Age-specific cyclical effects in job reallocation and labor mobility

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Abstract

We present an empirical analysis of job reallocation and labor mobility using matched worker-firm data for the Netherlands. Our data cover the period 1993–2002. We find that cyclical adjustments of the workforce occur mainly through fluctuations in worker entry for young and prime-age workers while for old workers they occur mainly through fluctuations in separations. Moreover, we find that employment dynamics of young workers are affected especially by national and sectoral employment fluctuations whereas employment of old workers varies especially with firm-specific employment changes.
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1. Introduction

In the literature on dynamic labor markets two issues are discussed more or less separately. The first issue is whether workforce adjustments over the business cycle occur mainly through job creation or through job destruction; the second issue is whether employment dynamics are age-specific. Our paper studies both issues and additionally investigates diferences in cyclical effects depending on whether the cycle occurs at the firm level, the sectoral level or the national level.

The first issue concerns the question whether as a response to business cycle fluctuations firms adjust their workforce through workers entering or workers leaving. Different studies have found different results.[1] In U.S. manufacturing workforce adjustments over the cycle occur mainly via

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[1] See Gielen and van Ours (2005) for a more extended overview of the literature.

job destruction rather than through job creation (Davis and Haltiwanger, 1999; Blanchard and Diamond, 1990). This may be due to job creation being more time-consuming than job destruction (Davis and Haltiwanger, 1999). Recessions may be a time of "cleaning-up", where outdated or unprofitable techniques and products are pruned out of the productive system and new technology is adopted. The adjustments take place in recessions, when the opportunity costs of forgone production are lowest (Caballero and Hammour, 1991). Similarly, Davis et al. (2005) find that contracting establishments in the U.S. rely on adjustments in the separation rate, not the accession rate, to bring about changes in employment. However, recently available new datasets indicate that, opposed to conventional wisdom, during the past two decades cyclical workforce adjustments in the U.S. occurred via the accession rate rather than the separation rate (Hall, 2005; Shimer, 2005). This is in line with findings for Europe, where workforce adjustments appear to occur mainly by changes in worker entry (Abowd et al., 1999) and job creation (Boeri, 1996).[2] For French firms, Abowd and Kramarz (2003) show this is optimal behavior given the cost structure of hirings and separations.

The second issue concerns the question whether there are age-specific differences in job and worker flows. Abowd et al. (2005) for example find that age-specific job flows may arise because older workers have different skill sets than younger workers. Studies based on both worker level data (Clark and Summers, 1981; Fallick, 1996) and firm level data (Abowd et al., 2005; Davis et al., 2005) find that young workers experience more employment dynamics than older workers. Firms may exploit business cycle fluctuations to change the composition of their workforce. Indeed, Blanchard and Diamond (1990) find clear cyclical differences in labor market flows for different age groups in the U.S.. In a recession, the highest increase in the flow from employment to unemployment is among young workers and the largest decrease in the flow from unemployment to employment is among young and old workers. Some other studies also find that both young (Clark and Summers, 1981) and old workers (OECD, 1995) bear a disproportionate share of the burden of a recession.

Age-specific effects are the result of both worker and firm decisions, which are based on human capital investments, adjustment costs and wage costs. Investments in firm-specific human capital make the employment relationship more productive. As a result, old workers who invested more in specific knowledge are less likely to quit than young workers. In a recession, firms may prefer to dismiss young workers first, because as yet they did not invest very much in firm-specific human capital and therefore have a lower productivity than older workers. It may also be easier to get rid of young workers because firing costs increase with age, tenure and wage. On the other hand, older workers may be laid off first, because they are overpaid due to the upward-sloping age-earnings profile (Lazear, 1979). Lazear (1995) combines both views in the "efficient layoff" rule, which states that both young and old workers will be laid off before prime-age workers.

This paper adds to the existing literature in two ways. First, we combine workforce adjustment and age-specificity which as far as we know have only been studied separately. We use information on job flows and worker flows to investigate whether age-specific effects in job reallocation and labor mobility exist and if so, whether these effects change over the business cycle. Second, in the analysis we distinguish between the effects of firm-specific, sectoral, and national economic shocks. This distinction allows a richer interpretation of cyclical phenomena and enables more precise policy recommendations.

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[2] Abowd et al. (1999) use French data, whereas Boeri (1996) uses data for France, Germany, Italy, Canada, Denmark, Norway and Sweden.

We use a unique dataset consisting of matched worker-firm data with information about worker mobility. The data cover the period 1993–2002, which allows us to study job and worker flows over a full cycle.[3] We find that age-specific cyclical effects in job and worker flows exist and that turnover varies most over the cycle for young and old workers. However, the effects of job loss are less harmful for young workers than for old workers. Moreover, we find that employment dynamics of young workers are affected especially by national and sectoral employment fluctuations whereas old workers' employment varies especially with firm-specific employment change.

The policy implications of our findings are twofold. First, there is not much that can be done about the cyclical employment fluctuations for young workers but policy makers should not worry about it. Second, since for many old workers separations are a one-way street, policy intervention is clearly relevant. Since firm-specific shocks are the main cause active labor market policies aimed at preventing job loss for old workers may prove to be useful.

The next section presents our data and some stylized facts. In Section 3 we report the results of our empirical analysis, where we estimate cyclical behavior of age-specific turnover. This is done both on the firm and on the worker level. Section 4 concludes.

2. Data and stylized facts

2.1. Data

We use the so-called AVO dataset which contains administrative information on workers and firms in the Netherlands and covers the period 1993–2002.[4] The information concerns matched worker-firm data in a repeated cross-section set-up where each cross-section contains information at two points in time. There are many observations; every year on average about 1900 firms and 44,000 workers are sampled. The dataset contains worker characteristics and job characteristics but there is no financial information about the firms such as value added, output, profits, capital and investment.[5]

The data are obtained by means of a two stage sampling procedure. In the first stage, a sample of firms is drawn from the Department of Social Affairs internal firm register that is roughly similar to the firm register of the Dutch statistical office. The sample is drawn using a stratified design — by economic sector and firm size.[6] In the second stage, a sample of workers within each firm is drawn. Information is collected from the wage administration of the firm for two distinct moments in time: October of the year of the survey (denoted by t) and October of the previous year (denoted by $t-1$). A distinction is made between workers working at the firm at both moments in time ('stayers'), workers working at the firm only at time t ('entrants'), and workers

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working at the firm only at time $t–1$ ('leavers').[7] The share of sampled workers within a firm decreases with firm size and depends on several worker categories (covered by collective bargaining contract or not; stayer/leaver/entrant). The sample size was increased if certain conditions were not met.[8] Because of this sampling design, some worker categories were underrepresented in the sample.[9]

2.2. Measuring job flows and worker flows

Few studies address both worker flows and job flows (Burgess et al., 2000; Davis et al., 2005). Our data allow us to analyze the two types of flows simultaneously. Job flows, i.e. job destruction, job creation, and job reallocation are defined following Davis and Haltiwanger (1999). We denote the level of employment at firm j in calendar year t as $e_{j,t}$ and we denote the change of employment at this firm between calendar year t and calendar year $t–1$ as $\Delta e_{j,t}$. The job destruction rate (JD) in calendar year t in the class of firms S, according to sector s and size class g, that firm j belongs to, is specified as:

$$JD_{S,t} = \frac{\sum_{j \in S^-}(|\Delta e_{j,t}|)}{\sum_{j \in S}(e_{j,t} + e_{j,t-1})/2} \tag{1}$$

where S^- represents the subset of firms within class S with $\Delta e_{j,t} < 0$. In the same way job creation rate (JC) is defined as:

$$JC_{S,t} = \frac{\sum_{j \in S^+}(\Delta e_{j,t})}{\sum_{j \in S}(e_{j,t} + e_{j,t-1})/2} \tag{2}$$

where S^+ represents the subset of firms within class S with $\Delta e_{j,t} > 0$. Furthermore, the job reallocation rate (JR) is defined as the sum of job creation rate and job destruction rate.

$$JR_{S,t} = JC_{S,t} + JD_{S,t} \tag{3}$$

Defined like this, the job destruction rate and the job creation rate use no information on real job flows, but are based on the net employment change at the employing unit.[10] Although these measures are used very frequently in the literature, they are imperfect and understate the true levels of gross job destruction and creation. Since individual jobs are not identified, some newly created and newly destroyed jobs may not show up as plant-level employment changes (Davis et

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[7] Note that since workers are observed at two moments in time, we do not know the number nor the characteristics of the workers who were hired after October of year $t–1$ and leaving the firm before October of year t.

[8] At least 10 employees had to be covered by a collective bargaining agreement and 10 not; the minimal number of stayers, entrants, and leavers had to be at least 8. This sampling design results at the firm level in random samples from subgroups of workers discerned by working in the firm in October of year t or $t–1$, or both, and covered by collective bargaining (or not).

[9] For more information about the sampling design, see Gautier et al. (1999).

[10] This is the standard definition of job flows in the literature which is chosen for practical reasons when information about gross employment changes or worker flows is absent. See for example Davis and Haltiwanger (1999).
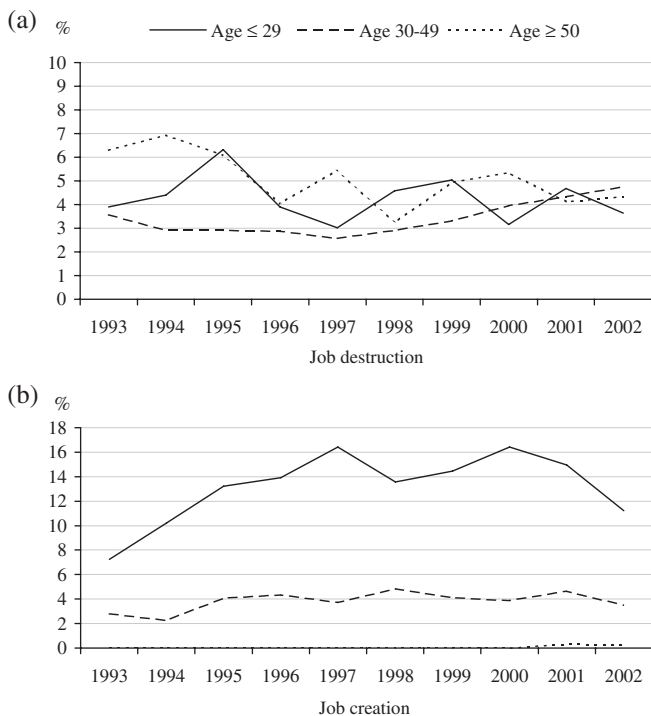
Fig. 1. Job flows by age group.

al., 1996). For example, if a firm changes the composition of its workforce by replacing 6 administrative jobs by 6 management jobs, in reality 6 jobs are created and 6 jobs are destroyed. However, because the total number of jobs remains the same no job destruction and job creation is measured.

Worker flows, i.e. worker separations (WS) and worker accessions (WA), are also defined as a share of average employment.

$$WS_{S,t} = \frac{\sum_{j \in S} F_{j,t}}{\sum_{j \in S} (e_{j,t} + e_{j,t-1})/2} \tag{4}$$

$$WA_{S,t} = \frac{\sum_{j \in S} H_{j,t}}{\sum_{j \in S} (e_{j,t} + e_{j,t-1})/2} \tag{5}$$

where F is the number of workers that left the firm in a particular period, and H denotes the number of workers that entered the firm in a particular period. Note that by definition it holds that:

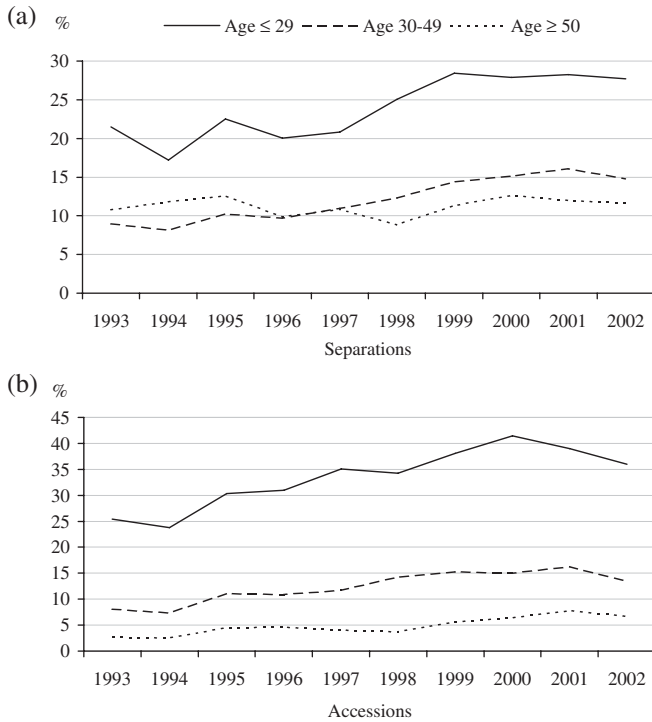$$JC_{S,t} - JD_{S,t} = WA_{S,t} - WS_{S,t} = \Delta e_{S,t} \tag{6}$$

Fig. 2. Worker flows by age group.

We distinguish three age categories of workers: young (up to 29 years), prime-age (30 to 49 years), and old (50 years and older).[11] Fig. 1 shows the observed differences between these age groups in terms of cyclical variation in job flows. There is more job destruction among old workers, while there is much more job creation among young workers. To some extent, of course, this has to do with the outflow of workers from firms being related to retirement and inflow of workers to firms being related to job market entrants. Nevertheless, as shown in Fig. 2 when it comes to worker flows there is much more dynamics in youth employment.

3. Empirical analysis

In this section the variability in job flows and worker flows is investigated. First, we estimate cyclical effects in job reallocation and worker mobility on firm level information. This enables us to compare the findings with results from previous studies. Then, we identify the age-specific cyclical sensitivity by including the three separate age groups in the analysis. Finally, we focus on the individual worker and estimate the cyclical sensitivity of worker flows for the different age groups.

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[11] The lower boundary of 29 is chosen to make sure also some high educated workers are included in the group of young workers. The upper boundary is chosen because workers in the Netherlands gradually become eligible for early retirement schemes as of the age of 50.

Table 1
Parameter estimates quasi panel

	Job destruction (1)	Job creation (2)	Job reallocation (3)	Worker separations (4)	Worker accessions (5)
a. Baseline model					
Δe_s	−0.141 (0.076)*	0.368 (0.116)**	0.227 (0.113)**	−0.053 (0.163)	0.385 (0.246)
Δe_n	0.002 (0.291)	0.406 (0.252)	0.408 (0.349)	1.034 (0.577)*	1.277 (0.581)**
$\bar{R}^2$	0.221	0.432	0.469	0.259	0.286
b. Age effects					
Young	0.009 (0.004)**	0.085 (0.006)**	0.094 (0.007)**	0.092 (0.008)**	0.177 (0.007)**
Old	0.045 (0.006)**	−0.020 (0.003)**	0.025 (0.006)**	0.017 (0.007)**	−0.056 (0.005)**
Young * Δe_s	−0.186 (0.057)**	0.709 (0.165)**	0.523 (0.167)**	0.026 (0.279)	0.916 (0.283)**
Prime–age * Δe_s	−0.159 (0.095)*	0.434 (0.106)**	0.275 (0.142)*	−0.167 (0.181)	0.430 (0.161)**
Old * Δe_s	−0.156 (0.113)	0.069 (0.099)	−0.087 (0.156)	−0.368 (0.211)*	−0.132 (0.196)
Young * Δe_n	−0.178 (0.249)	1.401 (0.466)**	1.223 (0.529)**	1.416 (0.863)	2.902 (0.933)**
Prime-age * Δe_n	0.291 (0.389)	0.191 (0.330)	0.483 (0.531)	1.546 (0.619)**	1.427 (0.594)**
Old * Δe_n	−0.286 (0.290)	0.787 (0.264)**	0.501 (0.416)	0.053 (0.524)	1.274 (0.508)**
$\bar{R}^2$	0.238	0.619	0.484	0.358	0.768

Note. The estimates are based on 473 observations in panel a and 1418 in panel b; robust standard errors in parentheses, a **/* indicates that the coefficient is different from zero at a 5%/10% level of significance; each column represents a separate estimate; all analyses include fixed effects for sector-firm size combinations.

3.1. Job reallocation and labor mobility

Our baseline model explaining job and worker turnover is:

$$y_{s,g,t} = \alpha_{s,g}^y + \beta_n^y \Delta e_{n,t} + \beta_s^y \Delta e_{s,t} + \varepsilon_{s,g,t}^y \tag{7}$$

where the dependent variables are job destruction rate ($y=JD$), job creation rate ($y=JC$), job reallocation rate ($y=JR$), worker separation rate ($y=WS$), and worker accession rate ($y=WA$) defined by sector (s), size class (g), and calendar year (t).[12] This approach enables us to follow groups of firms (based on sector and firm size) over time and create a quasi-panel. We estimate fixed effects models where $\alpha_{s,g}^y$ refers to fixed effects for sector-firm size combinations; Δe_n and Δe_s represent the employment growth rate on the national and sectoral level, respectively, and β_n and β_s measure the effect of the cycle, where β_s is identied because employment changes are different across sectors. Finally, ϵ is the error term.[13]

The parameter estimates of our baseline model are presented in the upper part of Table 1. The effects of the cyclical indicators are according to expectations. If sectoral employment goes up there is less job destruction and more job creation. Because the effect of the sectoral cycle on job destruction is smaller than the effect of the cycle on job creation, job reallocation reacts positively to an sectoral economic upswing. Note that this result is in line with the literature which states that turnover is concentrated in cyclical upturns. In accordance with the findings by Albaek and Sørensen (1998), we find that the worker accession rate increases in an economic upturn. Separations appear to behave procyclical. Apparently, the effect on quits, which react procyclical,

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[12] A comparable approach is used in Gomez-Salvador et al. (2004). By definitions (1)-(5), all of the dependent variables are larger than or equal to zero. Our dataset has a few observations with value zero. As part of a sensitivity analysis, we also used the logarithm of one + the flow rates as dependent variables. This does not change our conclusions.

[13] When computing standard errors we take the aggregate nature of some of our variables into account (Moulton, 1990).

dominates the effect on layoffs, which behave countercyclical.[14] Note that job turnover measures are affected by sectoral economic fluctuations, while worker mobility appears to respond to aggregate economic change.

3.2. Age-specific job reallocation and labor mobility

Our main interest is in age-specific effects of job reallocation and worker mobility. To estimate whether job turnover is different for workers of different age groups, Eq. (7) is re-estimated. Now $y_{s,g,t,k}$ is the dependent variable, where k denotes the age group (k = *young*, *prime-age*, *old*).[15] To investigate the age-specific cyclical sensitivity of job flows in more detail we include interaction terms between the age groups and both the national and sectoral employment change. The parameter estimates are shown in the lower part of Table 1. The results suggest that, conditional on the fixed effects and the business cycle, there are age-specific differences in job flows and worker flows. Jobs for older workers are destroyed relatively more often. Note that this is not due to more employment stability among other age groups, but to more dynamics in employment among other age groups. That is, the sum of worker inflow and outflow is much larger for young and prime-age workers than for older workers.[16] Similarly, we find there is less job creation for old workers compared to prime-age workers. For young workers there is relatively more job creation than for prime-age workers. Young workers experience more employment dynamics, but the difference in the accession rate between young workers and prime-age workers is much higher than the difference in the separation rate. This means that more jobs are created for young workers than for prime-age workers and also explains the absence of a difference between job destruction among young workers and among prime-age workers. The higher accession and separation rates imply that for most separating young workers another young worker is hired.

Not only do age-specific differences in job flows and worker flows exist, they also vary over the business cycle. As shown in the lower part of Table 1 many of the estimated coefficients of national and sectoral employment changes are age-specific. This is not the case for job destruction where the relevant coefficients do not differ significantly from each other. However for job creation and job reallocation there are substantial differences with young workers being more sensitive to cyclical fluctuations both at the national level and at the sectoral level. Also for worker separations there are clear differences. Whereas prime-age workers have a positive association with national employment older workers have a negative association with sectoral employment. The effect of both the national cycle and the sectoral cycle on worker accessions decreases significantly with age.

All in all, sectoral cyclical adjustments of the workforce occur mainly through fluctuations in accessions for young and prime-age workers while for old workers they occur mainly through fluctuations in separations. National fluctuations in employment also affect young and prime-age workers but do not influence old workers very much.

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[14] In Gielen and van Ours (2005) some sensitivity analyses are presented that illustrate the robustness of the results to changing specifications.

[15] Note that for labor mobility $y_{s,g,t}$ is a weighted average of $y_{s,g,t,k}$ for the different age groups. This does not hold for job turnover; $y_{s,g,t,k}$ uses more detailed information than $y_{s,g,t}$. Consider for example a firm replacing an old worker by a young worker. In the previous approach, the net employment change would be 0, therefore we would have no job creation and job destruction. However, in the age-specific approach, we identify a job destruction flow for old workers equal to 1 and a job creation flow for young workers equal to 1.

[16] Note that separations among older workers are slightly higher than for prime-age workers which may be related to the high separation probability for people older than 60 due to early retirement.

Table 2
Parameter estimates logit analysis

	Separations (1)	Accessions (2)
Young	0.490 (0.082)**	1.160 (0.065)**
Old	0.563 (0.121)**	−1.044 (0.125)**
Cyclical sensitivity		
Young * Δe_I	−1.655 (0.326)**	2.594 (0.348)**
Prime-age * Δe_I	−1.939 (0.473)**	4.472 (0.356)**
Old * Δe_I	−2.707 (0.384)**	6.460 (0.630)**
Young * Δe_s	5.395 (1.701)**	3.579 (1.560)**
Prime-age * Δe_s	3.275 (1.660)**	3.317 (1.968)*
Old * Δe_s	−4.432 (2.861)	3.593 (3.276)
Young * Δe_n	7.321 (6.258)	12.995 (5.030)**
Prime-age * Δe_n	5.830 (5.220)	6.019 (6.973)
Old * Δe_n	3.181 (7.157)	−2.023 (9.323)

Note. Estimations also include contract type, education level, job complexity level, tenure (only in separations estimation), gender, and occupation as well as fixed effects for sector and firm size combinations. The estimates are based on 270,771 observations; robust standard errors accounting for clustering of observations across sector and calendar year in parentheses, a **/* indicates that the coefficient is different from zero at a 5%/10% level of significance.

3.3. Separations and accessions by age

To study the age-specific differences in more detail we investigate separations and accessions at the individual level. We specify logit models in which the probability of individual job separation or accession depends on individual characteristics, cyclical effects, and fixed effects for sector-firm size combinations. In this model, the cyclical effects consist of firm-specific cyclical shocks (Δe_i) as well as sectoral and national cyclical changes (Δe_s and Δe_n, respectively). This enables us to disentangle internal and external cyclical effects.[17] The logit model for separations explains whether or not an individual leaves the firm between t–1 and t. So it concerns the behavior of all workers present in the firm at time t–1 and it is 'forward looking'. The logit model for accessions explains whether or not an individual entered the firm between t–1 and t, which is somewhat unusual because it concerns what happened to individuals present in the firm at time t and is thus 'backward looking'. Nevertheless, we estimate this model for reasons of symmetry.

The estimated coefficients are shown in Table 2. The results indicate that age effects remain significant, even after controlling for many worker and job characteristics. As in the firm-level analysis, we find that the probability of a separation for young and old workers is relatively high compared to prime-age workers, whereas the probability to enter a firm decreases with age.

If firm level employment expands the probability of separation decreases, whereas the probability of accession increases significantly by age.[18] Sectoral employment growth has a positive effect on the accession probability, but is not statistically different for different age groups. On the other hand, there is a positive effect on the separation probability especially for young and prime-age workers. National employment growth does not affect mobility for workers of different ages in a significantly different way.

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[17] Because we use aggregate variables we again corrected the standard errors for clustering of observations in year and sector. The results remain unchanged if we correct for residual correlation within firms.

[18] We applied Wald tests to investigate whether differences between parameter estimates are statistically significant.

Table 3
Predicted separation and accession probabilities

	All cases (1)	National cycle			Sectoral cycle			Firm-specific change		
		$\Delta e_n < 0$ (2)	$\Delta e_n > 0$ (3)	Diff. (4)	$\Delta e_s < 0$ (5)	$\Delta e_s > 0$ (6)	Diff. (7)	$\Delta e_i < 0$ (8)	$\Delta e_i > 0$ (9)	Diff. (10)
a. Separations										
Young	21.4	17.5	22.5	5.0	17.3	23.2	5.9	24.8	19.4	−5.4
Prime-age	10.7	9.1	11.0	1.9	9.2	11.4	2.2	12.3	9.6	−2.7
Old	11.2	11.8	11.1	−0.7	11.5	11.1	−0.4	13.0	9.5	−3.5
b. Accessions										
Young	30.2	23.1	32.1	9.0	23.7	32.9	9.2	22.3	35.1	12.8
Prime-age	11.1	8.5	11.7	3.2	8.5	12.3	3.8	6.5	14.7	8.2
Old	4.2	3.4	4.3	0.9	3.2	4.6	1.4	1.9	6.2	4.3

Note. Predictions represent average probabilities per group based on the parameters estimates presented in Table 2.

Since we would like to know the size of the effect of the cyclical fluctuations, we use the parameter estimates of Table 2 to predict the probability of separation and accession for the separate age groups in different stages of the economic cycle (Table 3).[19] The first column presents the predicted probabilities based on all cases, which again confirms that young workers have by far the highest mobility. It appears that separations of young and prime-age workers increase by cyclical upturns outside the firm. This is most likely due to changes in quits which seem to react more strongly to sectoral employment change than to aggregate employment change. This could be due to the fact that specific human capital can be more easily transferred to a related job within the same sector. For old workers a negative effect of an external — national or sectoral — employment change on separations is found, most likely because old workers are less likely to quit. Hence, the effect of the cycle on layoffs dominates the effect on quits. Firm-specific employment growth reduces separations for all age groups, most likely through layoffs, though the relative effect is largest for old workers. Although we do not distinguish between quits and layoffs, we think that workforce adjustments by firms via worker outflow mainly affect old workers, since young and prime-age workers have a possibility to prevent layoffs by changing jobs. For accessions we find that both firm-specific and external economic improvements increase the probability of accession for all age groups. In relative terms, old workers benefit most from firm-specific employment expansion, but in absolute terms young workers benefit the most. The relative increase due to external economic upturns is largest for young workers. Hence, just as in the firm-level analysis we find that young workers benefit most from cyclical upturns. Finally, note that the differences in accession probabilities over the cycle are larger than the changes in separation probabilities, which suggests that workforce adjustments occur especially via worker inflow and not so much via worker outflow.

4. Conclusions

The current paper investigates how firms adjust their workforce over the cycle. Our empirical analysis is based on matched worker-firm data for the Netherlands, collected over the period 1993–2002. Our dataset allows us to study both job flows and worker flows in great detail.

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[19] Since all predictions are different from zero at a 5% level of significance, we did not present the standard errors.

We investigate age-specific effects in workforce adjustments including in the analysis firm-specific shocks as well as sectoral and national economic shocks. Thus, we contribute to the existing literature in two ways. We expand the analysis of workforce adjustment by distinguishing between age groups and we enrich the analysis of cyclical effects.

We find that age plays an important role in the employment adjustment over the business cycle. The results from both the quasi-panel analysis and the worker level analyses indicate that young workers experience most employment dynamics. Moreover, cyclical adjustments of the workforce occur mainly through fluctuations in worker entry for young and prime-age workers while for old workers they occur mainly through fluctuations in separations. Our results for young and prime age workers are in line with European and recent U.S. studies that find that generally workforce adjustment takes place through accessions. Previous studies however do not distinguish cyclical adjustments by age. We find that national and sectoral employment fluctuations hardly affect separations and accessions for older workers. Only firm-specific employment fluctuations have relatively large effects. Young and prime-age workers are equally sensitive to national, sectoral and firm-specific employment fluctuations although the direction of the effect differs. Firm-specific employment growth for example leads to fewer separations while national and sectoral employment growth leads to more separations. Apparently, old workers are to a large extent shut off from the influence of the business cycle in sofar this does not affect their firm.

Since workforce adjustments occur mainly via worker inflow, we find that these adjustments lead to a rejuvenation of the workforce. Recessions especially affect young and old workers, but young workers are more able to recover quickly during a business cycle upturn. This is in line with previous studies which conclude that young workers face more employment dynamics. From our findings we conclude that, even though employment of young workers is relatively more volatile over the cycle, job loss in recessions is less harmful for this group, since they recover more quickly after a recession than old workers. Separations for old workers are more likely to be a one-way street out of the labor force into long-term unemployment.

In drawing policy conclusions from our findings the distinction between various age groups and different types of shocks is very useful. Whereas nothing much can be done about national and sectoral shocks that particularly influence the labor market position of young workers firm-specific shocks that mainly affect the position of old workers may be more prone to policy measures. And, whereas policy makers should not worry too much about employment fluctuations for young workers the labor market position of old workers clearly needs attention. Once they have lost their job it may be difficult to bring them back to work. Active labor market policies aiming to prevent job loss for old workers may therefore prove to be useful. For example, wage subsidies may improve the employability of older workers. Moreover, training of older workers in public training programs would help them to acquire new skills and to adapt to new demands, such that these workers are more likely to retain their jobs.

Acknowledgements

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