ($Empl_Y$)		0.002		0.003		-0.003**
		(0.001)		(0.002)		(0.001)
Constant	0.245***	0.231***	0.143***	0.130***	0.113***	0.152***
	(0.003)	(0.006)	(0.003)	(0.011)	(0.004)	(0.010)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A8: Trend regression 25 to 44 years old women

Dependent variable: Separation Rate *S(t)*	c: all values X: age >= 25 and < 45, women					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	1.51	3.23	3.09	0.84	10.89	25.45
Prob > F	0.254	0.103	0.122	0.527	0.016	0.005
R-squared	0.159	0.618	0.306	0.335	0.645	0.950
Adj. R-squared	0.054	0.427	0.207	-0.064	0.586	0.913
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.001	0.002**	0.001	0.001	0.002**	0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Dummy (d_c)		0.011*		0.000		-0.010**
		(0.005)		(0.006)		(0.003)
Employment growth ($Empl_Y$)		0.002		0.001		0.000
		(0.001)		(0.001)		(0.001)
Constant	0.233***	0.215***	0.151***	0.149***	0.122***	0.137***
	(0.004)	(0.007)	(0.002)	(0.011)	(0.003)	(0.007)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A9: Trend regression 25 to 44 years old men

Dependent variable: Separation Rate *S(t)*	c: all values X: age >= 25 and < 45, men					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	2.96	2.45	0.83	1.16	2.88	4.24
Prob > F	0.124	0.162	0.392	0.411	0.141	0.098
R-squared	0.270	0.550	0.106	0.411	0.324	0.761
Adj. R-squared	0.179	0.325	-0.022	0.057	0.212	0.582
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.001	0.002**	0.001	0.002	0.002	-0.003
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Dummy (d_c)		0.008		0.005		-0.022*
		(0.006)		(0.008)		(0.008)
Employment growth (*Empl*$_Y$)		0.001		0.003		-0.003
		(0.002)		(0.002)		(0.002)
Constant	0.253***	0.241***	0.138***	0.124***	0.106***	0.145***
	(0.004)	(0.007)	(0.004)	(0.013)	(0.005)	(0.016)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Trend regressions: 45 or more years old, women and men

Table A10: Trend regression 45 or more years old

Dependent variable: Separation Rate *S(t)*	c: all values X: age >= 45					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	3.32	2.11	2.44	1.22	2.39	2.14
Prob > F	0.106	0.200	0.162	0.393	0.173	0.238
R-squared	0.294	0.513	0.259	0.423	0.285	0.616
Adj. R-squared	0.205	0.270	0.153	0.077	0.165	0.329
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.001	0.001	-0.001	-0.003	-0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Dummy (d_c)		0.004		-0.008		0.017
		(0.006)		(0.012)		(0.012)
Employment growth (*Empl*$_Y$)		0.002		0.000		0.000
		(0.001)		(0.002)		(0.003)
Constant	0.202***	0.203***	0.156***	0.168***	0.154***	0.129***
	(0.003)	(0.007)	(0.004)	(0.012)	(0.006)	(0.015)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A11: Trend regression 45 or more years old women

Dependent variable: Separation Rate *S(t)*	c: all values X: age >= 45, women					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	14.56	6.11	38.47	11.04	17.86	16.67
Prob > F	0.005	0.030	0.000	0.012	0.006	0.010
R-squared	0.645	0.753	0.846	0.869	0.749	0.926
Adj. R-squared	0.601	0.630	0.824	0.790	0.707	0.870
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	-0.002***	-0.001	-0.003***	-0.004**	-0.004***	-0.001
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Dummy (d_c)		0.009		-0.007		0.017
		(0.007)		(0.008)		(0.006)
Employment growth (*Empl*$_Y$)		-0.001		0.001		0.000
		(0.001)		(0.001)		(0.001)
Constant	0.204***	0.197***	0.167***	0.174***	0.167***	0.141***
	(0.003)	(0.006)	(0.003)	(0.009)	(0.005)	(0.010)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A12: Trend regression 45 or more years old men

Dependent variable: Separation Rate *S(t)*	c: all values X: age >= 45, men					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	18.81	11.94	0.09	0.81	0.05	14.05
Prob > F	0.003	0.006	0.770	0.541	0.829	0.014
R-squared	0.702	0.857	0.013	0.327	0.008	0.913
Adj. R-squared	0.664	0.785	-0.128	-0.077	-0.157	0.848
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.003***	0.002*	0.000	-0.001	0.000	-0.003
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Dummy (d_c)		0.008		-0.022		0.030***
		(0.006)		(0.014)		(0.005)
Employment growth (*Empl*$_Y$)		-0.003**		0.002		-0.008***
		(0.001)		(0.003)		(0.002)
Constant	0.199***	0.193***	0.149***	0.173***	0.147***	0.121***
	(0.004)	(0.007)	(0.006)	(0.017)	(0.008)	(0.007)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Trend regressions: previous job tenure less than a year, women and men

Table A13: Trend regression previous job tenure less than a year

Dependent variable: Separation Rate *S(t)*	c: previous job tenure < 1 X: all values					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	14.36	4.07	6.09	1.46	2.5	0.94
Prob > F	0.005	0.068	0.043	0.332	0.165	0.499
R-squared	0.642	0.671	0.465	0.467	0.294	0.414
Adj. R-squared	0.598	0.506	0.389	0.147	0.176	-0.025
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.003*** (0.001)	0.003 (0.002)	0.002** (0.001)	0.002 (0.002)	0.005 (0.003)	-0.001 (0.009)
Dummy (d_c)		-0.005 (0.010)		0.000 (0.012)		-0.040 (0.047)
Employment growth (*Empl*$_Y$)		-0.002 (0.004)		0.000 (0.004)		-0.012 (0.015)
Constant	0.502 (0.006)	0.509 (0.012)	0.244 (0.005)	0.244 (0.018)	0.200 (0.018)	0.262 (0.073)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A14: Trend regression previous job tenure less than a year women

Dependent variable: Separation Rate *S(t)*	c: previous job tenure < 1 X: women					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	8.03	2.12	46.84	20.56	2.82	0.78
Prob > F	0.022	0.199	0.000	0.003	0.144	0.565
R-squared	0.501	0.515	0.870	0.925	0.320	0.368
Adj. R-squared	0.438	0.272	0.851	0.880	0.206	-0.105
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.003** (0.001)	0.002 (0.002)	0.004*** (0.001)	0.006** (0.001)	0.004 (0.002)	0.001 (0.006)
Dummy (d_c)		-0.004 (0.011)		0.009 (0.006)		-0.022 (0.042)
Employment growth (*Empl*$_Y$)		0.001 (0.003)		-0.001 (0.002)		-0.004 (0.013)
Constant	0.455*** (0.006)	0.458*** (0.013)	0.227*** (0.003)	0.216*** (0.009)	0.211*** (0.012)	0.244** (0.066)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A15: Trend regression previous job tenure less than a year men

Dependent variable: Separation Rate *S(t)*	c: previous job tenure < 1 X: men t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	14.52	4.18	0.93	0.25	2.21	1.06
Prob > F	0.005	0.065	0.368	0.855	0.188	0.459
R-squared	0.645	0.676	0.117	0.133	0.269	0.443
Adj. R-squared	0.600	0.515	-0.009	-0.388	0.148	0.025
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.004*** (0.001)	0.003 (0.002)	0.001 (0.002)	0.001 (0.004)	0.007 (0.005)	-0.002 (0.011)
Dummy (d_c)		-0.006 (0.013)		-0.002 (0.021)		-0.045 (0.050)
Employment growth (*Empl*$_Y$)		-0.002 (0.005)		0.001 (0.007)		-0.017 (0.017)
Constant	0.534*** (0.007)	0.542*** (0.015)	0.255*** (0.009)	0.257*** (0.030)	0.191*** (0.023)	0.263** (0.079)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Trend regressions: previous job tenure at least one year, women and men

Table A16: Trend regression previous job tenure at least one year

Dependent variable: Separation Rate *S(t)*	c: previous job tenure >= 1 X: all values t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	0.57	8.37	0.64	0.88	1.03	0.83
Prob > F	0.473	0.015	0.451	0.509	0.350	0.541
R-squared	0.066	0.807	0.083	0.347	0.146	0.385
Adj. R-squared	-0.050	0.711	-0.048	-0.045	0.004	-0.077
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.000 (0.000)	0.001* (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.002)
Dummy (d_c)		0.009** (0.003)		-0.005 (0.007)		-0.007 (0.009)
Employment growth (*Empl*$_Y$)		0.003** (0.001)		0.002 (0.002)		-0.004 (0.003)
Constant	0.170*** (0.003)	0.159*** (0.003)	0.151*** (0.004)	0.156*** (0.010)	0.137*** (0.004)	0.148*** (0.014)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A17: Trend regression previous job tenure at least one year women

Dependent variable: Separation Rate *S(t)*	c: previous job tenure >= 1 X: women					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	4.36	5.63	10.37	5.35	26.32	6.84
Prob > F	0.070	0.035	0.015	0.051	0.002	0.047
R-squared	0.353	0.738	0.597	0.763	0.814	0.837
Adj. R-squared	0.272	0.607	0.539	0.620	0.783	0.715
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	-0.001* (0.001)	0.000 (0.001)	-0.002** (0.000)	-0.003** (0.001)	-0.002*** (0.000)	-0.002* (0.001)
Dummy (d_c)		0.009* (0.004)		-0.008 (0.005)		-0.002 (0.006)
Employment growth (*Empl*$_Y$)		0.002 (0.001)		0.000 (0.001)		-0.001 (0.002)
Constant	0.178*** (0.003)	0.168*** (0.005)	0.163*** (0.003)	0.174*** (0.007)	0.146*** (0.002)	0.149*** (0.009)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A18: Trend regression previous job tenure at least one year men

Dependent variable: Separation Rate *S(t)*	c: previous job tenure >= 1 X: men					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	0.03	2.8	0.04	0.72	0.04	0.31
Prob > F	0.860	0.131	0.854	0.584	0.856	0.815
R-squared	0.004	0.583	0.005	0.300	0.006	0.191
Adj. R-squared	-0.120	0.375	-0.137	-0.120	-0.160	-0.416
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.000 (0.001)	0.002* (0.001)	0.000 (0.001)	0.000 (0.002)	0.000 (0.001)	-0.001 (0.003)
Dummy (d_c)		0.010* (0.005)		-0.003 (0.009)		-0.006 (0.013)
Employment growth (*Empl*$_Y$)		0.003 (0.002)		0.003 (0.003)		-0.004 (0.004)
Constant	0.163*** (0.004)	0.151*** (0.006)	0.143*** (0.005)	0.146*** (0.013)	0.130*** (0.006)	0.140*** (0.020)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Trend regressions: Industry affiliation

Table A19: Trend regression manufacturing

Dependent variable: Separation Rate *S(t)*	c: all values X: manufacturing					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	2.5	2.27	3.54	3.34	1.67	1.44
Prob > F	0.153	0.180	0.102	0.113	0.244	0.355
R-squared	0.238	0.532	0.336	0.667	0.218	0.520
Adj. R-squared	0.143	0.298	0.241	0.468	0.088	0.160
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	-0.002	0.000	-0.002	-0.003	-0.002	-0.006
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)
Dummy (d_c)		0.012		-0.003		-0.024
		(0.010)		(0.010)		(0.016)
Employment growth ($Empl_Y$)		0.002		0.003*		-0.003
		(0.002)		(0.002)		(0.003)
Constant	0.219***	0.207***	0.167***	0.174***	0.152***	0.184***
	(0.006)	(0.011)	(0.006)	(0.013)	(0.008)	(0.023)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A20: Trend regression construction sector

Dependent variable: Separation Rate *S(t)*	c: all values X: construction sector					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	0.2	4.87	0.38	3.86	0.03	0.08
Prob > F	0.663	0.048	0.558	0.090	0.878	0.968
R-squared	0.025	0.709	0.051	0.699	0.004	0.056
Adj. R-squared	-0.097	0.563	-0.084	0.518	-0.162	-0.652
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.001	0.000	-0.001	0.003	0.000	-0.003
	(0.001)	(0.002)	(0.002)	(0.004)	(0.002)	(0.008)
Dummy (d_c)		0.024**		-0.008		-0.013
		(0.008)		(0.015)		(0.029)
Employment growth ($Empl_Y$)		-0.005**		0.007**		-0.001
		(0.002)		(0.002)		(0.004)
Constant	0.457***	0.451***	0.258***	0.241***	0.222***	0.244**
	(0.008)	(0.010)	(0.011)	(0.025)	(0.012)	(0.056)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A21: Trend regression wholesale and retail trade

Dependent variable: Separation Rate *S(t)*	c: all values X: wholesale and retail trade					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	0.07	0.03	6.14	3.61	6.2	2.21
Prob > F	0.797	0.991	0.042	0.100	0.047	0.229
R-squared	0.009	0.016	0.467	0.684	0.508	0.624
Adj. R-squared	-0.115	-0.476	0.391	0.495	0.426	0.341
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.000	-0.001	-0.002**	-0.004**	-0.003**	-0.004
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.004)
Dummy (d_c)		-0.003		-0.013		-0.005
		(0.015)		(0.008)		(0.016)
Employment growth (*Empl*$_Y$)		0.001		-0.001		-0.004
		(0.005)		(0.002)		(0.004)
Constant	0.265***	0.267***	0.216***	0.235***	0.199***	0.212***
	(0.007)	(0.015)	(0.005)	(0.011)	(0.006)	(0.029)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A22: Trend regression hotels and restaurants

Dependent variable: Separation Rate *S(t)*	c: all values X: hotels and restaurants					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	1.32	1.12	0.01	3.15	0.13	0.16
Prob > F	0.284	0.412	0.927	0.124	0.732	0.918
R-squared	0.142	0.359	0.001	0.654	0.021	0.107
Adj. R-squared	0.034	0.039	-0.141	0.447	-0.142	-0.562
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	-0.001	0.000	0.000	-0.005**	-0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.006)
Dummy (d_c)		0.003		-0.028**		0.015
		(0.007)		(0.009)		(0.026)
Employment growth (*Empl*$_Y$)		0.001		-0.001		0.002
		(0.001)		(0.001)		(0.003)
Constant	0.584***	0.580***	0.304***	0.340***	0.270***	0.245***
	(0.004)	(0.008)	(0.007)	(0.013)	(0.011)	(0.043)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A23: Trend regression transport, storage and communication

Dependent variable: Separation Rate *S(t)*	c: all values X: transport, storage and communication					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	3.26	0.95	0.75	1.06	0.32	2.86
Prob > F	0.109	0.474	0.416	0.444	0.591	0.168
R-squared	0.290	0.322	0.097	0.389	0.051	0.682
Adj. R-squared	0.201	-0.017	-0.033	0.022	-0.107	0.444
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.006	0.002	0.005	0.023	0.004	-0.046*
	(0.004)	(0.009)	(0.005)	(0.013)	(0.007)	(0.019)
Dummy (d_c)		-0.023		0.080		-0.227*
		(0.043)		(0.058)		(0.083)
Employment growth (*Empl*$_Y$)		-0.003		0.017		-0.063*
		(0.011)		(0.015)		(0.024)
Constant	0.188***	0.217**	0.123***	-0.008	0.113**	0.518**
	(0.022)	(0.061)	(0.030)	(0.091)	(0.037)	(0.147)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A24: Trend regression banking and insurance

Dependent variable: Separation Rate *S(t)*	c: all values X: banking and insurance					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	3.06	1.02	0.86	0.67	1.04	0.63
Prob > F	0.118	0.447	0.385	0.607	0.348	0.635
R-squared	0.277	0.338	0.109	0.286	0.147	0.320
Adj. R-squared	0.186	0.007	-0.018	-0.142	0.005	-0.190
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.004	0.005	0.004	-0.005	0.004	0.003
	(0.002)	(0.004)	(0.005)	(0.010)	(0.004)	(0.009)
Dummy (d_c)		0.002		-0.053		-0.005
		(0.029)		(0.054)		(0.043)
Employment growth (*Empl*$_Y$)		0.003		-0.002		-0.006
		(0.004)		(0.007)		(0.006)
Constant	0.118***	0.108**	0.096***	0.167*	0.092***	0.110
	(0.014)	(0.031)	(0.027)	(0.072)	(0.021)	(0.068)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A25: Trend regression real estate, renting and business activities

Dependent variable: Separation Rate *S(t)*	c: all values X: Real estate, renting and business activities					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	30.87	12.99	1.79	1.81	2.22	1.05
Prob > F	0.001	0.005	0.222	0.262	0.187	0.462
R-squared	0.794	0.867	0.204	0.521	0.270	0.441
Adj. R-squared	0.768	0.800	0.090	0.233	0.149	0.022
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.009*** (0.002)	0.010*** (0.002)	0.002 (0.002)	0.001 (0.003)	0.003 (0.002)	-0.001 (0.004)
Dummy (d_c)		0.014 (0.015)		0.001 (0.021)		-0.021 (0.021)
Employment growth (*Empl*$_Y$)		0.004 (0.002)		0.004 (0.003)		0.000 (0.003)
Constant	0.256*** (0.010)	0.223*** (0.022)	0.194*** (0.010)	0.176*** (0.036)	0.157*** (0.010)	0.187*** (0.039)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A26: Trend regression public services

Dependent variable: Separation Rate *S(t)*	c: all values X: public services					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	1.41	3.82	1.29	0.74	3.21	1.14
Prob > F	0.269	0.076	0.294	0.572	0.123	0.435
R-squared	0.150	0.657	0.156	0.308	0.349	0.460
Adj. R-squared	0.043	0.485	0.035	-0.108	0.240	0.055
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.002 (0.001)	0.006*** (0.002)	0.002 (0.002)	0.005 (0.004)	0.003 (0.002)	0.009 (0.006)
Dummy (d_c)		0.024* (0.010)		0.007 (0.018)		0.021 (0.024)
Employment growth (*Empl*$_Y$)		0.003 (0.003)		0.005 (0.005)		0.005 (0.007)
Constant	0.136*** (0.008)	0.099*** (0.014)	0.098*** (0.009)	0.070* (0.033)	0.083*** (0.010)	0.035 (0.054)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Table A27: Trend regression other personal service activities

Dependent variable: Separation Rate *S(t)*	c: all values X: other personal service activities					
	t=1		t=2		t=3	
	Spec I	Spec II	Spec I	Spec II	Spec I	Spec II
Number of observations	10	10	9	9	8	8
F-test	0.53	1.82	1	2.06	0.3	1.13
Prob > F	0.487	0.243	0.351	0.224	0.605	0.437
R-squared	0.062	0.477	0.125	0.553	0.047	0.459
Adj. R-squared	-0.055	0.216	0.000	0.285	-0.112	0.053
	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)	Coeff. (Std. Err.)
Trend (*Y*)	0.001 (0.001)	0.000 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.001)	-0.002 (0.003)
Dummy (d_c)		0.015 (0.010)		-0.005 (0.011)		-0.003 (0.016)
Employment growth (*Empl*$_Y$)		-0.001 (0.001)		0.002 (0.001)		0.002 (0.002)
Constant	0.274*** (0.008)	0.206*** (0.012)	0.193*** (0.011)	0.168*** (0.017)	0.163*** (0.007)	0.150*** (0.028)

Note: Standard errors in parentheses. *** 1 percent significance level, ** 5 percent significance level, * 10 percent significance level (robust standard errors would not change significance levels). Spec I means a trend regression on (conditional) separation probabilities specified in equation (2). Spec II means a trend regression on separation probabilities specified in equation (3). Time spans are defined as periods from a reporting day per year.

Aufbau eines Individualdatenverarbeitungssystems zur Analyse des österreichischen Arbeitsmarktgeschehens

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Abstract

Administrative Datenquellen bieten eine Fülle an Informationen, die sich für Analysen des Arbeitsmarktgeschehens nutzen lassen. Um aus anonymisierten Individualdaten ökonomisch relevante Datengrundlagen zu erstellen, muss zunächst eine adäquate Datenaufbereitung stattfinden. Zur Analyse von Arbeitsplatzreallokation und Arbeitskräftemobilität wurden "matched employer – employee" Datensätze auf der Grundlage von Sozialversicherungsdaten generiert.

Die Aufbereitung der Versicherungsdateien der Hauptverbandes der Österreichischen Sozialversicherungsträger erfolgte unter drei Gesichtspunkten: Komprimierung der umfangreichen Datenbestände, Sichtbarmachen und Verbindung der Personen- und der Dienstgeberkontenperspektive, Schaffung von Schnittstellen, die eine Weiterverarbeitung der umfangreichen Datenbestände mit verschiedenen ökometrischen Programmen ermöglichen.

Einleitung

320 Millionen Datensätze so aufzubereiten, dass einerseits benötigte Informationen nicht verloren gehen und andererseits mit verschiedenen Softwareprodukten (Access, Excel, Oracle, Stata, SPSS) flexibel und mit verträglichem Zeitaufwand auf die aufbereiteten Datenbestände zugegriffen werden kann, das ist eine Herausforderung, die am WIFO in enger Zusammenarbeit zwischen EDV und FachreferentInnen im Jahr 2000 in Angriff genommen wurde. Im Folgenden wird beschrieben, welcher Weg bisher eingeschlagen wurde, um die Strukturen und Inhalte dieser Millionen Datensätze auf das eigentlich Relevante zu reduzieren und sichtbar zu machen.

Datenquellen

Derzeit werden vier Versicherungsdateien des Hauptverbandes der österreicherischen Sozialversicherungsträger (HV) ausgewertet. Diese Daten enthalten Informationen über

- Beschäftigungsverhältnisse, Arbeitslosigkeit, Pensionen, Elternkarenz und sonstige Versicherungsverhältnisse von rund 99% aller in Österreich lebenden Personen für den Zeitraum vom 1. 1. 1972 bis 31. 3. 2004 – diese Informationen werden im folgenden Text **Episodentabelle** genannt
- Jahresdurchschnitte der Bemessungsgrundlagen und der Transferleistungen – diese Informationen werden im folgenden Text **Bemessungsgrundlagetabelle** genannt
- Angaben zu den Personen – diese Informationen werden im folgenden Text **Personentabelle** genannt
- Angaben zu den Dienstgeberkonten – diese Informationen werden im folgenden Text **Dienstgeberkontentabelle** genannt

Episodentabelle

Diese enthält

- Personennummer: anonymisierter eindeutiger Personenschlüssel
- Dienstgeberkontonummer: anonymisierter eindeutiger Dienstgeberkontoschlüssel
- Hauptverbandsqualifikation: 2-stelliger Code, gibt Auskunft über Inhalt der Episode, z. B. welche Art von Beschäftigung- oder Versicherungsepisode
- Anfangsdatum der Episode
- Enddatum der Episode
- ef (Kennzeichnung echt, fingiert)

Bemessungsgrundlagetabelle

Diese enthält

- Personennummer: anonymisierter eindeutiger Personenschlüssel
- Dienstgeberkontonummer: anonymisierter eindeutiger Dienstgeberkontoschlüssel
- Jahr
- von: Monatsnummer, Anfang des Eintrages
- bis: Monatsnummer, Ende des Eintrages
- Beitragstage: innerhalb des angegebenen Jahres
- Teilentgeltstage
- Bemessungsgrundlage: monatliche Durchschnitte der Bemessungsgrundlagen und der Transferleistungen ohne Sonderzahlungen
- Sonderzahlungen: monatliche Durchschnitte
- Währung: A für Angaben der Bemessungsgrundlage und Sonderzahlungen in Schillingen, C für Angaben in Cent
- ef: e für ein effektives Dienstgeberkontonummer, f für ein fingiertes

Personentabelle

Diese enthält

- Personennummer: anonymisierter eindeutiger Personenschlüssel
- Geburtsjahr
- Staatsbürgerschaftsschlüssel
- akademischer Grad
- Sterbeart
- Sterbedatum
- gültig_von
- gueltig_bis
- Zeitstempel

Dienstgeberkontentabelle

Diese enthält

- Versicherungsträgernummer

- Dienstgeberkontonummer; anonymisierter eindeutiger Schlüssel der Abrechnungsstelle eines Betriebes oder eines Unternehmens mit der zuständigen Gebietskrankenkasse das heißt, eine Firma, die in mehreren Bundesländern tätig ist, hat mehrere Dienstgeberkontonummern
- Jahr: Jahr der Vergabe der Dienstgeberkontonummer
- nace: ÖNACE – Sechssteller
- wikl: Wirtschaftsklasse BS68
- beot: Code für Betriebsort, Bundesland und Bezirkskennzeichnung
- plz: Postleitzahl
- nuts: NUTS-Region
- aufb: Code welche Felder wie aufbereitet
- ef: Codierung für Kennzeichnung des Dienstgeberkonto e für echt, f für codiert
- gueltig_von: gültig von Datum
- gueltig_bis: gültig bis Datum
- Zeitstempel
- ort: Betriebsort

Fragestellungen

Auf Grundlage der Möglichkeiten der aufbereiteten Datensätze werden am WIFO in weiterer Folge ökonomische Analysen vorgenommen. Im vorliegenden Projekt werden beispielsweise die Frage der Arbeitsplatzreallokation und der Arbeitskräftemobilität behandelt. Ausgehend von bereits vorhandenen empirischen Arbeiten zu diesem Thema, werden folgende Analyseschritte durchgeführt:

- In einem ersten Schritt sind betriebliche Beschäftigungsveränderungen (Arbeitsplatzreallokation) und Churning nach Unternehmensalter, Wirtschaftsbereich, Unternehmensgröße, Personal- und Lohnstruktur, Bundesland zu ermitteln. Dabei werden unter anderem schrumpfende, stagnierende und wachsende Betriebe in – bezüglich des Beschäftigungsstandes – schrumpfenden, stagnierenden und wachsenden Branchen in solche mit hohen, mittleren und niedrigen Churning-Raten unterteilt.
- In einem zweiten Schritt gilt es die Struktur der aufgelösten Beschäftigungsverhältnisse in Vergleich zu den neu abgeschlossenen Arbeitsverhältnissen und zu weiter bestehenden Arbeitsbeziehungen zu untersuchen. Dies erfolgt anhand des Alters, des Geschlechts, des Lohnes und der Betriebszugehörigkeitsdauer. Bei neu abgeschlossenen Beschäftigungsverhältnissen wird zudem die vorangegangene Arbeitsmarkt- und Einkommensentwick-

lung der neuen Arbeitskräfte, bei aufgelösten Beschäftigungsverhältnissen die Zielpositionen der betreffenden Personen berücksichtigt.

- In einem dritten Schritt werden die identifizierten Typen an mobilen bzw. immobilen Personen wieder in Bezug gesetzt zu unterschiedlichen Typen von Betrieben (z. B. High-Churner und Low-Churner).

Datenbestände zu den Fragestellungen

In diesem Abschnitt wird dargestellt, wie für die oben genannten Fragestellungen die Datenquellen des Hauptverbandes der österreicherischen Sozialversicherungsträger aufbereitet wurden und der weitergehenden Analyse zugänglich gemacht wurden.

Zusammenfassung der Hauptverbandsqualifikationen

Wie erwähnt gibt es zurzeit 219 unterschiedliche Hauptverbandsqualifikationen, für die Auswertungen und Analyse ist daher eine Reduktion dieser Hauptverbandsqualifikationen von Vorteil, sie wurden zu 54 WIFO-Klassifikationen zusammengefasst (siehe Anhang).

Zusammenfassung zu Blöcken

Diese 54 WIFO-Klassifikationen werden weiters in vier Untergruppen unterteilt (siehe Anhang):

- Standardbeschäftigung
- Atypische Beschäftigung
- Arbeitslosigkeit
- Out of Labourforce

Aus Performancegründen wurden für diese vier Blöcke getrennte Datenbestände erstellt.

Bei den Feldern dieser Datensätze handelt es sich um

- Personennummer: anonymisierter eindeutiger Personenschlüssel
- Dienstgeberkontonummer: anonymisierter eindeutiger Dienstgeberkontoschlüssel
- Qualifikation: 3-stelliger Code, gibt Auskunft über Inhalt der Episode, z. B. welche Art von Beschäftigung- oder Versicherungsepisode
- Anfangsdatum
- Enddatum
- SZSTATUS: nur für die Blöcke Standardbeschäftigung und atypische Beschäftigung, beinhaltet den sozialrechtlichen Status; A für Arbeiter, D für Angestellte

Priorisierung

Untersucht man, wie im zweiten Analyseschritt des vorliegenden Projekts (siehe Abschnitt 'Fragestellungen') beschrieben, die Struktur der aufgelösten Beschäftigungsverhältnisse im Vergleich zu den neu abgeschlossenen Arbeitsverhältnissen und zu weiter bestehenden Arbeitsbeziehungen, benötigt man eine Priorisierung der Dienstverhältnisse auf Personenbasis. Was verstehen wir unter Priorisierung? In den ursprünglichen Datenquellen existieren oft viele Episoden pro Person gleichzeitig. Wird ein Datenbestand so zusammengefasst, dass aus gleichzeitigen Episoden einer Person eine Episode entsteht, welche einen einzigen dominanten Status aufweist, sprechen wir von Priorisierung. Um den Informationsverlust durch diesen Vorgang für bestimmte Fragestellungen zu reduzieren erfolgt die Priosrisierung im ersten Schritt nur innerhalb der oben angeführten vier Blöcke und erst in einem weiteren Schritt für den Gesamtbestand.

Durchführung der Priorisierung

Den einzelnen Qualifikationen wird eine Priorisierungsnummer zugewiesen, wobei 1 die höchste Priorität darstellt. Das Datenset wird für jede Person absteigend nach der Priosisierungsnummer sortiert. Es wird ein Hilfsvektor angelegt, dessen Elemente die Tage pro Person der vorgegebenen Episodenintervalle darstellen. Dann wird pro Person die absteigend sortierten Datensatze in diesem Hilfsvektor übereinander gelegt. Somit überschreiben für die überlappenden Zeitbereiche Episoden mit höherer Priorität Episoden mit niedriger Priorität. Diese so entstanden eindeutigen Tageseinträge werden in einem nächsten Schritt zusammengefasst.

Erstellung der aufrechten Dienstverhältnisse

Für Fragestellungen der Verbleibszeiten, des Beginn oder der Beendigung eines Dienstverhältnisses sind die Unterscheidungen zwischen einzelnen Qualifikationen wie z. B. Beschäftigungsverhältnis, Krankenstand und Wochengeld nicht notwendig, sondern im Gegenteil eher hinderlich. Auch kurze Lücken, die sich oft aus organisatorischen Abläufen ergeben, sollen nicht als Beendigung und Wiedereinstieg gesehen werden, sondern als durchgehende Episode. Daher wurde ein eigener Datenbestand Aufrechte Dienstverhältnisse (kurz 'AD' genannt) erzeugt.

Um diese geschlossenen aufrechten Dienstverhältnisse erstellen zu können, wurden in einem ersten Schritt Lücken zwischen zwei Standardbeschäftigungsepisoden, die kürzer als 7 Tage sind festgestellt und als eigene Episoden mit den folgenden Klassenbezeichnungen in der Tabelle HV_BESCH gespeichert. Anschließend werden alle aneinandergrenzende Standardbeschäftigungsepisoden und alle gekennzeichnete Lücken zu einer Episode AD zusammengefasst.

Z. B. Personnummer X, Dienstgeberkontonummer Y

Aus: US UW wird: AD

Dieser Datensatz ist im Oracle unter HV_AD gespeichert und enthält die Felder:

- Personennummer: anonymisierter eindeutiger Personenschlüssel
- Dienstgeberkontonummer: anonymisierter eindeutiger Dienstgeberkontoschlüssel
- Anfangsdatum
- Enddatum

Dienstgeberkontobereinigung

Für die oben genannte Fragestellung der Aufnahme oder Beendung eines Dienstverhältnisses muss die Dienstgeberkontonummer (im Folgenden DG genannt) noch näher untersucht werden.

Tritt eine DG in der Episodentabelle in der uns zur Verfügung stehenden Zeitperiode das erste Mal auf, so sprechen wir von einer Gründung. Analog sprechen wir von einer Schließung, wenn eine DG das letzte Mal auftritt.

Zwei Phänomene bedürfen besonderer Beachtung:

- Eine DG existiert nicht durchgehend für einen Zeitraum in den Daten, sondern es gibt Unterbrechungen. Ist das Wiederauftreten eine Dienstgeberkontonummer tatsächlich aktuell eine Gründung oder gibt es zu definierende Bedingungen, die erfüllt werden müssen, damit wir von einer Gründung sprechen. Analoge Überlegungen gelten auch für Schließungen. Welche Bedingungen müssen erfüllt sein, damit wir von einer Schließung einer Dienstgeberkontonummer sprechen.
- Gibt es Übergänge von einer Dienstgeberkontonummer A zu einer anderen Dienstgeberkontonummer B, die nicht als Schließung von A und Gründung von B angesehen werden, sondern als Fortsetzung des Dienstgeberkontonummer A durch die Dienstgeberkontonummer B.

Wir sprechen von einer Gründung einer Dienstgeberkontonummer, wenn vor einem Eintrag in der Episodentabelle länger als ein Kalenderjahr keine Beschäftigungsepisode zu diesem Dienstgeberkontonummer existiert.

Wir sprechen von einer Schließung einer Dienstgeberkontonummer, wenn nach einem Eintrag in der Episodentabelle länger als ein Kalenderjahr keine Beschäftigungsepisode zu diesem Dienstgeberkontonummer existiert.

Wir definieren den Übergang einer Dienstgeberkontonummer A in eine andere B über die Schnittmenge von Personennummern dieser beiden Dienstgeberkontonummern. Das heißt, liegt unserer Definition nach eine Schließung von A vor und eine unmittelbar angrenzende Gründung von B vor, und kommen mindestens 60 Prozent der Personennummern zum Tag der Schließung von A bei der Gründung von B vor, so sprechen wir von einem Übergang. In diesem Fall fassen wir die Dienstgeberkontonummer A und B zu einer Dienstgeberkontonummer zusammen. Diesen Vorgang nennen wir Dienstgeberkontenbereinigung. Er wird nur für Dienstgeberkontonummer mit mehr als 5 Personen bei der Gründung und Schließung durchgeführt.

Dienstgeberkontenepisoden

Um Fragen zu betrieblichen Beschäftigungsveränderungen schnell und bequem beantworten zu können, werden auf der Grundlage des Datenbestandes der aufrechten Dienstverhältnisse Datensätze erstellt, die zu jedem Zeitpunkt die Anzahl der Beschäftigungsverhältnisse pro Dienstgeberkonto angeben. Dieser Datensatz wird Dienstgeberepisoden genannt.

Er ist im Oracle unter HV_DG_EPISODEN_AD gespeichert und enthält folgende Felder:

- Dienstgeberkontonummer: anonymisierter eindeutiger Dienstgeberkontoschlüssel
- Anzahl der aufrechten Dienstverhältnisse
- Anfangsdatum
- Enddatum

Stichtagsbestände

Um Stichtagsauswertungen effizient durchführen zu können, werden die Datenbestände aufrechte Dienstverhältnisse, Standardbeschäftigung und atypisch Beschäftigte, die an den Stichtagen 7. 3., 7. 6., 7. 9. und 7. 12. Episoden aufweisen, getrennt als Stichtagsbestände gespeichert. Dies erfolgt für die Jahre 1994 bis 2004.

Bei den Feldern dieses Datensatzes handelt es sich um

- Personennummer: anonymisierter eindeutiger Personenschlüssel
- Dienstgeberkontonummer: anonymisierter eindeutiger Dienstgeberkontoschlüssel
- Anfangsdatum
- Enddatum

Zu- und Abgänge zu den Aufrechten Dienstverhältnissen

Ebenso werden für den Datenbestand aufrechte Dienstverhältnisse die Zu- und Abgänge zwischen den Stichtagen getrennt gespeichert.

Bei den Feldern dieses Datensatzes handelt es sich um

- Personennummer: anonymisierter eindeutiger Personenschlüssel
- Dienstgeberkontonummer: anonymisierter eindeutiger Dienstgeberkontoschlüssel
- Datumsänderung
- Zu_oder_ab: enthält A, wenn es sich um einen Abgang handelt, Z bei Zugang
- Jahr
- Quartal

Auswertungstools

Filtern von Datenbeständen

Um die vorhanden Datenbestände unter Verwendung von ACCESS bequem nach bestimmten Personen oder Dienstgeberkonten einschränken zu können, wurde ein Werkzeug mit dem Namen Filter geschaffen. Nach Aufruf einer Datenbank namens FILTER kann man über Formulareingabe festlegen aus welchen vorhandenen Datenbeständen welche Einschränkungen vorgenommen werden sollen. Das Resultat steht sodann in einer Tabelle im ACCESS für die weitere Verarbeitung zur Verfügung.

Stichtage

Ebenso können die Stichtage 7. 3. xxxx, 7. 6. xxxx, 7. 9. xxxx, 7. 12. xxxx eines beliebigen anzugebenden Datenbestandes gezogen werden. Das Resultat steht dann in einer Tabelle im ACCESS für weitere Verarbeitung zur Verfügung. Dies ist als Ergänzung zu den bereits gespeicherten Stichtagstabellen gedacht.

Vorausgegangene und nachfolgende Episoden (woher_wohin)

Für die Frage, was passiert nach einem bestimmten Ereignis, z. B. nach der Beendigung von Dienstverhältnissen, wurde eine Access-Datenbank geschaffen, die über ein Formular gesteuert folgende Funktion erfüllt:

Sie wählt aus einem anzugebenden Datenbestand Episoden nach den Angaben eines Ereignisdatenbestandes aus. So ein Ereignisdatenbestand, der das Ereignis definiert, nach dem ausgewählt werden kann, wäre in unserem obigen Beispiel eine Tabelle mit den Abgangsdaten.

Bei den Feldern dieses Datensatzes handelt es sich um

- Personennummer: anonymisierter eindeutiger Personenschlüssel
- EreignisDatum

- Zeitpunkt
- Intervall. kann 0 sein, dann werden Episoden zum Zeitpunkt gewählt
  wenn > 0 Episoden im Intervall Zeitpunkt + Intervall gewählt (wohin)
  wenn < 0 Episoden im Intervall Zeitpunkt – Intervall gewählt (woher)

Jahresscheiben

Berechnungen und Auswertungen innerhalb eines Kalenderjahres sind häufig und immer wieder notwendig. Deshalb wurde ein Tool zur Verfügung gestellt, mit dem aus einem vorhandenen Episodendatenbestand, bei dem die einzelnen Episoden über die Jahre reichen, mehrere Episoden geschaffen werden, die zum Jahreswechsel unterteilt sind.

Aus wird

3.4.1998 bis 20.12.1999 → 3.4.1998 bis 31.12.1998 1.1.1999 bis 20.12.1999 →

Stichproben

Aus den sehr umfangreichen Datenbeständen, die in einer ORACLE-Datenbank zur Verfügung gestellt werden, können Stichproben gezogen werden und die in weiterer Folge für Analysen herangezogen werden können.

Anhang Standardbeschäftigung

HV-Qualifikation	Beschreibung	WIFO-KLASSE	SZSTATUS	Priorität
10	Arbeiter	US	A	6
11	Arbeiter	US	A	6
12	Arbeiter	US	A	6
14	Angestellte	US	D	6
15	Angestellte	US	D	6
16	Angestellte	US	D	6
34	Wochengeldbezug auf Dienstgeberkonto bezogen	UW		3
36	Krankengeldbezug (auf Dienstgeberkonto bezogen)	UK		2
A2	Pflichtversicherung nur in der Arbeitslosigkeit	US		6
B1	Lehrling (Arbeiter)	UL	A	4
B2	Lehrling (Arbeiter)	UL	A	4
B4	Lehrling (Angestellte)	UL	D	4
C1	Hausgehilfen (Arbeiter)	US	A	6
C4	Hausangestellte	US	D	6
C6	Arbeiter	US	A	6
C7	Angestellte	US	D	6
D1	Hausbesorger (Arbeiter)	US	A	6
E4	Entwicklungshelfer	US		6
G1	Arbeiter	US	A	6
G2	Arbeiter	US	A	6
G3	Arbeiter	US	A	6
G4	Angestellte	US	D	6
G5	Angestellte	US	D	6
G6	Angestellte	US	D	6
G7	Krankenpflegeschülerinnen	UP		5
J1	PV als öffentlicher Bediensteter	UB		1
Z1	Unbekannte unselbständige Beschäftigung	US		6

Anhang atypisch

HV-Qualifikation	WIFO-Klasse	SZSTATUS	Priorität
18	SG	S	1
19	SB	S	2
20	SB	M	2
64	SB	S	2
79	SX	V	1
96	SM	M	4
97	SM	M	4
99	SM	M	4
A8	SM	M	4
A9	SM	M	4
F1	SF	S	1
F2	SF	S	1
F3	SG	S	1
F4	SF	S	1
G8	GB	A	6
G9	GB	D	6
J3	GB		6
J8	UX		8
J9	UX		8
M8	SB	M	2
P1	FD	W	3
P2	FD	W	3
P3	FD	F	3
P4	FD	F	3
P7	GF	F	7
P8	GF	F	7
Q9	EH	A	5
Z2	SX	S	1

Anhang Arbeitslosigkeit

HV-Qualifikation	Priorität	WIFO-Klasse
02	3	AL
35	7	WG
37	6	KS
38	1	AL
40	5	PV
48	4	AX
56	8	AL
81	4	AX
C5	2	AL

Anhang Out of Labourforce

HV-Qualifikation	WIFO-KLASSE	Priorität	HV-Qualifikation	WIFO-KLASSE	Priorität	HV-Qualifikation	WIFO-KLASSE	Priorität
05	PAS	7	A3	KG	4	K3	FW	27
06	PA	5	A7	BS	20	K4	FW	27
07	PI	11	D2	UR	17	K5	FW	27
08	PI	11	D3	KE	16	K6	FW	27
09	PA	5	D4	WF	15	K7	FW	27
13	KI	25	D5	PAL	6	K8	FW	27
22	BS	20	D6	PAA	8	K9	FW	27
23	BS	20	D7	PAI	9	N1	RE	22
25	FW	27	D8	PAT	12	N2	RE	22
26	FW	27	D9	PAG	10	N3	RE	22
27	FW	27	E1	FW	27	N4	AK	2
28	FW	27	E2	FW	27	N6	50	29
29	FW	27	E3	KI	25	N7	50	29
30	AB	26	E5	FW	27	N8	50	29
31	AB	26	E6	FW	27	N9	PAG	10
32	AB	26	E7	FW	27	O1	MV	31
33	PD	13	E8	FW	27	O2	MV	31
41	KG	4	E9	FW	27	O3	KV	28
42	RE	22	F5	FW	27	O4	KV	28
43	KG	4	F6	FW	27	O5	KV	28
44	AB	26	F7	FW	27	O6	KV	28
45	BS	20	F8	FW	27	O7	MV	31
47	RE	22	F9	FW	27	O8	HK	18
49	LG	3	H1	AB	26	O9	HK	18
50	FW	27	H2	AB	26	P5	PO	19
51	XX	30	H3	AB	26	P6	PO	19
53	ZD	14	H4	AB	26	Q1	KI	25
54	PA	5	H5	AB	26	Q2	KV	28
61	BS	20	I1	FW	27	Q3	KV	28
63	PW	24	I2	FW	27	Q4	KV	28
65	PW	24	I3	FW	27	Q5	FW	27
66	RH	23	I4	KV	28	Q6	50	29
68	RH	23	I5	KG	4	Q7	50	29
69	RH	23	I7	KV	28	Q8	50	29
70	AB	26	I9	KV	28			
78	BS	20	J2	KU	21			
80	AB	26	J5	PA	5			
83	BS	20	J6	PW	24			
86	RH	23	J7	PW	24			
87	KI	25	K1	FW	27			
98	LG	3	K2	FW	27			

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