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Employment losses are larger in firms with high percentages workers in a relatively weak labour market position, while continuing workers are assured of wage increases regardless of sales shocks suffered by the firm at which they work.

Flexible Wages or Flexible Workers? A Decomposition of Wage Bill Adjustment by Dutch Firms, 2006–2013

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Abstract

This paper investigates how firms adjust wages and employment in periods of adverse economic circumstances, using extensive, administrative linked employer–employee panel data for the Netherlands. Changes in the contractual wage bills of firms are decomposed into wages and job flows, distinguishing stayers and workers entering and exiting the firm. Employment reduction is found to be the major channel for wage-bill contraction by firms, indicating downward wage rigidity. A negative relationship is established between firms’ degree of downward wage rigidity and their employment growth, suggesting that job losses in response to adverse shocks would be significantly lower if wages were more downwardly flexible. Moreover, employment loss hits a non-random group of workers: given a severe negative shock in sales, employment losses are larger in firms with high percentages workers in a relatively weak labour-market position, while continuing workers are assured of wage increases regardless of sales shocks suffered by the firm at which they work.

Keywords: Wages, Employment flows, Linked employer-employee data

JEL Classification: J30, J31, J41, J62

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1 Introduction

This paper studies the ways in which firms adjust their wage bills (the sum of all wages paid by a firm) in times of declining demand. The paper takes a relatively wide perspective: as empirical studies typically aim to explain the development of either employment or wages, I study adjustments to wages and job flows simultaneously and from a firm perspective. Hereto I use an extensive, administrative linked employer-employee panel dataset for the Netherlands, which contains wages and participation data for all workers. Firm characteristics are, however, typically not available across the whole sample. I focus on a sample of firms with 25 workers or more for which data concerning year-to-year changes in sales are available. This data-set comprises more than 75,000 firm-year observations, which are based on 12.3 million job-year observations.

The study comprises two parts: (1) decomposition and (2) regression analysis. In the first part, changes in the contractual wage bills of firms are decomposed into items related to price (hourly wages) and volume (hours worked, number of jobs), distinguishing between stayers and workers entering and exiting the firm. I also considered overtime pay and incidental wages. I analyse the impact of adverse sales shocks of various sizes on this decomposition by estimating the asymmetry in the responses by firms to falling or growing sales. The decompositions are examined through various variables, such as sales growth (by group) and the share of open-term contracts. The results of these decompositions are accompanied by additional detailed information regarding job flows, wages and hours worked by groups of workers and types of contract. The decomposition-analysis discloses how firms choose their mix of wage mitigation and employment reduction in response to adverse sales growth. One limitation arises, however, that comparing decompositions of two groups of firms does not take into account the differences in observed characteristics.

The second part of the analysis comprises multivariate regressions which relate wage changes, job flows or employment growth to a number of firm characteristics. Again, the unit of observation is the firm. The analyses generally focus on firm-year observations for which sales decrease, or even decline sharply, since this is when adjustments typically occur.

The paper contributes to the literature about downward wage rigidity. Rising unemployment during The Great Recession has led to renewed interest in this subject. Downward wage rigidity can occur for a variety of reasons.¹ Though smoothing wages over time may be optimal from some

¹Shapiro and Stiglitz (1984) argued that it is optimal for firms to pay wages above the market-clearing level to give workers an incentive to provide high effort, with the quasi-rent workers lose if they get fired possibly preventing them from shirking. Insider-outsider theories state that unions and collective bargaining generate wages that exceed the market-clearing

perspectives, theoretical studies emphasize a trade-off with more employment volatility which may imply less job security for specific groups on the labour market.² Recent empirical research indeed suggests that both nominal and real wages are downwardly rigid in many European countries (Babecký et al. (2012), Knoppik and Beissinger (2009), Holden and Wulfsberg (2014)). Still, studies of wage rigidity have their limitations. Firstly, measurement of wage rigidity is often restricted to the wages of workers who have remained working at a firm for two consecutive years (stayers), but firms may partly offset the downwardly rigid wages of stayers by using job turnover to adjust their average wages. Secondly, studies of downward wage rigidity often focus on the lower end of the distribution of wage changes, for example by comparing the left hand side of the actual distribution of wage changes with that of a symmetric, theoretical distribution representing a situation without downward wage rigidity (Dickens et al. (2007), Goette et al. (2007)). However, firms may compensate for rigid downward wages through moderate wage growth at the middle and higher segments of their wage change distribution; therefore, the relationship between downward wage rigidity and changes in employment is not clear-cut (Elsby (2009), Stüber and Beissinger (2012)). Studies of the United States confirm that wage stickiness is highly heterogeneous between groups of workers, both between stayers and movers (Pissarides (2009)) and among percentile groups (Robin (2011)). Thirdly, most studies of wage rigidity focus on contractual wages, so micro-econometric studies of wage rigidity generally do not reveal to what extent firms use other wage components to adjust their wage bills. Given these limitations of wage-rigidity studies, analysing how firms respond to adverse shocks requires considering how wages of non-stayers, wages at the middle and higher ends of the wage-change distribution, and wage components other than contractual wages all react.

Little is known, however, about the strategies firms use to reduce their labour costs in response to adverse sales shocks, nor about the possible im-

level and that such wages respond little to adverse labour market situations (Lindbeck and Snower (1986)). Smoothing wages over the business cycle may also be optimal because firms can diversify firm-specific risks, while risk-averse workers can not (Teulings and Bovenberg (2009)).

²In a negative demand shock, there is a trade-off between the responsiveness of wages and reduction in employment. In a basic labour demand-supply framework with an inelastic labour supply, a leftward shift of the labour demand curve due to a demand shock leads to unemployment if wages do not fall (Pessoa and Van Reenen (2014)). Moreover, search and matching models require wages that are unresponsive to current labour-market conditions to generate the volatility in job-finding rates and unemployment that are observed in the data across the business cycle (Hall (2005), Shimer (2004), Shimer (2005)). On the other hand, wages in new job matches often do show volatility (with a modification based on fixed matching costs, the canonical search and matching model can generate both cyclical unemployment volatility and wage flexibility in new matches (Pissarides (2009)).

pediments firms face to such adjustments. Adjustment of employment at the extensive margin may, for example, be limited by employment-protection legislation and rules concerning the use of temporary contracts. At the intensive margin, institutions such as partial unemployment insurance and regulation of working hours play a role. Whether adjustment takes place in terms of wages or in terms of employment is quite important, since unemployment and job insecurity are costly to individual workers leading to large losses in income, skills and human capital, as well as a lower state of well-being (Origo and Pagani (2009), Clark et al. (2010)). Especially for older workers, the cost of losing a job is high; their probability of finding a new job after displacement is substantially lower and their wage drop (if they do find a new job) larger than for prime-age workers Deelen et al. (2014). Given the lack of clarity of how firms adjust wages and employment (and, as a result, labour productivity) to adverse shocks, the answer has to come from empirical research. This study aims to shed light on these adjustments.

The main findings of the paper are the following. The decomposition analysis shows that employment reduction is by far the most important channel for contracting wage bills, indicating downward wage rigidity. In this regard, firms use not only increased exits but also reduced entries, probably to avoid firing costs. A striking result is that the contractual wage growth of stayers is only somewhat lower at firms hit by an adverse shock, compared to firms with increasing sales, and wage changes remain positive on average. Over the years, however, wage growth has decelerated across the board. I find no indication that job flows are used as a vehicle to reduce the average wage; wages of entrants do not lag further behind those of stayers when sales growth is more adverse. Hence, contractual wages have minor importance for wage-bill adjustment in adverse times for both stayers and entrants. Contractual working hours provide some downward flexibility, as do overtime pay and incidental wages, but the magnitude of the effect is small.

Regression analysis confirms that, in the short run, stayers' wage growth is only somewhat responsive to negative sales shocks. By contrast, employment growth is quite sensitive to firm characteristics, especially with larger negative sales shocks are larger. Employment loss, however, does not hit a random group of workers: given a severe negative shock in sales, employment losses are larger at firms with higher percentages of immigrants, short-tenured workers, temporary contracts, non-regular job-types and part-time jobs. Moreover, I find a significant negative relationship between firms' degree of downward wage rigidity and their employment growth, suggesting that employment reduction would be significantly lower if wages were more downwardly flexible. These findings may point to a segmented labour market, where, on the one

hand, employment adjustments predominantly affect workers in a relatively weak labour market position, whereas ongoing workers are assured that wage increases will not be jeopardised by sales shocks suffered by their firms.

The remainder of this paper is organised as follows. Section 2 describes the methodology. Section 3 discusses the data and the institutional features of the Dutch labour market. The results of the decomposition analysis are presented in subsection 4.1. Estimated relationships among job flows, wage or employment growth and firm characteristics are presented in subsection 4.2, and subsection 4.3 discusses the results. Section 5 concludes.

2 Methodology

The first part of the analysis, the decomposition of firms' changing wage bills, is inspired by Fuss (2009), which decomposed wage-bill changes at the firm level into components due to wage changes and components due to flows of employment. That study used administrative, matched employer–employee data of individual earnings merged with firms' annual accounts for Belgium from 1997 to 2001. Fuss' results agreed with what one would expect from a downwardly rigid wage environment (which stems, among other things, from the Belgian system of full automatic indexation under which the base-wage of all workers is adjusted to inflation). On average, Fuss finds that wage-bill contractions result essentially from employment cuts in spite of wage increases.

The contractual wage bill is the sum of the monthly contractual wages of firm i . By contractual wage I mean, the base wage, excluding overtime pay and performance-related pay, such as incidental pay, extra pay and bonuses. At time t , firm i employs $J_{i,t}$ workers (indexed by j), earning a monthly contractual wage $w_{ji,t}$. The changes in the wage bill are scaled on the average wage bill over both years, following Davis and Haltiwanger (1992). As a first step, Equation 1 simply decomposes the growth rate of the wage bill $\overset{\circ}{WB}_{i,t}$ into a component related to the change in the average monthly contractual wage and a component related to the change in the number of workers.

$$\begin{aligned} \overset{\circ}{WB}_{i,t} &= \frac{\sum_{J_{i,t}} w_{ji,t} - \sum_{J_{i,t-1}} w_{ji,t-1}}{0.5(\sum_{J_{i,t}} w_{ji,t} + \sum_{J_{i,t-1}} w_{ji,t-1})} \\ &= \frac{J_{t-1}(\bar{w}_t - \bar{w}_{t-1}) + (J_t - J_{t-1})\bar{w}_t}{0.5(\sum_{J_{i,t}} w_{ji,t} + \sum_{J_{i,t-1}} w_{ji,t-1})} \end{aligned} \tag{1}$$

Out of the $J_{i,t}$ workers that firm i employs at time t , $S_{i,t}$ are stayers, workers employed by firm i in both t and $(t-1)$, and $N_{i,t}$ are entrants, employed by firm i at t but not yet employed by this firm at $(t-1)$. Out of the $J_{i,t-1}$ workers

that firm i employs at time $(t-1)$, $E_{i,t-1}$ are exiters, employed by firm i at $(t-1)$ but not at t , and $S_{i,t-1}$ stayers. The change in the wage bill of a firm is equal to the sum of the wages of stayers and entrants in year t minus the sum of the wages of stayers and exiters in year $(t-1)$:

$$W\overset{\circ}{B}_{i,t} = \frac{(\sum_{J_{i,t} \in S_{i,t}} w_{j_i,t} + \sum_{J_{i,t} \in N_{i,t}} w_{j_i,t})}{0.5(\sum_{J_{i,t}} w_{j_i,t} + \sum_{J_{i,t-1}} w_{j_i,t-1})} - \frac{(\sum_{J_{i,t-1} \in S_{i,t-1}} w_{j_i,t-1} + \sum_{J_{i,t-1} \in E_{i,t-1}} w_{j_i,t-1})}{0.5(\sum_{J_{i,t}} w_{j_i,t} + \sum_{J_{i,t-1}} w_{j_i,t-1})} \quad (2)$$

Replacing the sum of contractual wages of each group (S, N or E) by the number of workers in that group times their average contractual wage and rewriting the equation gives the decomposition of the change in the contractual wage bill (equation 3). The first component reflects the contribution from the change in the average contractual monthly wage of stayers, while the second component represents the contribution from the net change in employment. The third and fourth components relate to the contribution of job flows. For example, if exiters are replaced by an equal number of lower-waged entrants, the change in net employment is zero, but job flows negatively contribute to the change in the wage bill lowering the average wage level. More specifically, the third component reflects new entrants and their wages, relative to those of stayers. Since the average wage of newly hired workers is below that of stayers, the component is negative: hiring new workers reduces wage-bill growth. Analogously, the last component reflects the contribution of workers exiting the firm and their wages, relative to the wages of stayers. Since the average wage of exiters is below that of stayers, workers leaving increases wage-bill growth.³

$$W\overset{\circ}{B}_{i,t} = \frac{(N_t - E_{t-1})\bar{w}_t^S + S_t(\bar{w}_t^S - \bar{w}_{t-1}^S) + N_t(\bar{w}_t^N - \bar{w}_t^S) - E_{t-1}(\bar{w}_{t-1}^E - \bar{w}_t^S)}{0.5(\sum_{J_{i,t}} w_{j_i,t} + \sum_{J_{i,t-1}} w_{j_i,t-1})} \quad (3)$$

Since the contractual monthly wage (w) is equal to the contractual number of working hours per month (H) times the contractual hourly wage (w^h), the wage-bill change can be further decomposed in terms of number of jobs, hours worked and the hourly wages of stayers, entrants and exiters (equation 4). The

³Wages of stayers are used as a common benchmark for the wages of both entrants and exiters. Direct comparison between wages of entrants and exiters would only be possible for firms that featured both entrants and exiters in a particular year. Note that these components compensate ‘overshooting’ by the second component, which is caused by the fact that the change in net employment is valued at the average wage of stayers in year t .

first component is again the contribution of the net change in employment, valued at the average wage of stayers in year t . The contribution of stayers is split into one component for the change in hourly wage (the second component in equation 4) and one for the change in the average working hours of stayers (the third component in equation 4). The fourth and fifth components depict the job-flow contributions of hourly wages by non-stayers, while the last two components represent job-flow contributions of hours worked by non-stayers. The tables in the results section contain six items, since the last two components are presented as a single component, ‘hours worked, non-stayers’. Besides the contractual wage bill, wider definitions of the wage bill are also considered on top of this: one including overtime pay and another including incidental and extra pay.

$$\begin{aligned}
W\overset{\circ}{B}_{i,t} = & \frac{(N_t - E_{t-1})\bar{w}_t^S + \sum_S(w_t^{hS} - w_{t-1}^{hS})H_t^S + \sum_S(H_t^S - H_{t-1}^S)w_{t-1}^{hS}}{0.5(\sum_{Ji,t}w_{ji,t} + \sum_{Ji,t-1}w_{ji,t-1})} + \\
& \frac{(\bar{w}_t^{hN} - \bar{w}_t^{hS})N_t\bar{H}_t^N - (\bar{w}_{t-1}^{hE} - \bar{w}_t^{hS})E_{t-1}\bar{H}_{t-1}^E}{0.5(\sum_{Ji,t}w_{ji,t} + \sum_{Ji,t-1}w_{ji,t-1})} + \\
& \frac{(\bar{H}_t^N - \bar{H}_t^S)N_t\bar{w}_t^{hS} - (\bar{H}_{t-1}^E - \bar{H}_t^S)E_{t-1}\bar{w}_t^{hS}}{0.5(\sum_{Ji,t}w_{ji,t} + \sum_{Ji,t-1}w_{ji,t-1})}
\end{aligned} \tag{4}$$

Having computed the decomposition of the change in wage bill for each firm-year combination, the next step is to assess to what extent wage-bill adjustments are *symmetric* between favourable and adverse states. I define a firm-year combination as an adverse state if the firm’s sales decreased compared to the year before, whereas a firm-year combinations in which sales of a firm increase or remain constant are termed favourable.⁴ The analysis focusses on the way firms adapt to an exogenous shock in sales.⁵ I therefore analyse the impact of an adverse sales shock on firms’ wage-change decompositions by estimating the asymmetry between firm-year observations with falling and growing sales (or, alternatively, between severe and more moderate

⁴Parsimonious regressions in Table A.1 in Appendix A illustrate that wage-bill contraction is strongly correlated with sales reduction. As a robustness check, in Table B.1 in Appendix B, I use the wage-bill change instead of sales growth to distinguish between favourable (positive wage-bill growth) and adverse (negative wage-bill growth) states.

⁵Although reversed causality cannot be fully excluded (for example, high wages may lead to overpriced products, inducing low sales), sales reduction may to a large extent be considered an exogenous shock, perhaps even more so since the observed period is characterized by reduced demand.

negative sales shocks, for example the asymmetry between subsamples of firms based on the yearly percentile distribution of the change in sales, like P1–P25 compared to P25–P75 or P25–P75 compared to P75–P100). To estimate this asymmetry, for each item of the decomposition a Student’s t-test is performed for the hypothesis that there is no difference in the mean between the two states. In this regard, the next simple equation is estimated using maximum likelihood—for sake of consistency with the method used by Fuss (2009)—, taking into account common year effects γ_t :

$$\Delta x_{k_i,t} = \alpha_k + \beta_k \cdot dum_{k_i,t} + \gamma_{k_t} + \epsilon_{k_i,t} \quad (5)$$

where $k = 1, \dots, 6$, since equation 5 is estimated separately for each item of equation 4⁶

The second part of the paper relates employment growth, job flows and wage growth to an extensive set of firm characteristics, applying linear and logistic regression analyses. Again the firm is the unit of observation. As with the decomposition analysis, the regression analysis focusses on the adjustment in cases of adverse sales shocks. Indicators for nominal and real downward wage rigidity have been included as explanatory variables in the regressions to analyse the relation between downward wage rigidity and employment growth (see Appendix C for more detailed information on the indicators of wage rigidity).

3 Data and institutional features of the Dutch labour market

3.1 Data

This paper uses administrative, linked employer–employee data for the Netherlands covering the period 2006–2013. Data from the Social Statistical Datasets (SSD), containing wages, hours worked and other characteristics for all jobs in the Netherlands, have been merged with workers’ personal characteristics and firm data (see Appendix C for more detailed information on the creation of the dataset and the applied selections).

⁶The tables in the results section refer to the items $\Delta x_{k_i,t}$ as the contributions to the gross contractual wage-bill growth by the change in:

- 1) net employment: $(N_t - E_{t-1})\bar{w}_t^S/D$
 - 2) hourly wage, stayers: $\Sigma_S(w_t^{hS} - w_{t-1}^{hS})H_t^S/D$
 - 3) hourly wage, entrants: $(\bar{w}_t^{hN} - \bar{w}_t^{hS})N_t\bar{H}_t^N/D$
 - 4) hourly wage, exiters: $(\bar{w}_{t-1}^{hE} - \bar{w}_t^{hS})E_{t-1}\bar{H}_{t-1}^E/D$
 - 5) hours worked, stayers: $\Sigma_S(H_t^S - H_{t-1}^S)w_{t-1}^{hS}/D$
 - 6) hours worked, non-stayers: $(\bar{H}_t^N - \bar{H}_t^S)N_t\bar{w}_t^{hS} - (\bar{H}_{t-1}^E - \bar{H}_t^S)E_{t-1}\bar{w}_t^{hS}/D$,
- where $D = \text{denominator } 0.5(\Sigma_{j_i,t}w_{j_i,t} + \Sigma_{j_i,t-1}w_{j_i,t-1})$.

Data regarding wages and hours worked are available for all workers in all firms, an improvement compared to Fuss (2009), whose data do not cover all Belgian firms. Moreover, the data here contain exact information on the start and end date of all jobs; however, dismissals and voluntary exits can not be distinguished. Firm-level data such as that concerning sales, however, are generally only available for a subset of firms.

I choose to restrict the sample to workers aged 23 to 65. The main reason to exclude workers younger than 23 is that the Dutch mandatory youth minimum wage follows a steep profile: from the age of 15 to 23, the minimum wage increases yearly by 15 to 17%. Hence, workers on a youth minimum wage see automatic wage increases by two-digit percentages. As a result, youth workers in some sectors also face a higher probability of dismissal as their birthday approaches (Kabátek (2015)). The inclusion of young workers in my data could thus mask a possible downward adjustment of stayers' wages in response to a negative shock. Workers aged over 65 are also excluded from the data; working after the mandatory retirement age is possible, but contracts generally require renegotiation. Hence, these age groups may experience large individual wage changes for reasons that are not the primary focus of this paper.

For each set of two subsequent years, wage-bill changes are decomposed for all private-sector firms with 25 employees or more that exist in October of both years. In the main analysis, firm-year combinations are excluded that are characterised by firm dynamics, such as mergers and acquisitions. A robustness check explores how including such combinations affects the results. Summarized, the analyses focus on wages paid to workers aged 23 to 65 in ongoing, private-sector firms which are not subject to firm dynamics and employ at least 25 workers.⁷

3.2 Descriptive statistics

The period observed in this study, 2007–2013, is characterised by two major economic contractions. Macro-economic growth plummeted from 1.7% in 2008 to -3.8% in 2009 and dropped below zero again in 2012 (-1.1%) and 2013 (-0.2%) (CPB (2016)). Graph 1 in Appendix A presents yearly kernel densities for several key variables, based on the data used in this study that refers to firms with 25 or more workers. Sales growth (depicted in the graph in the first row, left) starts to falter in 2008 and then drops sharply in 2009; not only does the distribution shift to the left but the left tail of the distribution is also

⁷This sample comprises about 16% of the entire workforce as in 2010-2011 the sample contains 2.1 million jobs (see Table 5), while the total number of jobs in the entire economy (so including the public and semi-public sector) amount to 13.3 million (see Appendix C).

Table 1: Descriptive statistics

	Mean	SD	Q1	Median	Q3
Growth in contractual wage bill (in %)	-0.4	21.7	-6.0	1.6	8.4
Employment growth (in %)	-3.8	27.6	-8.3	0.0	5.8
# Jobs	118.6	528.8	31.0	46.0	85.0
# Working hours per month per worker	147.1	24.2	137.8	153.4	163.4
Share exiters (t-1) (in %)	19.0	17.1	8.1	13.8	23.1
Share entrants (t) (in %)	16.6	16.4	5.9	12.5	21.9
Share aged 60-65 among exiters (t-1) (in %)	10.2	17.3	0.0	0.0	14.3
Share aged 55-64 among exiters (t-1) (in %)	5.6	11.3	0.0	0.0	7.7
Average age stayers (t-1)	41.1	4.3	38.5	41.4	43.9
Age exiters /age stayers (t-1)	96.9	14.3	88.5	96.1	1.0
Age entrants /age stayers (t)	85.6	13.8	77.4	85.5	93.6
Δ Log wage stayers (hourly); permanent contract	2.4	7.8	-0.1	2.6	5.3
Δ Log wage stayers (hourly); temporary contract	4.0	17.5	-1.3	3.3	8.4
Δ Log hours worked stayers; permanent contract	0.2	7.8	-1.9	-0.0	1.8
Δ Log hours worked stayers; temporary contract	-0.7	16.5	-3.9	0.0	3.7
Log wage exiters - log wage stayers (hourly)	-10.7	21.6	-22.4	-11.0	0.1
Log wage entrants - log wage stayers (hourly)	-14.6	22.0	-26.7	-14.8	-3.5
Log hours exiters - log hours stayers	-9.5	24.1	-15.6	-3.7	3.0
Log hours entrants - log hours stayers	-7.6	24.9	-12.7	-0.9	4.4
Δ Log overtime hours	-0.05	2.24	-0.26	0.00	0.17
Δ Log share part-time jobs	-0.0	10.2	-3.3	-0.0	3.1
Share stayers. permanent (t) (in %)	70.4	25.1	61.1	78.1	88.2
Share stayers. temporary (t) (in %)	13.0	18.0	1.6	6.6	17.4
Share exiters. permanent (t-1) (in %)	11.0	11.7	4.0	7.9	13.8
Share exiters. temporary (t-1) (in %)	8.0	14.3	0.0	3.1	8.3
Share entrants. permanent (t) (in %)	6.8	10.1	0.0	3.5	8.8
Share entrants. temporary (t) (in %)	9.8	14.4	0.0	4.9	12.9
# Firm-year observations	124,551				
# Worker-year observations (*mln)	15.5				

Notes: The data concern pooled annual observations for 2006–2013. The sample comprises all private sector firms employing 25 workers existing in two subsequent years and not subject to firm dynamics (mergers etc.). The statistics present the (unweighted) mean, standard deviation and quantiles of pooled firm-year observations. The variables partly concern (unweighted) averages per firm (for example in case of Δ log wage stayers) or the difference between averages per firm (for example in case of 'log wage exiters - log wage stayers').

Source: Own calculations using registration data from Statistics Netherlands.

very fat. Sales growth improves over the following years, dropping again in 2012 and 2013, although not as much as in 2009. The other variables show a similar pattern, although the temporary improvement in sales in 2010 is not followed immediately by wage and job growth; in fact 2010 is the weakest year. Furthermore, the densities of contractual wage-bill growth and particularly growth in the gross monthly wages of stayers (respectively: first row,

right; second row, left) are, strikingly, much more compressed than those of sales. In adverse years (2010, 2013), the left tail is thin, suggesting wages are downwardly rigid. Employment growth (second row, right) strongly recovers in 2011, thereby returning to the levels found before the first dip, followed by a second dip in 2012 and 2013. The job exit rate (third row, left) is highest in years characterised by high employment growth. The job enter rate (third row, right) is much more dispersed than the exit rate. Note that the exit rate reflects both voluntary quitting, which increases in times of employment growth, and dismissals, which increase in adverse times; the data do not allow distinction between these two types of exits.

Table 1 presents descriptive statistics for all private-sector firms that exist in two subsequent years and are not subject to firm dynamics (e.g., mergers) and employ 25 or more workers. The growth in contractual wage bill exceeds employment growth at all quartiles, consistent with the generally positive growth in the wages of stayers. Job flows are substantial: on average 19.0% of workers leave a firm every year, while 16.6% are newly hired workers, typically relatively young. The wage growth of stayers on temporary contracts shows more variation than those on permanent contracts. Wages of newly hired workers, and to a lesser extent those of exiters, are typically below those of stayers. Whilst most newly hired workers enter the firm on temporary contracts, workers on this type of contract have a much higher probability of exiting the firm. Appendix C provides more detailed information on the creation of this dataset and the applied selections.

3.3 Institutional features of the Dutch wage setting

Institutions partly determine the room firms have to adjust employment and wages. After some OECD statistics on the relevant trends, this sub-section concisely overviews the institutional background in the Netherlands. Temporary employment as a share of dependent employment has increased from 16.6% in 2006 to 20.5% in 2013, much higher than the average share in the EU-28 (13.7% in 2013). The employment rate of those aged 55–64 year has increased sharply, from 47.7% in 2006 to 59.2% in 2013, in reaction to changes in the costs of early retirement and an increase in the statutory retirement age. Part-time work is exceptionally common in the Netherlands, with almost four out of ten jobs on part-time contracts, more than twice the EU-28 and OECD average. Another trend is increasing labour-market polarisation, with high- and low-wage occupations simultaneously expanding at the expense of middle-wage occupations, although the trend's magnitude in the Netherlands is smaller than in other countries (Berge and Ter Weel (2015)).

Partial labour-market reforms were implemented during the 1990s: em-

ployment protection regulations for regular contracts remained more or less unchanged, while rules concerning the use of temporary contracts were relaxed. In 1999, the ‘Flexibility and Security Law’ aimed to increase employers’ flexibility to use temporary employment, while at the same time increasing protections for flexible workers as their contracts progress. To cope with the crisis, firms could make use of a part-time unemployment benefit regulation from April 2009 until the end of 2010. At its maximum extent, 40,000 workers made use of the regulation, remaining to work on average 60% of their original working hours for three quarters of a year. The perceived effect of the arrangement is limited: Hijzen and Venn (2011) found that the part-time unemployment benefit regulation saved five to six thousand full-time jobs.

Regarding wage setting, a system of collective wage bargaining, vital roles for social partners and a relatively high minimum wage are the most relevant institutions in the Netherlands. Since 1982, there is a system of ‘controlled decentralization’ in which the government does not intervene directly in wages directly; whereas government and social partners coordinate wage negotiations centrally, the actual negotiations concerning wage differentiation and the terms of employment are conducted on a decentralised basis. Collective labour agreements which have been negotiated at the enterprise level can be extended to the entire sector if the firm concluding the contract employs at least 60% of the workers in the sector. Due to this extension policy, union coverage is high, although union density is low.

4 Results and discussion

4.1 Results of decomposition

The decomposition analysis explores how firms adjust their wage bills to adjust to adverse sales shocks compared to situations of positive sales growth. In Table 2, the first four columns refer to the decomposition of firms’ growth in contractual wage bills. The upper panel of the table shows the decomposed items, which sum to the growth in the contractual wage bill displayed in the first line of the lower panel. The second and third lines of the lower panel present growth in the wage bill according to broader definitions of the wage bill. Column 1 and 2 refer to firms-year combinations that are characterised by positive and negative sales growth, respectively; the figures are the unweighted averages over firms. Column 3 presents for each item separately the $\hat{\beta}$, the estimated difference between ‘adverse times’ (sales falling) and ‘good times’ (sales increasing), according to equation 5, reflecting an asymmetrical response between favourable and adverse periods. Columns 5–10, discussed subsequently, explore the heterogeneity of wage-bill adjustments over percentile groups of

sales growth.

The lower panel shows that enterprises with increasing sales grew their contractual wage bill by 3.30% on average, while firms with decreasing sales had wage bills that declined by 4.42%. The asymmetry between the favourable and adverse state is -6.33% (which is the estimated β for the dummy-variable; see the explanation of equation 5), or somewhat larger if overtime pay, incidental wages and extra pay are taken into account.

Considering the decomposition in more detail, all $\hat{\beta}$'s in column 3 differ significantly from zero, confirming that firms' wage-bill adjustment is asymmetric between adverse and favourable times, but the decomposed items are evidently not equally important. 'Change in net employment' is by far the most important channel for wage-bill adjustment in adverse times. However, hours worked are hardly reduced, indicating that firms only use the extensive margin to downwardly adjust their wage bills. In good times, on the other hand, the item 'change in net employment' is small; firms thus may increase their labour productivity through corporate restructuring and/or adopting technological change instead of expanding their employment.⁸

⁸Note that the contribution by 'net change in employment' is calculated using the monthly wage level of stayers; insofar as wages and hours worked of non-stayers are below those of stayers, this affects the decomposition items 'hourly wage, entrants', 'hourly wages, exiters' and 'hours worked, non-stayers'.

Table 2: Decomposition of wage-bill changes 2007–2013 by sales growth (percentiles) groups

	$\Delta S \geq 0$	$\Delta S < 0$	$\hat{\beta}$		P75–P100	P25–P75	$\hat{\beta}$		P1–P25	$\hat{\beta}$	
Contribution to gross contractual wage-bill change by:											
-change in net employment	0.51	-7.64	-6.99	***	1.94	-1.69	-3.08	***	-11.07	-8.26	***
-hourly wage, stayers	2.27	1.84	-0.35	***	2.45	2.04	-0.28	***	1.82	-0.32	***
-hourly wage, entrants	-2.32	-1.61	0.48	***	-2.73	-1.92	0.55	n.s.	-1.49	0.31	***
-hourly wage, exiters	1.76	2.06	0.29	***	2.00	1.59	-0.21	***	2.45	0.77	***
-hours worked, stayers	0.71	0.40	-0.17	***	0.71	0.67	-0.06	n.s.	0.22	-0.17	***
-hours worked, non-stayers	+ 0.36	0.53	0.21	**	0.33	0.44	0.00	n.s.	0.57	0.20	**
Gross wage-bill change (in %):											
-contractual	3.30	-4.42	-6.33	***	4.69	1.12	-3.05	***	-7.48	-7.42	***
-contractual + overtime pay	3.30	-4.65	-6.61	***	4.76	1.03	-3.23	***	-7.80	-7.68	***
-contractual + overtime, inc. & extra pay	3.36	-4.62	-7.11	***	4.84	1.02	-3.49	***	-7.65	-7.94	***
# firm-year observations	42997	32605			18072	39950			17580		
# worker-year observations (*mln)	6.7	5.6			2.4	7.5			2.5		

Notes: Data refer to private sector firms with at least 25 employees for which Δ sales is available for year (t), whereas firm-year combinations with firm dynamics (mergers etc.) are left out of the data. ΔS = change in sales, P1–P25, P25–P75 and P75–P100 are subsamples of firms based on the yearly percentile distribution of the change in sales. $\hat{\beta}$ is the estimation result for equation 5, applied to the wage bill and each of its components separately: $\hat{\beta}$ in column 3 refers to $\Delta S < 0$ compared to $\Delta S \geq 0$; $\hat{\beta}$ in column 6 refers to P25–P75 compared to P75–P100; $\hat{\beta}$ in column 9 refers to P1–P25 compared to P25–P75. The relationship between the items of the decomposition and equation 4 is explained in footnote 6. Significance levels: * : 5% ** : 1% *** : 0.1%.

Source: Own calculations using registration data from Statistics Netherlands

Regarding the intensive margin, changes in the working hours of stayers do mitigate the wage bill in adverse times compared to good times, but only in a limited way. Similar to the growth in the hourly wage of stayers, the growth in working hours remains positive, albeit smaller than when sales increase. The positive contribution of ‘hours worked by non-stayers’ reflects the fact that exiters, and to a lesser extent entrants, work in jobs with fewer hours than stayers; $\hat{\beta}$ is negative, but mainly because there are more exiters in adverse times. Overall, for entrants and exiters taken together, adjustments to working hours have a minor effect on the wage bill.

Job flows could be another channel to adjust the wage bill, especially if firms reduce wages of new hires or dismiss high-waged workers during adverse periods. What happens to the wages of entrants or exiters cannot be seen directly from the decomposition table. The complementary information in Table A.2 in Appendix A shows that entrants’ wages are generally lower than those of stayers, in line with steep wage profiles over tenure, but the data give no indication that firms offer especially low starting wages during adverse times. The item ‘hourly wage, entrants’ in the decomposition is less negative in adverse times, mainly because of the reduced volume of cheap entrants. The magnitude of the item ‘hourly wage, exiters’ in the decomposition is more positive in adverse times: increased exit of low-paid workers contributes positively to the decomposition of changes in the wage bill.⁹

To see how firms adjust to more adverse circumstances, the right-hand side of Table 2 explores the heterogeneity of wage-bill adjustments over percentile groups of sales growth. The decomposition is presented for the high end (P75–P100) of the sales growth distribution, the middle part (P25–P75) and the low end (P1–P25), the latter referring to a severe downward shock in sales. $\hat{\beta}$ in column 6 refers to P25–P75 compared to P75–P100, whereas $\hat{\beta}$ in column 9 refers to P1–P25 compared to P25–P75. Results show that during a relatively severe shock, the change in net employment still remains the main channel for downward wage-bill adjustment. Growth in the contractual working hours of stayers slows but remains positive. Changes in the contractual wage of stayers mitigate the wage-bill change by only 0.32 to 1.82 percentage-points. Hence, the growth in the hourly contractual wage of stayers is scarcely lower at the lower end of the sales distribution for stayers on both permanent and temporary contracts (Table A.2), probably because collective labour agreements put a floor on contractual wage growth. Besides, as the lower panel shows, firms cut overtime pay and incidental wages during adverse sales shocks.

⁹Exiters also have lower wages than stayers, although in bad times more highly paid workers tend leave the firm, as Table A.2 shows, that the share of older workers among exiters rises, probably into early retirement. That said, whereas the wage differential between exiters and entrants reduces in bad times, the number of exiters is higher.

Exits and entries respond differently to sales; the share of newly hired workers decreases roughly linearly when sales deteriorate, while exits show a U-shaped pattern. Exits are subject to two opposite effects which cannot be disentangled from the data: voluntary job-switches are more abundant when the economy is robust, whereas firms dismiss more workers and renew fewer temporary contracts when business deteriorates. Comparing the upper (P75–P100) and the lower (P1–P25) end of the sales distribution, Table A.2 shows that the average share of entries decreases more than the share of exits increases. Hence, reduced entries are an important means to reduce wage bills when sales decline since the firm has more control over entries than over the entirety of exits and no dismissal costs are involved.

Although firms at the lower end of the sales-growth distribution hire substantially fewer new workers, the complementary information does not suggest that firms apply extra reductions in starting wages. Wages of entrants are below those of stayers (i.e., log wage entrants - log wage stayers is positive) but this difference becomes smaller when sales growth is lower (i.e., the estimated β comparing these states is positive). The exact effect is difficult to assess, however, because the composition of the group of stayers itself and therefore its average wage is affected by inflows and outflows. Since the last-in, first-out rule is applied within 10-year age brackets, dismissals reduce the share of older workers, who generally earn higher wages. However, the findings suggest that, even at the lower end of the sales distribution, contractual wages are not an important means to adjust the wage bill, with respect to neither stayers nor new hires.

One might suppose that in the short run, adjustment could predominantly run through employment, but that firms will adjust wages downward if sales growth remains adverse over a longer period. Therefore, I analyse to what extent the decomposition results are sensitive to the *persistence* of an adverse sales shock. To do so, I repeat the decomposition analysis for the (smaller) sample of firms for which data on sales growth are available for both the year of observation (t) and the year before, ($t-1$). I split this sample into three groups: first, firms with positive sales growth in the year of observation (t); second, firms with sales decrease in (t) and sales growth in ($t-1$); and third, firms with sales decrease in both (t) and ($t-1$). $\hat{\beta}$ in column 3 of Table 3 refers to the asymmetry between the second and first groups of firms, while $\hat{\beta}$ in column 6 refers to the asymmetry between the third and first groups of firms. In case of a protracted sales decrease (Table 3, column 5), the wage-bill contraction is more than twice as high as when sales drop after a year of sales growth (column 2). Even so, the wage increase of stayers is still positive and only slightly lower. Hours worked by stayers reduce only slightly. Reductions

in overtime pay, incidental and extra pay contribute to wage-bill reduction, but to a limited extent and not by much more than after a one-time drop in sales. Even if these items are reduced strongly, their impact is still limited because they represent only a small part of the wage bill (for example, in 2009/2010 the average amount of overtime, incidental and extra pay amounted to about 5% of the amount received as contractual wages. Hence, these data support the picture that firms only choose employment reduction as a means to reduce their wage bills, even if their sales remain depressed for a prolonged period. Even if I repeat the same decomposition analysis for the sub-sample of firms for which data on sales growth are available for both the year of observation and for year $(t-1)$ and $(t-2)$, no additional wage mitigation is found on average for sales drops of three years in a row compared to two years, whereas the reduction in employment is substantially larger in this case.¹⁰

Employment reduction is far more important for firms that have a *share of open-term contracts* below the median and hence a higher share of temporary contracts. The more flexible firms in terms of their contract types use net employment to a greater extent to adjust their wage bills. Of course, firms will have tailored the mix of contract types to their needs, given the specific environments in which they operate. Firms with a higher share of open-term contracts are more inclined to cut down on incidental and extra pay, but there is no large difference regarding contractual wages. The hourly wages and hours worked by stayers are only slightly reduced, remaining positive for such firms in adverse periods.

¹⁰I repeat the decomposition analysis for the sub-sample of firms for which data on sales growth are available for both the year of observation and years $(t-1)$ and $(t-2)$. Out of this sample, I compare three groups: first, firms with positive sales growth in the year of observation (t) whereas sales growth in $(t-1)$ and $(t-2)$ may be positive or negative, 20,360 observations; second, firms with decreasing sales in (t) and $(t-1)$ and positive sales growth in $(t-2)$, 3,082 firms; third: firms with decreasing sales in both (t) , $(t-1)$ and $(t-2)$, 4,939 observations. The $\hat{\beta}$ describing the asymmetry between groups 2 and 1 amounts to -5.77 for gross wage-bill growth, -5.98 for the net change in employment and -0.31 for the hourly wage of stayers. The $\hat{\beta}$ describing the asymmetry between groups 3 and 1 amounts to -8.75 for gross wage-bill growth, -10.15 for the net change in employment and -0.36 for the hourly wage of stayers.

Table 3: Decomposition of wage-bill changes 2007–2013 by sales growth in current and prior year

	$\Delta S_t \geq 0$	$\Delta S_t < 0$ $\Delta S_{t-1} \geq 0$	$\hat{\beta}$		$\Delta S_t < 0$ $\Delta S_{t-1} < 0$	$\hat{\beta}$	
Contribution to gross contractual wage-bill change by:							
-net change in employment	-1.42	-5.15	-3.15	***	-10.40	-7.51	***
-hourly wage, stayers	2.30	2.02	-0.10	n.s.	1.68	-0.39	***
-hourly wage, entrants	-2.06	-1.59	0.32	***	-1.30	0.56	***
-hourly wage, exiters	1.91	1.77	-0.03	n.s.	2.05	0.08	n.s.
-hours worked, stayers	0.43	0.45	-0.14	**	0.08	-0.28	***
-hours worked, non-stayers	+ 0.33	0.40	0.11	n.s.	0.55	0.22	n.s.
Gross wage-bill change (in %):							
-contractual	1.49	-2.11	-3.08	***	-7.34	-7.04	***
-contractual + overtime pay	1.47	-2.43	-3.38	***	-7.46	-7.23	***
-contractual + overtime, inc. & extra pay	1.52	-2.47	-3.68	***	-7.43	-7.86	***
# firm-year obs.	32,581	13,534			10,528		
# worker-year obs. (*mln)	4.9	2.2			2.2		

Notes: Data refer to all private sector firms with at least 25 employees for which Δ sales is available for both year (t) and year (t-1) (therefore the sample is smaller than in Table 2). This sample is split into three groups: first, firms with positive sales growth in the year of observation (t) and no requirements for sales growth in (t-1) and (t-2); second, firms with sales decrease in (t) and sales growth in (t-1); third, firms with sales decrease in both (t) and (t-1). $\hat{\beta}$ is the estimation result for equation 5, applied to the wage bill and each of its its components separately: $\hat{\beta}$ in column 3 refers to the asymmetry between the second and the first group of firms, while $\hat{\beta}$ in column 6 refers to the the asymmetry between the third and the first group of firms. The relationship between the items of the decomposition and equation 4 is explained in footnote 6. Significance levels: * : 5% ** : 1% *** : 0.1%.

Source: Own calculations using registration data from Statistics Netherlands

Table 4: Decomposition of wage-bill changes 2007–2013, firms by share of open-term contracts

	Share open-term contracts $\geq P50$			Share open-term contracts $< P50$					
	$\Delta S \geq 0$	$\Delta S < 0$	$\hat{\beta}$	$\Delta S \geq 0$	$\Delta S < 0$	$\hat{\beta}$			
Contribution to gross contractual wage-bill change by:									
-net change in employment	-0.07	-6.72	-5.36	***	1.06	-8.62	-8.94	***	
-hourly wage, stayers	2.28	1.88	-0.32	***	2.27	1.80	-0.39	***	
-hourly wage, entrants	-1.60	-1.01	0.42	***	-3.01	-2.25	0.56	***	
-hourly wage, exiters	1.10	1.30	0.15	*	2.39	2.86	0.53	***	
-hours worked, stayers	0.68	0.36	-0.16	***	0.74	0.43	-0.18	***	
-hours worked, non-stayers	+	0.28	0.33	0.04	n.s.	0.45	0.74	0.37	**
Gross wage-bill change (in %)									
-contractual	2.68	-3.85	-5.20	***	3.90	-5.02	-7.74	***	
-contractual + overtime pay	2.69	-4.07	-5.47	***	3.87	-5.27	-8.00	***	
-contractual + overtime, inc. & extra pay	2.79	-4.02	-6.23	***	3.90	-5.25	-8.26	***	
# firm-year observations	20,994	16,845			22,003	15,760			
# worker-year observations (*mln)	3.3	2.8			3.4	2.7			

Notes: Data refer to all private sector firms with at least 25 employees, whereas firm-year combinations with firm dynamics (mergers etc.) are left out of the data. ΔS = change in sales. P50 is the median based on the yearly percentile distribution of the share of open-term contracts of firms. $\hat{\beta}$ is the estimation result for applying equation 5 to the wage bill and each of its components separately. The relationship between the items of the decomposition and equation 4 is explained in footnote 6. Significance levels: * : 5% ** : 1% *** : 0.1%.

Source: Own calculations using registration data from Statistics Netherlands

These differences by contract type are consistent with those over *sectors of economic activity*. The business services and Horeca (hotel/restaurant/café) sectors, where job flows (the share of both entrants to and exiters from the workforce) are two-to-three times larger compared to manufacturing, construction and goods trade, have a considerable flexible, non-core workforce (see the decomposition results by sector of economic activity in Table A.3 in Appendix A). Several features suggest that these sectors may have a segmented labour market.¹¹ First, compared to other sectors, the share of temporary contracts among entrants and exiters is much higher in the business services and Horeca sectors and the wage level of non-stayers falls further short to that of stayers. Second, the share of older workers among exiters is remarkably low in these sectors. In the Horeca sector, the age of both entrants and exiters is remarkably low compared to stayers. Wage changes for stayers are relatively high in the business services sector, which might indicate that insiders may have strong bargaining positions.

Despite some variation by sector of economic activity, the conclusion that wages of stayers continue to grow in bad times and is almost as much as in favourable times continues to stand for all sectors. Moreover, where wage changes are already moderate with positive sales growth, as in the transport and communications and Horeca sectors, there seems to be less room to reduce wage changes when sales deteriorate, suggesting downward wage rigidity. The mandatory minimum wage may put a floor on wage increases in these sectors. Moreover, pay scales in collective labour agreements create strong guidelines for wage changes in sectors with low- and middle-income jobs. High-wage jobs, however, are often paid above the maximum of the highest pay scales, offering more room to adjust contractual wages (Deelen and Euwals (2014))

Wage-bill growth has varied largely over *years* (Table 5). In 2007–2008, firms facing decreasing sales reduced their wage bills on average by 0.76%, whereas in 2008–2009 the average reduction was 5.66%; also the number of firms facing fewer sales rose by almost 50% in that same period. Although this reduction is large, macro-economic data show that during the early phase of the crisis in the Netherlands the reduction in employment still fell short of the drop in GDP due to labour hoarding, motivated by the relatively strong financial position of firms at the onset of the crisis as well as the fact that the previous tight labour market where it was hard to fulfill vacancies was fresh in the minds of employers (Gelauff et al. (2014)). Our decomposition shows that overtime pay and incidental wages offered some downward flexibility, -0.50 percentage-points in 2008–2009. Wage-bill contraction found its trough in the

¹¹Tables with complementary information by sectors of industry and by year are available upon request.

next year, 2009–2010. Employment reduction has been the key channel for wage-bill adjustment in the crisis years 2008–2009 and 2009–2010, featuring a net change in employment for firms with a drop in sales of -10.90 in 2009–2010, against only -5,68 in 2007–2008.

Wage growth of stayers remained positive in almost every year, even for firms where sales decreased, suggesting nominal wage rigidity.

Table 5: Decomposition of wage-bill changes 2007–2013, by year

	2006-2007		2007-2008		2008-2009		2009-2010		2010-2011		2011-2012		2012-2013	
	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$
Contribution to gross contractual wage-bill change by:														
-net change in empl.	-6.29	-7.78***	-5.68	-6.75***	-8.76	-8.38***	-10.90	-7.91***	-7.88	-8.73***	-6.53	-8.23***	-6.35	-7.24***
-h. wage, stayers	1.73	-0.20	4.09	-0.20***	3.19	-0.55***	2.49	-0.30**	2.03	-0.40***	-2.05	-0.35***	1.26	-0.48***
-h. wage, entrants	-1.91	0.50***	-2.02	0.42***	-1.19	1.04***	-1.32	0.49***	-2.18	0.50***	-1.63	0.65***	-1.36	0.71***
-h. wage, exiters	2.11	0.52**	2.42	0.34**	2.31	0.16	2.16	0.44**	2.81	0.53**	1.26	0.31***	1.39	0.14
-hours, stayers	1.54	-0.16***	0.09	-0.11	-1.22	-0.11***	-1.02	-0.33**	-0.09	-0.10	3.95	-0.12	0.27	-0.23***
-hours, non-stayers +	0.47	0.01.	0.34	0.20	0.01	0.00	0.84	0.39**	0.73	0.19	1.01	0.53***	0.45	0.03
Gross wage-bill change (in %):														
-contractual	-2.34	-7.06***	-0.76	-6.10***	-5.66	-7.83***	-7.75	-7.23***	-4.57	-8.01***	-3.98	-7.23***	-4.34	-7.08***
-contr.+ overtime pay	-2.59	-7.28***	-1.18	-6.31***	-6.13	-8.13***	-7.72	-7.59***	-4.71	-8.12***	-4.14	-7.39***	-4.46	-7.28***
-idem + inc./extra pay	-2.40	-7.19***	-1.32	-6.43***	-6.16	-8.34***	-7.62	-7.60***	-4.72	-8.06***	-4.10	-7.32***	-4.35	-7.46***
# firms $\Delta S \geq 0$	8,593		7,562		3,766		5,663		8,056		4,952		4,405	
# firms $\Delta S < 0$	3,002		4,388		6,538		4,812		4,236		5,051		4,578	
# workers (1)	1.3		1.2		0.6		0.9		1.3		0.7		0.7	
# workers (2)	0.4		0.7		1.1		0.9		0.8		0.9		0.7	

Notes: Data refer to all private sector firms with at least 25 employees for which Δ sales is available, whereas firm-year combinations with firm dynamics (mergers etc.) are left out of the data. ΔS = change in sales. ΔWB_2 includes contractual as well as overtime pay, ΔWB_3 includes incidental and extra wage on top of this. $\hat{\beta}$ is the estimation result for equation 5, applied to the wage bill and each of its components separately and refers to $\Delta S < 0$ compared to $\Delta S \geq 0$. The relationship between the items of the decomposition and equation 4 is explained in footnote 6. # workers (1) = # workers in firms $\Delta S \geq 0$ (mln); # workers (2) = # workers firms $\Delta S < 0$ (mln). Significance levels: * : 5% ** : 1% *** : 0.1%.

Als a robustness check the decomposition for 2009-2010 has been repeated for a sample including workers aged 18-22. In that case the results for $\hat{\beta}$ for 2009-2010 (in the same order as in the table) are the following: -8.43; -0.29; 0.64; 0.49; -0.44; 0.49; -7.55; -7.92; -7.94.

Source: Own calculations using registration data from Statistics Netherlands

Notably, hourly wage growth of stayers, although remaining positive in most years, generally has come down between 2007 and 2012. In 2011–2012 the change in hourly wages of stayers even became negative, although this was almost fully offset by a positive growth in hours worked. It has already been established that firms offer not much lower contractual wage growth in adverse conditions than in favourable settings. This is clearly reflected by the fact that the beta (which quantifies the asymmetry between the favourable and adverse state, see the explanation of equation 5) is relatively low compared to the average growth in the hourly wage for firms with sales drops. For the net change in employment this ratio (of the beta and the coefficient) is much higher, especially in the most severe years of downturn. This again may reflect downward wage rigidity, which presumably is more outspoken during downturns. However, across the board (so both for firms with negative and positive sales growth) the wage growth of stayers has been gradually reduced over the years, possibly due to a relatively high level of coordination, as in the Netherlands the outcomes of the consultations of the Dutch social partners serve as important guidelines for wage bargaining at the enterprise and sector levels. However, the fact that it took quite some time to reduce wages may partly be related to the fact that at the onset of the crisis many firms were still in a good financial position. Related, labour hoarding was quite common in the onset of the crisis, while more recently the recovery of unemployment took longer than in most other countries.

4.2 Regression analysis of wages, job flows and employment

While the decomposition analysis in the last subsection provides insight into the balance between the elements of wage-bill change, this analysis only allows exploration of variations over a single dimension, such as the share of open-term contracts (see Table 4); if decompositions of two groups of firms are compared, the differences in observed characteristics are not considered. Therefore, I use a multivariate OLS-regression analysis to examine the relative importance of various covariates $X_{i,t}$. The dependant variable $Y_{i,t}^\circ$ is either the growth in employment in firm i or the growth in the hourly wage in firm i . Again, the unit of observation is the firm, while the covariates often concern the shares of certain groups of workers in firm i (in percentages) or dummy variables related to categorical variables. Common year effects γ_t are taken into account as well:

$$Y_{i,t}^\circ = \alpha + X_{i,t} \cdot \beta + \gamma_t + \epsilon_{i,t} \quad (6)$$

The regressions explain variables underlying the results of decomposition, such as the wage growth of stayers, employment growth and job flows. I focus

on these underlying variables rather than on the decomposed items themselves, because the latter may be impacted by, for example, both wages and the size of the group of workers, which would make the results more difficult to interpret.

The regressions elucidate the role of labour-market rigidities and firm characteristics.¹² Since the main interest here is the balance between the adjustments to wages and to employment, I include employment growth as a covariate in the wage-growth regressions, while I include wage-growth and indicators for downward wage rigidity in the regressions for job flows and employment. To address reverse-causality issues, other explanatory variables are mostly measured at year $t-1$, whereas the dependent variables refer to changes in year t relative to $t-1$ and an instrumental variable is used for the shares of migrant workers per firm (as explained in Appendix C). I include variables regarding the state of business, contracttype, type of collective labour agreement, variables concerning the composition of the labour force of the firm, sector and other firm characteristics.

Table 6 offers results for both wage and employment growth, highlighting the most relevant covariates that illustrate variation over sales shocks.¹³ Column 1 presents results for the sub-sample of firm-year observations for which sales increased. Columns 2 and 3 show regressions on samples with increasingly adverse sales growth, observations respectively below the median and below the 10th percentile of the sales-growth distribution. Hence, the third column contains the fewest observations, comprising those firms that experienced a severe downturn. Columns 4, 5 and 6, concern employment growth in the same fashion.

Concerning the wage growth of stayers, a comparison of ‘average’ (column 2) and severe (column 3) negative sales shocks reveals that most covariates are strikingly similar. The correlation between the magnitude of firms’ sales decreases and the wage growth of stayers is small and insignificant. Although sales may impact wage growth partly through other covariates, such as the business result (profit rate) and whether the firm ceases to exist during the following year, these coefficients are also small. The low sensitivity of stayers’

¹²OLS is applied, but SUR regressions give very comparable results. Table A.8 explores Random Effects and Fixed Effects estimations as alternatives to the OLS regressions used in the main analysis. The results are described in the note underneath that table.

¹³Other covariates are often similar over the sales growth samples. These covariates merely reflect variations in productivity or bargaining positions and are less relevant with respect to adjustments to sales shocks. For example, higher training expenditures, a higher share of highly educated workers and larger firm size are typically associated with higher wage growth. The full results can be found in Tables A.5 and A.6 in Appendix A.

wages to sales growth is consistent with the findings of the decomposition analysis in Tables 2 and 3.

Table 6: OLS-Regressions of the growth of hourly wages and employment of firms by sales growth groups

Dependent variable: Sample:	Growth rate hourly wage			Growth rate employment		
	$\hat{S} \geq 0$	$\hat{S} < P50$	$\hat{S} < P10$	$\hat{S} \geq 0$	$\hat{S} < P50$	$\hat{S} < P10$
State of business						
Growth rate sales (t)	0.0188***	0.0021	0.0048	0.1158***	0.3145***	0.3442***
Growth rate sales, squared (t)	-0.0094***	0.0013	0.0023	-0.0751***	0.1376***	0.1543***
Growth rate sales (t-1)	0.0047***	0.0044***	0.0010	0.0292***	0.0621***	0.0793***
Profit (t-1)	0.0022***	0.0040***	0.0027	0.0386***	0.0608***	0.1007***
Firm ceasing to exist in (t+1)	0.0022	0.0017	-0.0006	-0.0053	-0.0273***	-0.0456**
Contracttype						
Share of open-term contracts (t-1)	-0.0017	-0.0029	-0.0085**	0.0281***	0.0386***	0.0447***
Share of regular jobs (t-1)	-0.0114***	0.0002	0.0034	0.0188	0.0402***	0.0747**
Share of full-time jobs (t-1)	0.0720***	0.0591***	0.0553***	0.0401***	0.0427***	0.1040***
Share of job tenure ≥ 10 years (t-1)	-0.0046**	-0.0047**	-0.0093**	0.0271***	0.0278***	0.0109
Type of collective labour agreement						
Enterprise level (t-1)	0.0058***	0.0069***	0.0061*	0.0007	-0.0029	0.0056
Sector level, no extension (t-1)	-0.0024	-0.0009	0.0040	-0.0143***	-0.0195***	-0.0190
Extended to sector level (t-1)	-0.0008	0.0007	0.0022	0.0025	0.0026	0.0001
Immigrant workers						
Share from EU-enlargement '04, '07	-0.0282*	-0.0386**	-0.0605	0.0245	0.0933	0.1420
Share from other western countries	-0.0020	0.0003	-0.0021	-0.0830***	-0.1142***	-0.2015***
Share from non-western immigrants	-0.0143**	-0.0233**	-0.0284	-0.0390*	-0.0227	-0.1788
indicator downward wage rigidity						
Nominal wage rigidity (t)				-0.3452***	-0.4153***	-0.7624***
Real wage rigidity (t)				-0.3479***	-0.3734***	-0.6987***
Constant	0.0360**	0.0511**	0.0335	0.3153***	0.2387***	0.6759***
# Observations	34,150	31,814	6,363	33,124	30,848	6,177
R-squared	0.2183	0.2008	0.1844	0.2932	0.2454	0.2255

Notes: See Appendix C for variable description and Table A.5 and A.6 for the full results. Columns (1) and (4) refer to positive sales growth, (2) and (3) to sales growth below the median, (5) and (6) refer to the first decile of the sales growth distribution, representing a severe negative shock in sales. Significance levels: * : 5% ** : 1% *** : 0.1%.

Table 7: OLS-regressions of employment growth and job flows of firms by sales growth groups

Dependent variable: Sample:	Empl.growth $\hat{S}<P50$	sh_N $\hat{S}<P50$	sh_E $\hat{S}<P50$	Empl.growth $\hat{S}<P10$	sh_N $\hat{S}<P10$	sh_E $\hat{S}<P10$
State of business						
Growth rate sales (t)	0.3145***	0.0384***	-0.2760***	0.3442***	0.0272**	-0.3170***
Growth rate sales, squared (t)	0.1376***	0.0195***	-0.1181***	0.1543***	0.0141***	-0.1402***
Growth rate sales (t-1)	0.0621***	0.0096***	-0.0525***	0.0793***	0.0085**	-0.0709***
Profit (t-1)	0.0608***	0.0054***	-0.0554***	0.1007***	0.0140***	-0.0867***
Firm ceasing to exist in (t+1)	-0.0273***	-0.0112***	0.0161**	-0.0456**	-0.0205***	0.0251
Contract type						
Share of open-term contracts (t-1)	0.0386***	-0.0431***	-0.0817***	0.0447***	-0.0236***	-0.0684***
Share of regular jobs (t-1)	0.0402***	-0.1961***	-0.2363***	0.0747**	-0.1881***	-0.2628***
Share of full-time jobs (t-1)	0.0427***	-0.0208***	-0.0635***	0.1040***	-0.0037	-0.1078***
Share of job tenure ≥ 10 years (t-1)	0.0278***	-0.0422***	-0.0699***	0.0109	-0.0452***	-0.0561***
Type of collective labour agreement						
Enterprise level (t-1)	-0.0029	0.0042**	0.0070*	0.0056	0.0112***	0.0056s
Sector level, no extension (t-1)	-0.0195***	0.0092***	0.0287***	-0.0190	0.0084	0.0274**
Extended to sector level (t-1)	0.0026	0.0011	-0.0015	0.0001	-0.0012	-0.0014
Immigrant workers						
Share from EU-enlargement '04, '07	0.0933	-0.0130	-0.1063**	0.1420	-0.0048	-0.1468
Share from other western countries	-0.1142***	0.0006	0.1148***	-0.2015***	-0.0178	0.1837***
Share from non-western immigrants	-0.0227	0.0381**	0.0607*	-0.1788	-0.0294	0.1494
Indicator downward wage rigidity						
Nominal wage rigidity (t)	-0.4153***	0.0511*	0.4665***	-0.7624***	0.0621	0.8245***
Real wage rigidity (t)	-0.3734***	0.0655**	0.4390***	-0.6987***	0.0863	0.7850***
Constant	0.2387***	0.3063***	0.0676	0.6759***	0.3528***	-0.3231*
# Observations	30, 848	30, 848	30, 848	6, 177	6, 177	6, 177
R-squared	0.2454	0.6958	0.4765	0.2255	0.6903	0.4189

Notes: See Appendix C for variable description and Table A.7 for the full regression results. The left three columns refer to sales below the median, whereas the right three columns refer to the first decile of the sales growth distribution. Note that coefficients for employment are equal to the difference between the coefficients for the share of entrants en the share of exiters. Significance levels: * : 5% ** : 1% *** : 0.1%.

Wage growth of stayers is generally weakly related to the firms' share of open-term contracts (consistent with the findings of the decomposition analysis in Table 4); higher job security is not associated with a stronger wage bargaining position, probably partly because variables concerning the workforce composition (such as level of education, migrant-status, age) cover the group with open-term contracts to a large extent. Also, large share of long-tenured jobs is generally associated with lower wage growth, consistent with wage-profiles flattening over tenure. During sharp downturns, workers on open-ended and long-tenured contracts seem to trade their job security for a slightly lower wage increase. Seniority-related employment protection rights, such as last-in, first-out dismissal rules and tenure-based severance pay and notice periods not only imply high dismissal costs for employers but also discourage voluntary job mobility among highly protected workers, who lose their rights when they enter a new job.

At the enterprise level, CLAs are positively correlated with growth in the hourly wage of stayers, which may indicate that collective bargaining at the enterprise level increases bargaining power compared to workers having no CLA. CLAs at the sector level, either directly or through extension of contracts at the enterprise level, are not suggested to lead to apparent higher wage growth.¹⁴

Regarding the share of immigrants at firms, I find negative coefficients, except for severe downturns.¹⁵ A higher share of immigrants originating from countries that became part of the EU in 2004 or 2007 is associated with lower wage growth. Since these workers immigrated recently (after the accession of their countries in 2004 or 2007), they are entitled to limited UB duration and employment protection, so their bargaining power is low. Moreover, their reservation wage may be lower, perhaps for example because their dependents live in their country of origin where their earnings have higher purchasing power. Also, a higher share of immigrants from non-western countries is asso-

¹⁴OECD (2004) states: 'It is unclear how much emphasis should be placed on ranking organisational structures of collective bargaining in terms of their implications for macroeconomic performance. That structural orientation has informed a rich body of research, as exemplified by the influential study of Calmfors and Driffill (1988) and the literature it stimulated. However, the great difficulty encountered by researchers attempting to identify robust associations between differences in bargaining organisation and differences in macroeconomic performance suggest that quite different organisational forms may be capable of similar performance.'

¹⁵The theoretical literature is inconclusive about the effect of migration on wages and employment. If the skill-mix of migrants is similar to that of native workers, no effect is expected. If their skill-mix does not match that of natives, the effects of migration on wages and employment depend on the flexibility of the economy to change its output mix and on its openness to international trade Dustmann and Meghir (2005).

ciated with lower wages at a firm.

The picture is altogether different regarding employment growth. The large and highly significant coefficients for the growth rate of sales in columns 5 and 6 of Table 6 suggest that changes in net employment are quite sensitive to sales growth, especially for firms with declining sales. The profit rate and whether the firm ceases to exist in the subsequent year also show large and significant correlations. The worse the state of the firm, the larger the correlated job loss, whereas firms display no identified increase in the responsiveness of wages.

Type of contract, of course is an important factor when it comes to employment adjustment; open-term contracts, regular job types and full-time jobs are associated with more employment growth or less job loss. This sensitivity of employment reduction to the share of non-core contract types is particularly high among firms facing severe downturns in sales.

Firms with CLAs concluded at the sector level are associated with less employment growth or more employment loss compared to firms without a CLA. This may indicate that wage agreements concluded at a higher level of centralization fit individual firms less well, leading these firms to reduce employment as they cannot adjust wages under the terms of the sector CLA.

A higher share of migrant workers, especially from western countries, is accompanied by significantly lower job growth or more job reduction.¹⁶ Especially conditional on a large sales drop, employment reduction of firms is very sensitive to the share of workers with a migration background.

Last but not least, I find a strong, negative relationship between the incidence of downward wage rigidity at firms and their employment growth.¹⁷ Wage rigidity indicators were derived from the stayers' distribution of wage changes, see variable description in Appendix C. A higher share of jobs at a firm for which wage growth clumps around zero (nominal wage rigidity) or around inflation expectations (real wage rigidity), goes along with a spike in the wage growth distribution and a higher wage-rigidity indicator. The negative relationship between downward wage rigidity and employment growth is even more distinct in cases of strong sales shocks. This finding suggests that nominal and real downward wage rigidity come at a cost in terms of employment: if wages were more downwardly flexible, there could be fewer job

¹⁶This group includes the four largest immigrant groups to the Netherlands: those from Suriname, the Netherlands Antilles, Turkey and Morocco

¹⁷I control for the growth in the hourly wages of stayers: in general, there is a positive relationship between wage and employment growth in firms, so more favourable conditions are matched by both more jobs and higher wage growth. Conditional on that, I find a negative effect of the indicators of downward wage rigidity on employment growth; a larger spike in the wage-growth distribution at zero or at the expected inflation rate is associated with less employment growth. See Table A.6 in Appendix A.

losses during demand shocks. To indicate the magnitude: if the average share of workers with a wage freeze increases by one percentage-point, the associated employment reduction is 0.35 percentage-points with sales growth below the median, and 0.65 percentage-points during a severe (below P10) negative shock in sales.¹⁸

As employment growth results from changes in job flows, Table 7 explores to what extent employment growth and the share of entrants and exiters in the workforce change in the case of sales shocks.¹⁹ The left three columns refer to sales below the median, while the right three columns refer to the first decile of the sales growth distribution. Note that the coefficients for employment are equal to the difference between the coefficients for the share of entrants and the share of exiters. Exits show more variation than entries over the presented firm characteristics. A higher share of open-ended and regular contracts is merely associated, as expected, to less outflow of workers. CLAs at the sector level are clearly associated with more outflow of workers. Also, the effect of a high share of immigrants from other western countries runs mainly through more exits. Finally, the negative effect of wage rigidity on employment runs fully through a response in terms of exits, most probably dismissals.

To summarize, in cases of an average or severe negative sales shocks the correlation with wage growth for most covariates is small and holds across the board. By contrast, employment growth seems quite sensitive to firm characteristics²⁰ and to the magnitude of the sales shock. A larger share of migrant workers or workers on a temporary or having a non-regular job type go hand in hand with stronger employment reduction. This suggests that employment reduction in bad times predominantly hits groups of workers with a relatively weak labour-market positions, predominantly through increased exits: immigrants, employees on temporary contracts, non-regular job-types and part-time jobs, predominantly through increased exits. Also, downward wage rigidity is strongly associated with more exits and less employment, especially after a severe shock in sales.²¹ These findings may point to a segmented labour

¹⁸For this exercise, wage freezes are defined as a monthly wage growth between -0.1% and +0.1%; among firms with decreasing sales, on average 6.4% of their workers have a wage freeze (sd 0.1424). The indicator of nominal downward wage rigidity has a high correlation (0.85) with a firm's share of wage freezes. The mentioned 'effects' of a 1 percentage-point impulse in the share of workers having wage freezes are thus calculated as 0.85 times the estimated coefficient in Table 6.

¹⁹Table A.7 presents the full regression results.

²⁰The firm characteristics themselves are generally fairly stable, however, over the various regression samples. See Table B.3 in Appendix B

²¹Similar regressions for incidental wage growth, growth in hours worked by stayers and the wages of entrants compared to those of stayers, provide no indication—agreeing with the findings of the decomposition analysis—that any of these are used as important adjustment

market, where, on the one hand, employment adjustment predominantly affects workers with relatively weak labour-market position, while, on the other hand, ongoing workers can be assured that sales shocks suffered by the firm will not strongly affect their increasing wages.

4.3 Discussion

One of the main findings of this paper is that firms in the Netherlands downwardly adjust wage bills predominantly by reducing employment. In the short run, the contractual wage growth of continuing workers is rather insensitive to whether the sales of the firm for which they work increase or (sharply) decrease. Over the longer run, however, wage growth has decelerated across the board. This might be due to a high level of coordination, as outcomes of consultations of the Dutch social partners serve as important guidelines for wage bargaining at the enterprise and sector levels in the Netherlands. This model of ‘controlled decentralisation’ has the merit that stayers’ wage increases are moderate and predictable and labour-market unrest is avoided. One likely rationale is that employers are afraid to harm the workers’ motivation. On a recent survey (Dalen and Henkens (2018)) employers mentioned this factor as a main argument against the demotion (reducing an employee’s rank and salary) of older workers. A positive relationship between effort and the wage level is acknowledged by empirical studies of, among others, Fehr and Falk (1999) and Bewley (1999); the latter finds that good morale (related to fairness) among a firm’s workforce has positive effect on profits by increasing the workers’ productivity and effort, while wage cuts decrease morale.

The first possible drawback of the model of ‘controlled decentralisation’ is that wage growth at some firms may be more moderate than necessary, which can be undesirable from a macro-economic point of view in case of low spending. The second possible drawback may be that wage flexibility is limited; wage-bill adjustments are then largely provided by job reduction, which affects a non-random group of workers. This is consistent with the results of an international survey of employers (ECB (2009)), which showed that Dutch firms stand out in their strong reliance on the destruction of flexible jobs to adjust their wage bills in periods of adverse sales growth.

Deelen and Verbeek (2015) observe relatively high downward real wage rigidity in the Netherlands, concentrated among workers who are relatively old, highly educated, and often on open-term contracts and full-time jobs. These are also the groups that are best-represented by labour unions, in line with the idea that the high level of coordination is a factor behind positive wage

mechanisms to severe sales shocks.

growth of stayers. The Social Economic Council advised enlarging the support for collective labour agreements by involving groups that are underrepresented among the union membership (SER (2013)).

5 Conclusions

This paper offers insight into how Dutch firms adjust their wage bill during downturns. wage-bill changes were firstly decomposed and secondly job flows, employment and wage growth were regressed on job and firm characteristics. I used extensive, administrative linked employer–employee data for the Netherlands for the period 2006-2013.

The first part decomposes wage-bill changes into components related to changes in hourly wages, hours worked and number of jobs, separated for stayers and workers entering and exiting the firm. I find that job destruction is, by far, the most important channel for wage-bill contraction, suggesting that wages are downwardly rigid. In this regard, not only increased exits but also reduced entries are used, probably to prevent firing costs. Compared to firms with growing sales, increases in the hourly contractual wages of stayers is only somewhat lower in firms hit by an adverse shock in sales, presumably because collective labour agreements put a floor on contractual wage growth for all firms. On average, employment reduction contributes about 20 times more to wage-bill reduction than wage reductions of stayers. Over the years, however, wage growth has been reduced across the board. However, the fact that it took quite some time to reduce wages may partly be related to the fact that at the onset of the crisis many firms were still in a good financial position. Related, labour hoarding was quite common in the onset of the crisis, while more recently the recovery of unemployment took longer than in most other countries.

Job flows have not served as an important mechanism to reduce the average wage; there is no indication that entrants' wages are reduced extra below those of stayers during periods of adverse sales growth. Contractual working hours provide some downward flexibility of relatively small magnitude compared to the overall wage bill, as do overtime pay and incidental wages.

In the second part of this study, regressions relating changes in wages and employment to firm characteristics confirmed that the wage growth of stayers is not very responsive to the size of sales decreases. By contrast, the response of employment growth is quite sensitive to both firm characteristics and the magnitude of negative sales shocks. Employment losses are concentrated in firms with a higher share of immigrants, short-tenured workers, younger as well as older workers, employees on temporary contracts, non-regular job types and

part-time jobs.

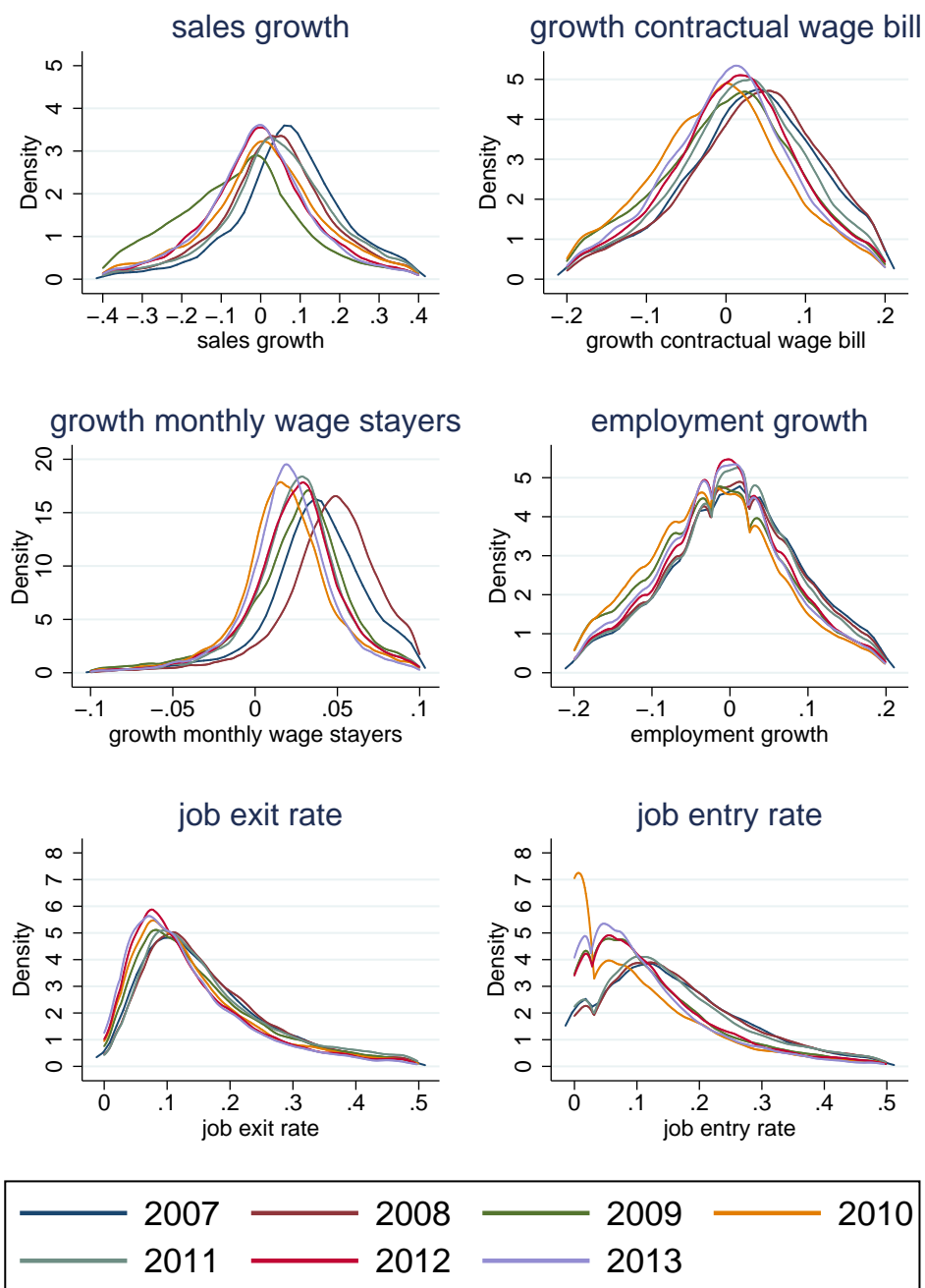
Moreover, I found a significant negative relation between downward wage rigidity and employment growth in firms. This suggests that more downwardly flexible wages would significantly lower the reduction in employment caused by adverse shocks.

These findings may point to a segmented labour market, where, on the one hand, employment adjustment predominantly affects workers with a relatively weak labour-market position, while continuing workers can be assured, on the other hand, that their wage increase will not be jeopardised by sales shocks suffered by the firm at which they work. This possible segmentation could, however, result from rational behaviour by employers, given the institutional context. More research is therefore needed to assess the relationship between labour-market outcomes and the nature of the labour-market institutions, such as those involved in employment protection and wage formation.

Appendix A: Additional tables and graphs

wage-bill contraction is strongly correlated with sales reduction: the parsimonious regressions in Table [A.1](#) indicate that for firms with decreasing sales a drop in sales of 10% is associated with a reduction of the contractual wage bill by on average 3% – 4% (columns 3 and 4). The wage-bill reduction is even larger if sales were also decreasing in the year before. In contrast, for firms with growing sales (columns 1 and 2) the correlation between sales growth and wage-bill growth is rather low.

Figure 1: Kernel density graphs firms ≥ 25 workers, by year



Source: Own calculations based on registration data from Statistics Netherlands.

Table A.1: Relationship between sales growth and contractual wage-bill growth for various sub-samples

Dependent variable: Sample:	$\Delta S \geq 0$ ≥ 25 workers	$\Delta S \geq 0$ ≥ 25 workers	$\Delta S < 0$ ≥ 25 workers	$\Delta S < 0$ ≥ 25 workers	$\Delta S < 0$ all firm sizes	$\Delta S < 0$ all firm sizes
Growth rate sales (t)	0.0135*** (0.0026)	0.0114*** (0.0048)	0.3518*** (0.0208)	0.3375*** (0.0399)	0.4033*** (0.0188)	0.3782*** (0.0367)
Growth rate sales (t) ²	-0.0017*** (0.0003)	-0.0011* (0.0005)	0.0579 (0.0369)	-0.1216 (0.0712)	0.1673*** (0.0321)	-0.0485 (0.0640)
Growth rate sales (t-1)		0.0057** (0.0020)		0.1356*** (0.0167)		0.1231*** (0.0151)
Firm size 25-99	0.0653*** (0.0042)	0.0706*** (0.0056)	0.0245*** (0.0051)	0.0242** (0.0087)	-0.0072** (0.0022)	-0.0073 (0.0045)
Firm size 100-499	0.0515*** (0.0044)	0.0554*** (0.0058)	0.0149** (0.0054)	0.0174 (0.0092)	-0.0170 (0.0030)	-0.0140 (0.0056)
Firm size ≥ 500					-0.0321*** (0.0060)	-0.0311** (0.0100)
Year 2008	0.0074** (0.0026)		0.0130** (0.0042)		0.0143*** (0.0039)	
Year 2009	-0.0232*** (0.0033)	-0.0288*** (0.0039)	-0.0172*** (0.0040)	-0.0236*** (0.0072)	-0.0145*** (0.0037)	-0.0240*** (0.0069)
Year 2010	-0.0520*** (0.0029)	-0.0613*** (0.0043)	-0.0485*** (0.0042)	-0.0312*** (0.0070)	-0.0489*** (0.0039)	-0.0333*** (0.0066)
Year 2011	-0.0138*** (0.0026)	-0.0164*** (0.0034)	-0.0202*** (0.0043)	-0.0223*** (0.0076)	-0.0163*** (0.0039)	-0.0260*** (0.0071)
Year 2011	-0.0144*** (0.0030)	-0.0178*** (0.0036)	-0.0153*** (0.0041)	-0.0242*** (0.0075)	-0.0124*** (0.0037)	-0.0282*** (0.0069)
Intercept	-0.0126** (0.0044)	-0.0022 (0.0057)	0.0010 (0.0060)	-0.0002 (0.0105)	0.0340*** (0.0036)	0.0348*** (0.0072)
<i>N</i>	38, 108	15, 042	27, 538	8, 420	43, 787	11, 724

Notes: Excluded from the sample are the first and highest percentile of the sales growth distribution as well as firm-year combinations subject to firm dynamics (e.g. mergers, etc.). Sectors of industry dummies are not included in this specification; the coefficients would be insignificant and those for sales unaffected. OLS estimation is used, but an RE-specification gives very similar results. Robust standard errors in parentheses. Significance levels: * : 5% ** : 1% *** : 0.1%. *Source:* Own calculations using registration data from Statistics Netherlands

Table A.2: Complementary info for Table 2, the decomposition by sales growth groups

	$\Delta S \geq 0$	$\Delta S < 0$	$\hat{\beta}$		P75-P100	$\hat{\beta}$		P25-P75	$\hat{\beta}$		P1-P25
Growth in contractual wage bill (in %)	3.30	-4.42	-9.34	***	4.69	-4.79	***	1.12	-10.28	***	-7.48
Growth in # of jobs	0.25	-7.48	-10.35	***	1.36	-4.75	***	-1.71	-11.76	***	-10.79
Share exiters (t-1)	16.90	18.46	1.59	***	18.63	-0.34	***	15.88	2.83	***	20.35
Share entrants (t)	17.05	13.32	-4.24	***	19.48	-2.81	***	14.67	-4.18	***	13.05
Share aged 60-65 among exiters (t-1)	9.88	10.89	-0.10	n.s.	9.59	0.28	n.s.	10.48	-0.61	***	10.69
Share aged 55-59 among exiters (t-1)	5.31	5.77	0.27	***	5.30	0.01	n.s.	5.38	0.28	**	6.00
Average age stayers (t-1)	40.85	41.42	-0.01	n.s.	40.55	-0.00	n.s.	41.20	-0.02	**	41.43
Age exiters to age stayers (t-1)	96.81	97.25	0.18	n.s.	97.26	-0.74	***	96.64	0.14	***	97.56
Age entrants to age stayers (t)	85.74	84.44	-0.70	***	86.77	-1.37	***	84.67	0.16	n.s.	84.74
Δ Log wage stayers (hourly), permanent	2.56	2.11	-0.30	***	2.75	-0.23	***	2.29	-0.24	***	2.13
Δ Log wage stayers (hourly), temporary	4.19	3.59	-0.46	**	4.57	-0.69	***	3.79	-0.26	n.s.	3.59
Δ Log hours worked stayers, permanent	0.35	-0.02	-0.15	**	0.38	-0.23	***	0.27	-0.07	n.s.	-0.21
Δ Log hours worked stayers, temporary	-0.70	-1.02	-0.15	n.s.	-0.64	-0.17	n.s.	-0.76	-0.21	n.s.	-1.23
Log h.wage exiters - Log h.wage stayers	-10.32	-9.60	0.63	**	-10.45	0.36	n.s.	-10.03	0.55	**	-9.51
Log h.wage entrants - Log h.wage stayers	-14.54	-13.53	0.99	***	-14.37	0.22	n.s.	-14.51	1.26	***	-12.87
Log hours exiters - Log hours stayers	-8.53	-7.41	0.85	***	-8.34	0.29	n.s.	-8.60	1.16	***	-6.47
Log hours entrants - Log hours stayers	-5.59	-6.93	-1.03	***	-5.23	-0.67	***	-6.22	-0.94	***	-7.00
Δ Log overtime hours	0.04	-0.16	-0.17	***	0.11	-0.12	***	-0.03	-0.16	***	-0.22
Δ Log Share part-time jobs	0.07	-0.20	0.01	n.s.	0.19	-0.17	*	-0.05	0.09	n.s.	-0.29
Share stayers, permanent (t)	71.05	74.70	3.30	***	68.49	2.25	***	73.49	3.28	n.s.	74.93
Share stayers, temporary (t)	11.89	11.98	0.82	***	12.04	0.35	***	11.84	1.01	***	12.01
Share exiters, permanent (t-1)	9.76	11.00	1.25	***	10.33	-0.16	*	9.44	2.21	***	12.20
Share exiters, temporary (t-1)	7.14	7.46	0.52	***	8.30	-0.09	n.s.	6.43	0.78	***	8.15
Share entrants, permanent (t)	6.81	5.34	-1.55	***	7.73	-1.38	***	5.86	-1.39	***	5.29
Share entrants, temporary (t)	10.24	7.98	-2.68	***	11.74	-1.47	***	8.81	-2.81	***	7.76

Notes: Data refer to all private sector firms with at least 25 employees for which Δ sales is available; firm-year combinations with firm dynamics (mergers etc.) are excluded from the sample. ΔS = change in sales, P1-P25, P25-P75 and P75-P100 are subsamples of firms based on the yearly percentile distribution of the change in sales. ΔWB_2 includes contractual as well as overtime pay, ΔWB_3 includes incidental and extra wage on top of this. $\hat{\beta}$ is the estimation result for equation 5, applied to the wage bill and each of its components separately: column 3 refers to $\Delta S < 0$ compared to $\Delta S \geq 0$; column 6 to P25-P75 compared to P75-P100; column 9 refers to P1-P25 compared to P25-P75. Significance levels: * : 5% ** : 1% *** : 0.1%. *Source:* Own calculations using registration data from Statistics Netherlands

Table A.3: Decomposition of wage-bill changes 2007–2013 by sectors of economic activity

	Manufacturing		Construction		Goods Trade		Horeca		Transport Comm.		Business services	
	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$	$\Delta S < 0$	$\hat{\beta}$
Contribution to gross contractual wage-bill change by:												
-net change in employment	-6.01	-5.09***	-6.55	-4.25***	-4.93	-4.29***	-6.19	-8.04***	-7.65	-7.94***	-14.01	-13.19***
-hourly wage, stayers	2.16	-0.26***	1.65	-0.14	1.72	-0.46***	1.62	-0.33	1.51	-0.22	1.82	-0.55***
-hourly wage, entrants	-0.72	0.45***	-0.97	0.23**	-1.51	0.49***	-3.84	0.79**	-1.36	0.50***	-3.17	0.73***
-hourly wage, exiters	1.18	0.23**	1.20	0.31*	1.54	0.07	3.73	0.15	1.70	0.24	4.33	0.72***
-hours worked, stayers	0.32	-0.15***	0.36	-0.24*	0.44	-0.07	0.28	-0.14	0.81	-0.26	0.27	-0.20**
-hours worked, non-stayers +	0.23	0.02	0.18	0.05	0.48	0.07	0.72	0.60	0.49	0.32**	1.18	0.51
Gross wage-bill change (in %):												
-contractual	-2.83	-4.79***	-4.14	-4.49***	-2.25	-4.58***	-3.66	-6.88***	-4.51	-7.37***	-9.56	-11.46***
-contr. + overtime pay	-3.14	-5.13***	-4.34	-5.85***	-2.42	-4.78**	-3.75	-6.99***	-4.98	-7.79***	-9.67	-11.60***
-idem + incid. & extra pay	-2.96	-5.65***	-4.30	-5.98***	-2.44	-5.77***	-3.72	-6.82***	-5.10	-8.19***	-9.73	-11.90***
# firms $\Delta S \geq 0$	12,775		3,880		11,082		975		4,692		9,505	
# firms $\Delta S < 0$	9,741		3,269		8,772		708		3,071		6,966	
# workers (1)			1.7	0.5			1.4	0.2			0.9	1.9
# workers (2)			1.5	0.4			1.1	0.1			0.8	1.6

Notes: Data refer to all private sector firms with at least 25 employees for which Δ sales is available, whereas firm-year combinations with firm dynamics (mergers etc.) are left out of the data. ΔS = change in sales. ΔWB_2 includes contractual as well as overtime pay, ΔWB_3 includes incidental and extra wage on top of this. $\hat{\beta}$ is the estimation result for equation 5, applied to the wage bill and each of its components separately and refers to $\Delta S < 0$ compared to $\Delta S \geq 0$. The relationship between the items of the decomposition and equation 4 is explained in footnote 6. # workers (1) = # workers in firms $\Delta S \geq 0$ (mln); # workers (2) = # workers firms $\Delta S < 0$ (mln). Significance levels: * : 5% ** : 1% *** : 0.1%.

Source: Own calculations using registration data from Statistics Netherlands

Table A.5: Regressions of the growth rate of the hourly wage of job-stayers by sales growth groups 2006–2013

Dependent variable:	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage
	≥ 0	<0	<0	$<P50$	$<P25$	$<P10$
Sample - sales growth:	OLS	OLS	Probit	OLS	OLS	OLS
Estimation technique:						
State of business						
Growth rate sales (t)	0.0188*** (0.0027)	0.0028 (0.0031)	0.1455** (0.0705)	0.0021 (0.0031)	0.0006 (0.0042)	0.0048 (0.0071)
Growth rate sales, squared (t)	-0.0094*** (0.0020)	0.0017 (0.0020)	0.0699 (0.0461)	0.0013 (0.0020)	0.0003 (0.0025)	0.0023 (0.0036)
Growth rate sales (t-1)	0.0047*** (0.0013)	0.0037*** (0.0014)	0.1597*** (0.0316)	0.0044*** (0.0013)	0.0036** (0.0016)	0.0010 (0.0022)
Dummy missing obs.: Growth sales (t-1)	0.0007 (0.0008)	-0.0013 (0.0010)	-0.0270 (0.0212)	-0.0006 (0.0009)	-0.0005 (0.0013)	-0.0016 (0.0020)
Ref. group: business result (t-1) <0	-	-	-	-	-	-
Business result (t-1) ≥ 0	0.0022*** (0.0008)	0.0038*** (0.0008)	0.0765*** (0.0192)	0.0040*** (0.0008)	0.0033*** (0.0010)	0.0027 (0.0017)
Ref. group: continuing firm (t)	-	-	-	-	-	-
Dummy firm ceases to exits next year (t)	0.0022 (0.0016)	0.0031 (0.0020)	0.1083*** (0.0398)	0.0017 (0.0018)	0.0011 (0.0024)	-0.0006 (0.0038)
Dummy end of firm out of observed period (t)	0.0045*** (0.0011)	0.0067*** (0.0011)	0.2484*** (0.0238)	0.0059*** (0.0011)	0.0049*** (0.0015)	0.0045** (0.0021)
Share of workers subject to part-time UB (t-1)	-0.0136 (0.0091)	-0.0199* (0.0117)	-0.0007 (0.1663)	-0.0159 (0.0107)	0.0031 (0.0085)	-0.0011 (0.0141)
Dummy missing obs.: Share part-time UB (t-1)	0.0680*** (0.0016)	0.0687*** (0.0020)	-0.1851*** (0.0391)	0.0689*** (0.0018)	0.0692*** (0.0024)	0.0695*** (0.0037)

Table A.5 Continued from previous page

Dependent variable:	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	
	≥ 0	< 0	< 0	$>$ sector mean	$< P50$	$< P25$	$< P10$
Sample - sales growth:	OLS	OLS	Probit	OLS	OLS	OLS	OLS
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS	OLS
Type of job							
Share of open-term contracts (t-1)	-0.0017 (0.0015)	-0.0027 (0.0019)	-0.0267 (0.0383)	-0.0029 (0.0018)	-0.0045* (0.0027)	-0.0085** (0.0039)	
Share of regular jobs (t-1)	-0.0114*** (0.0034)	0.0027 (0.0033)	0.0060 (0.0625)	0.0002 (0.0032)	0.0020 (0.0042)	0.0034 (0.0066)	
Share of full-time jobs (t-1)	0.0720*** (0.0036)	0.0555*** (0.0039)	0.9575*** (0.0623)	0.0591*** (0.0038)	0.0568*** (0.0055)	0.0553*** (0.0067)	
Share of jobs hired from TWA's (t-1)	-0.0004** (0.0002)	0.0007*** (0.0002)	0.0283 (0.0254)	0.0007*** (0.0002)	-0.0004 (0.0024)	-0.0029 (0.0041)	
Share of hired self-employed (t-1)	0.0014*** (0.0003)	0.0009 (0.0007)	-0.0003 (0.0202)	0.0007 (0.0006)	0.0013 (0.0012)	0.0017 (0.0038)	
Dummy missing obs.: Share TWA (t-1)	-0.0024 (0.0038)	-0.0025 (0.0044)	0.0096 (0.1084)	-0.0004 (0.0043)	0.0008 (0.0058)	0.0098 (0.0072)	
Collective labour agreement							
CLA enterprise level (t-1)	0.0058*** (0.0015)	0.0060*** (0.0019)	0.0728** (0.0363)	0.0069*** (0.0020)	0.0060*** (0.0020)	0.0061* (0.0035)	
CLA sector level, no extension (t-1)	-0.0024 (0.0015)	-0.0005 (0.0014)	0.0183 (0.0345)	-0.0009 (0.0013)	0.0002 (0.0019)	0.0040 (0.0031)	
CLA enterprise extended to sector level (t-1)	-0.0008 (0.0007)	0.0009 (0.0009)	-0.0099 (0.0203)	0.0007 (0.0008)	0.0022* (0.0012)	0.0022 (0.0020)	
Ref. group: no collective labour agreement (CLA)	-	-	-	-	-	-	
CLA unknown (t-1)	0.0053* (0.0030)	0.0029 (0.0051)	0.1857** (0.0842)	0.0043 (0.0044)	0.0075* (0.0043)	0.0035 (0.0074)	
Composition of the labour force							
Share of male workers (t-1)	-0.0400*** (0.0027)	-0.0266*** (0.0032)	-0.5414*** (0.0565)	-0.0280*** (0.0031)	-0.0234*** (0.0045)	-0.0216*** (0.0059)	

Table A.5 Continued from previous page

Dependent variable:	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage
	≥ 0	< 0	< 0	$< P50$	$< P25$	$< P10$
Sample - sales growth:	OLS	OLS	Probit	OLS	OLS	OLS
Estimation technique:						
Share of workers aged 23-35 (t-1)	0.0059* (0.0032)	0.0039 (0.0039)	0.3993*** (0.0778)	0.0038 (0.0037)	0.0059 (0.0051)	0.0008 (0.0081)
Ref. group: Share of workers aged 36-50 (t-1)	-	-	-	-	-	-
Share of workers aged 51-65 (t-1)	0.0053 (0.0041)	0.0092** (0.0043)	0.1092 (0.0952)	0.0076* (0.0042)	0.0151*** (0.0058)	0.0073 (0.0096)
Share of job tenure ≥ 10 years (t-1)	-0.0033* (0.0019)	-0.0046** (0.0020)	-0.2021*** (0.0473)	-0.0047** (0.0019)	-0.0075*** (0.0025)	-0.0093** (0.0040)
Ref. group: Dutch workers	-	-	-	-	-	-
Share of immigrants after EU-enlargement (t-1)	-0.0282* (0.0145)	-0.0262 (0.0190)	-0.0866 (0.3283)	-0.0386** (0.0188)	-0.0245 (0.0231)	-0.0605 (0.0387)
Share of immigrants other western countries	-0.0020 (0.0050)	0.0040 (0.0061)	0.0968 (0.1081)	0.0003 (0.0058)	0.0031 (0.0091)	-0.0021 (0.0125)
Share of other non-western immigrants (t-1)	-0.0143** (0.0065)	-0.0265*** (0.0103)	-0.3508* (0.1980)	-0.0233** (0.0092)	-0.0323** (0.0156)	-0.0284 (0.0189)
Training, education and contractual wage						
Ratio training expenditures firm / sales (t-1)	0.1248*** (0.0391)	0.1584*** (0.0439)	3.1330*** (1.1421)	0.1402*** (0.0406)	0.1159** (0.0496)	0.0411 (0.0434)
Share low educated workers (t-1)	-0.0339*** (0.0024)	-0.0420*** (0.0030)	-0.7359*** (0.0549)	-0.0408*** (0.0029)	-0.0441*** (0.0039)	-0.0405*** (0.0062)
Share medium educated workers (t-1)	-0.0223*** (0.0020)	-0.0275*** (0.0025)	-0.5091*** (0.0504)	-0.0270*** (0.0024)	-0.0300*** (0.0033)	-0.0264*** (0.0048)
Ref. group: Share high educated workers (t-1)	-	-	-	-	-	-
Share workers with low wage (t-1)	-0.0145	-0.0298**	0.2707*	-0.0275**	-0.0309**	-0.0117

Table A.5 Continued from previous page

Dependent variable:	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage
	≥ 0	< 0	< 0	$< P50$	$< P25$	$< P10$
Sample - sales growth:	OLS	OLS	Probit	OLS	OLS	OLS
Estimation technique:						
Share workers with medium wage (t-1)	(0.0092) -0.0238*** (0.0067)	(0.0130) -0.0367*** (0.0097)	(0.1621) -0.0496 (0.1249)	(0.0123) -0.0347*** (0.0092)	(0.0136) -0.0370*** (0.0102)	(0.0167) -0.0208* (0.0121)
Ref. group: Share workers with high wage (t-1)	-	-	-	-	-	-
Average hourly wage of the firm (t-1)	-0.0022*** (0.0005)	-0.0034*** (0.0007)	-0.0089 (0.0074)	-0.0033*** (0.0006)	-0.0035*** (0.0007)	-0.0024*** (0.0008)
Std. dev. of hourly wage in the firm (t-1)	-0.0004* (0.0002)	-0.0001 (0.0003)	-0.0050 (0.0041)	-0.0001 (0.0002)	0.0001 (0.0003)	-0.0004 (0.0004)
Dummy missing obs.: training expenditures (t-1)	0.0018 (0.0039)	0.0027 (0.0044)	0.0445 (0.1078)	0.0012 (0.0042)	0.0003 (0.0057)	-0.0055 (0.0070)
Other firm characteristics						
Ref. group: low Share of incidental wage (t-1)	-	-	-	-	-	-
Intermediate Share of incidental wage (t-1)	0.0013* (0.0008)	0.0009 (0.0009)	0.0453** (0.0206)	0.0009 (0.0008)	0.0004 (0.0012)	0.0014 (0.0019)
High Share of incidental wage (t-1)	0.0009 (0.0009)	-0.0012 (0.0011)	0.0626** (0.0252)	-0.0007 (0.0011)	-0.0010 (0.0015)	0.0002 (0.0023)
Ref. group: firm size 25 - 99 workers (t-1)	-	-	-	-	-	-
Firm size 100 - 500 workers (t-1)	0.0028*** (0.0007)	0.0014* (0.0007)	0.0113 (0.0184)	0.0018** (0.0007)	-0.0001 (0.0010)	0.0001 (0.0017)
Firm size ≥ 500 workers (t-1)	0.0086*** (0.0015)	0.0074*** (0.0018)	0.1114*** (0.0409)	0.0073*** (0.0017)	0.0057*** (0.0019)	0.0090*** (0.0032)
Ref. group: # establishments 1 (t-1)	-	-	-	-	-	-

Table A.5 Continued from previous page

Dependent variable:	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage
	≥ 0	< 0	< 0	$< P50$	$< P25$	$< P10$
Sample - sales growth:	≥ 0	< 0	< 0	$< P50$	$< P25$	$< P10$
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS
# establishments 2 - 50 (t-1)	-0.0026*** (0.0006)	-0.0017** (0.0007)	-0.0604*** (0.0164)	-0.0017*** (0.0006)	-0.0014 (0.0009)	-0.0025 (0.0016)
High # establishments ≥ 50 (t-1)	-0.0137*** (0.0036)	-0.0100*** (0.0027)	-0.3092*** (0.0783)	-0.0087*** (0.0027)	-0.0054* (0.0032)	-0.0109* (0.0060)
Ref. group: Dutch ownership (t-1)	-	-	-	-	-	-
UK/US ownership (t-1)	-0.0010 (0.0012)	-0.0025* (0.0014)	-0.1447*** (0.0369)	-0.0001 (0.0013)	0.0002 (0.0019)	0.0014 (0.0032)
Foreign ownership, no UK/US (t-1)	-0.0009 (0.0010)	0.0012 (0.0013)	-0.0216 (0.0286)	0.0020 (0.0012)	0.0025 (0.0016)	0.0036 (0.0026)
Ownership unknown (t-1)	-0.0257*** (0.0044)	-0.0169*** (0.0054)	-0.5512*** (0.1437)	-0.0172*** (0.0047)	-0.0082 (0.0078)	0.0061 (0.0330)
Ref. group: non-exporting firm (t-1)	-	-	-	-	-	-
Exporting firm (t-1)	0.0014 (0.0013)	0.0024 (0.0015)	0.0427 (0.0332)	0.0024 (0.0015)	0.0050** (0.0021)	0.0049 (0.0032)
Export unknown (t-1)	0.0047*** (0.0012)	0.0028** (0.0014)	0.0428 (0.0290)	0.0028** (0.0013)	0.0037** (0.0018)	0.0074** (0.0029)
Sectors of economic activity and years						
Mineral extraction sector (t)	0.0075 (0.0069)	-0.0018 (0.0083)	0.0343 (0.3263)	0.0006 (0.0076)	0.0107 (0.0158)	0.0149 (0.0159)
Manufacturing sector (t)	0.0031 (0.0055)	0.0055 (0.0062)	-0.1316 (0.2768)	0.0076 (0.0061)	0.0174 (0.0134)	0.0014 (0.0053)
Ref. group: energy and water sector (t)	-	-	-	-	-	-
Construction sector (t)	0.0002 (0.0056)	0.0032 (0.0063)	-0.0456 (0.2783)	0.0059 (0.0062)	0.0140 (0.0136)	-0.0030 (0.0062)
Goods trade sector (t)	0.0005	0.0006	-0.2823	0.0029	0.0133	0.0004

Table A.5 Continued from previous page

Dependent variable:	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage
	≥ 0	< 0	< 0	$< P50$	$< P25$	$< P10$
Sample - sales growth:			> sector mean			
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS
Horeca sector (t)	(0.0055) 0.0007 (0.0057)	(0.0062) 0.0008 (0.0064)	(0.2768) -0.3406 (0.2813)	(0.0061) 0.0030 (0.0062)	(0.0135) 0.0112 (0.0137)	(0.0055) -0.0017 (0.0070)
Transport and communication sector (t)	-0.0003 (0.0056)	0.0051 (0.0063)	-0.0365 (0.2781)	0.0062 (0.0062)	0.0180 (0.0136)	0.0066 (0.0059)
Business services sector (t)	0.0046 (0.0055)	0.0049 (0.0063)	-0.3014 (0.2774)	0.0073 (0.0061)	0.0164 (0.0135)	0.0012 (0.0055)
Ref. variable: year 2008	-	-	-	-	-	-
Dummy year 2009	-0.0075*** (0.0012)	-0.0095*** (0.0012)	0.0877*** (0.0259)	-0.0099*** (0.0012)	-0.0096*** (0.0017)	-0.0130*** (0.0029)
Dummy year 2010	0.0518*** (0.0014)	0.0530*** (0.0017)	-0.0070 (0.0368)	0.0534*** (0.0017)	0.0549*** (0.0022)	0.0516*** (0.0033)
Dummy year 2011	0.0481*** (0.0012)	0.0478*** (0.0015)	-0.1596*** (0.0363)	0.0484*** (0.0015)	0.0496*** (0.0019)	0.0475*** (0.0031)
Dummy year 2012	-	-	-	-	-	-
Dummy year 2013	-0.0344*** (0.0016)	-0.0374*** (0.0019)	0.1134*** (0.0396)	-0.0377*** (0.0018)	-0.0379*** (0.0022)	-0.0451*** (0.0035)
Relation employment Growth - wage Growth						
Growth employment firm (in %) (t)	0.0068** (0.0034)	0.0085** (0.0036)	0.0999** (0.0458)	0.0080** (0.0036)	0.0068* (0.0039)	0.0073 (0.0052)
Constant	0.0360** (0.0163)	0.0568*** (0.0209)	0.0535 (0.0535)	0.0511** (0.0199)	0.0428* (0.0245)	0.0335 (0.0260)

Table A.5 Continued from previous page

Dependent variable:	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage	Hourly wage
			> sector mean			
Sample - sales growth:	≥ 0	<0	<0	<P50	<P25	<P10
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS
Observations	34,150	29,463	29,463	31,814	15,908	6,363
R-squared	0.2183	0.2026		0.2008	0.2034	0.1844
Log likelihood			1.31e+05			

Notes: Data refer to all private sector firms with at least 25 employees that exist in two subsequent years and for which sales growth data are available, whereas firm-year combinations with firm dynamics (mergers etc.) are left out of the data. Significance levels: * : 5% ** : 1% *** : 0.1%. The table presents OLS-regressions for the nominal change in the hourly wages of stayers if sales are increasing (column 1) or decreasing (column 2). Column 3 gives the results of a probit regression of the probability that the nominal change in the hourly wages of stayers exceeds that of the sector the firm is in. Columns 4, 5 and 6 show regressions performed on increasingly smaller samples with increasingly adverse sales growth, the samples respectively containing observations below the median, the 25th percentile and the 10th percentile of the sales growth distribution. Hence, the sixth column contains the least observations, only the ones that experience a severe shock in sales. Dummy 2012 drops out due to multicollinearity with 'dummy end of firm out of observed period (t)'.
Source: Own calculations using registration data from Statistics Netherlands.

Table A.6: Regressions of employment growth by sales growth groups 2006–2013

Dependent variable:	Employment	Employment	Employment	Employment	Employment	Employment
	≥ 0	<0	<0	$<P50$	$<P25$	$<P10$
Sample - sales growth:	OLS	OLS	Probit	OLS	OLS	OLS
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS
State of business						
Growth rate sales (t)	0.1158*** (0.0103)	0.3275*** (0.0128)	1.9444*** (0.0777)	0.3145*** (0.0125)	0.3290*** (0.0198)	0.3442*** (0.0372)
Growth rate sales, squared (t)	-0.0751*** (0.0083)	0.1447*** (0.0097)	1.0544*** (0.0527)	0.1376*** (0.0095)	0.1464*** (0.0123)	0.1543*** (0.0189)
Growth rate sales (t-1)	0.0292*** (0.0041)	0.0653*** (0.0055)	0.5278*** (0.0389)	0.0621*** (0.0052)	0.0733*** (0.0073)	0.0793*** (0.0111)
Dummy missing obs.: Growth sales (t-1)	-0.0019 (0.0025)	-0.0009 (0.0031)	-0.0218 (0.0229)	-0.0001 (0.0028)	0.0028 (0.0046)	0.0062 (0.0084)
Ref. group: business result (t-1) <0	-	-	-	-	-	-
Business result (t-1) ≥ 0	0.0386*** (0.0023)	0.0633*** (0.0030)	0.4296*** (0.0207)	0.0608*** (0.0028)	0.0784*** (0.0043)	0.1007*** (0.0082)
Ref. group: continuing firm (t)	-	-	-	-	-	-
Dummy firm ceases to exits next year (t)	-0.0053 (0.0061)	-0.0322*** (0.0082)	-0.0720 (0.0440)	-0.0273*** (0.0072)	-0.0360*** (0.0105)	-0.0456** (0.0185)
Dummy end of firm out of observed period (t)	0.0208*** (0.0029)	0.0227*** (0.0034)	0.0936*** (0.0254)	0.0218*** (0.0032)	0.0254*** (0.0052)	0.0461*** (0.0100)
Share of workers subject to part-time UB (t-1)	-0.0028 (0.0115)	-0.0349 (0.0237)	-0.3791* (0.1955)	-0.0373* (0.0215)	-0.0641* (0.0334)	-0.0073 (0.0537)
Dummy missing obs.: Share part-time UB (t-1)	-0.0375*** (0.0045)	-0.0317*** (0.0064)	-0.4400*** (0.0443)	-0.0346*** (0.0060)	-0.0329*** (0.0095)	-0.0455** (0.0190)

Table A.6 Continued from previous page

Dependent variable:	Employment	Employment	Employment	Employment	Employment	Employment	
	≥ 0	< 0	< 0	$>$ sector mean	$< P50$	$< P25$	$< P10$
Sample - sales growth:							
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS	OLS
Type of job							
Share of open-term contracts (t-1)	0.0281*** (0.0054)	0.0397*** (0.0063)	0.2530*** (0.0430)	0.0386*** (0.0060)	0.0456*** (0.0093)	0.0447*** (0.0170)	
Share of regular jobs (t-1)	0.0188 (0.0133)	0.0376*** (0.0142)	-0.0536 (0.0766)	0.0402*** (0.0136)	0.0326* (0.0195)	0.0747** (0.0352)	
Share of full-time jobs (t-1)	0.0401*** (0.0084)	0.0399*** (0.0098)	0.1725*** (0.0662)	0.0427*** (0.0092)	0.0691*** (0.0160)	0.1040*** (0.0313)	
Share of jobs hired from TWA's (t-1)	0.0009 (0.0008)	0.0021* (0.0011)	0.0147 (0.0130)	0.0022** (0.0011)	0.0095 (0.0158)	-0.0054 (0.0313)	
Share of hired self-employed (t-1)	-0.0024 (0.0016)	-0.0008 (0.0031)	-0.0493* (0.0254)	-0.0012 (0.0032)	-0.0004 (0.0053)	-0.0181 (0.0143)	
Dummy missing obs.: Share TWA (t-1)	-0.1190*** (0.0166)	-0.1145*** (0.0276)	-1.0993*** (0.1494)	-0.1125*** (0.0266)	-0.1189*** (0.0339)	-0.1452*** (0.0512)	
Collective labour agreement							
CLA enterprise level (t-1)	0.0007 (0.0035)	-0.0043 (0.0047)	0.0300 (0.0390)	-0.0029 (0.0045)	0.0014 (0.0076)	0.0056 (0.0162)	
CLA sector level, no extension (t-1)	-0.0143*** (0.0049)	-0.0185*** (0.0051)	-0.1628*** (0.0379)	-0.0195*** (0.0048)	-0.0199*** (0.0077)	-0.0190 (0.0159)	
CLA enterprise extended to sector level (t-1)	0.0025 (0.0019)	0.0007 (0.0026)	-0.0467** (0.0215)	0.0026 (0.0025)	-0.0008 (0.0042)	0.0001 (0.0089)	
Ref. group: no collective labour agreement (CLA)	-	-	-	-	-	-	
CLA unknown (t-1)	-0.0533*** (0.0129)	-0.0356** (0.0178)	-0.3149*** (0.1037)	-0.0334** (0.0156)	-0.0352 (0.0243)	-0.0163 (0.0440)	
Composition of the labour force							
Share of male workers (t-1)	-0.0255*** (0.0079)	-0.0319*** (0.0090)	-0.0599 (0.0612)	-0.0360*** (0.0085)	-0.0458*** (0.0142)	-0.0734*** (0.0274)	

Table A.6 Continued from previous page

Dependent variable:	Employment	Employment	Employment	Employment	Employment	Employment
Sample - sales growth:	≥ 0	< 0	< 0	$< P50$	$< P25$	$< P10$
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS
Share of workers aged 23-35 (t-1)	-0.0204** (0.0089)	-0.0218* (0.0118)	-0.1269 (0.0838)	-0.0155 (0.0112)	-0.0235 (0.0187)	-0.0318 (0.0352)
Ref. group: Share of workers aged 36-50 (t-1)	-	-	-	-	-	-
Share of workers aged 51-65 (t-1)	-0.0819*** (0.0110)	-0.0627*** (0.0128)	-0.6260*** (0.1021)	-0.0574*** (0.0121)	-0.0594*** (0.0198)	-0.0658 (0.0401)
Share of job tenure ≥ 10 years (t-1)	0.0171*** (0.0054)	0.0271*** (0.0068)	0.2658*** (0.0518)	0.0278*** (0.0065)	0.0268*** (0.0098)	0.0109 (0.0200)
Ref. group: Dutch workers	-	-	-	-	-	-
Share of immigrants after EU-enlargement (t-1)	0.0245 (0.0484)	0.0825 (0.0675)	0.0338 (0.3829)	0.0933 (0.0644)	0.0733 (0.0790)	0.1420 (0.1320)
Share of immigrants other western countries	-0.0830*** (0.0169)	-0.1133*** (0.0235)	-0.7415*** (0.1226)	-0.1142*** (0.0220)	-0.1302*** (0.0364)	-0.2015*** (0.0740)
Share of other non-western immigrants (t-1)	-0.0390* (0.0214)	-0.0230 (0.0504)	0.2762 (0.2161)	-0.0227 (0.0443)	-0.0558 (0.0847)	-0.1788 (0.1601)
Training, education and contractual wage						
ratio training expenditures firm / sales (t-1)	-0.0081 (0.0837)	0.0200 (0.1171)	-1.4667 (0.9741)	0.0478 (0.1156)	0.0690 (0.1683)	0.1102 (0.2360)
Share low educated workers (t-1)	0.0117** (0.0060)	0.0060 (0.0073)	0.0808 (0.0584)	0.0091 (0.0069)	0.0017 (0.0110)	0.0001 (0.0210)
Share medium educated workers (t-1)	0.0026 (0.0051)	0.0030 (0.0065)	0.1168** (0.0538)	0.0043 (0.0062)	0.0034 (0.0099)	-0.0052 (0.0183)
Ref. group: Share high educated workers (t-1)	-	-	-	-	-	-
Share workers with low wage (t-1)	-0.0741***	-0.0327	-0.3437*	-0.0318	-0.0321	-0.0805

Table A.6 Continued from previous page

Dependent variable:	Employment	Employment	Employment	Employment	Employment	Employment
Sample - sales growth:	≥ 0	< 0	< 0	$< P50$	$< P25$	$< P10$
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS
Share workers with medium wage (t-1)	(0.0198) -0.0524*** (0.0147)	(0.0257) -0.0089 (0.0191)	(0.1807) -0.2013 (0.1393)	(0.0245) -0.0129 (0.0183)	(0.0393) 0.0060 (0.0280)	(0.0752) -0.0173 (0.0527)
Ref. group: Share workers with high wage (t-1)	-	-	-	-	-	-
Average hourly wage of the firm (t-1)	-0.0020** (0.0010)	0.0010 (0.0013)	0.0051 (0.0084)	0.0012 (0.0012)	0.0014 (0.0020)	-0.0005 (0.0037)
Std. dev. of hourly wage in the firm (t-1)	-0.0002 (0.0005)	0.0003 (0.0006)	-0.0016 (0.0044)	0.0002 (0.0006)	0.0013 (0.0010)	0.0035* (0.0019)
Dummy missing obs.: training expenditures (t-1)	-0.0717*** (0.0164)	-0.0470* (0.0271)	-0.5263*** (0.1442)	-0.0532** (0.0261)	-0.0317 (0.0332)	0.0055 (0.0494)
Other firm characteristics						
Ref. group: low Share of incidental wage (t-1)	-	-	-	-	-	-
Intermediate Share of incidental wage (t-1)	-0.0058*** (0.0021)	-0.0079*** (0.0026)	-0.0877*** (0.0221)	-0.0081*** (0.0024)	-0.0071* (0.0041)	-0.0018 (0.0084)
High Share of incidental wage (t-1)	-0.0047* (0.0026)	-0.0003 (0.0032)	-0.0221 (0.0270)	-0.0007 (0.0030)	0.0006 (0.0050)	0.0132 (0.0102)
Ref. group: firm size 25 - 99 workers (t-1)	-	-	-	-	-	-
Firm size 100 - 500 workers (t-1)	-0.0014 (0.0019)	-0.0035 (0.0023)	-0.0693*** (0.0196)	-0.0031 (0.0022)	-0.0045 (0.0037)	0.0082 (0.0075)
Firm size ≥ 500 workers (t-1)	-0.0017 (0.0050)	0.0092** (0.0045)	-0.0672 (0.0458)	0.0061 (0.0045)	0.0188** (0.0075)	0.0241 (0.0167)
Ref. group: # establishments 1 (t-1)	-	-	-	-	-	-

Table A.6 Continued from previous page

Dependent variable:	Employment	Employment	Employment	Employment	Employment	Employment
Sample - sales growth:	≥ 0	< 0	< 0	$< P50$	$< P25$	$< P10$
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS
# establishments 2 - 50 (t-1)	-0.0018 (0.0018)	-0.0011 (0.0021)	-0.0676*** (0.0175)	-0.0011 (0.0020)	-0.0037 (0.0033)	0.0035 (0.0067)
High # establishments ≥ 50 (t-1)	0.0061 (0.0123)	0.0052 (0.0091)	-0.0750 (0.0850)	0.0051 (0.0094)	0.0149 (0.0169)	0.0340 (0.0455)
Ref. group: Dutch ownership (t-1)	-	-	-	-	-	-
UK/US ownership (t-1)	-0.0109*** (0.0036)	-0.0151*** (0.0051)	-0.0758** (0.0387)	-0.0142*** (0.0046)	-0.0211*** (0.0077)	-0.0152 (0.0144)
Foreign ownership, no UK/US (t-1)	-0.0061** (0.0026)	-0.0111*** (0.0038)	-0.0664** (0.0301)	-0.0119*** (0.0035)	-0.0143** (0.0061)	-0.0264** (0.0125)
Ownership unknown (t-1)	0.0090 (0.0201)	0.0253 (0.0167)	-0.2050 (0.1681)	0.0316** (0.0153)	0.0546*** (0.0199)	0.0976** (0.0445)
Ref. group: non-exporting firm (t-1)	-	-	-	-	-	-
Exporting firm (t-1)	-0.0181*** (0.0037)	-0.0008 (0.0045)	0.0105 (0.0350)	-0.0029 (0.0043)	0.0004 (0.0072)	0.0091 (0.0139)
Export unknown (t-1)	-0.0271*** (0.0036)	-0.0063 (0.0044)	0.1209*** (0.0314)	-0.0096** (0.0043)	-0.0142** (0.0071)	-0.0167 (0.0136)
Sectors of economic activity and years						
Mineral extraction sector (t)	0.0046 (0.0633)	0.0171 (0.0329)	-0.0292 (0.3566)	0.0059 (0.0337)	-0.0801 (0.0496)	-0.0883** (0.0404)
Manufacturing sector (t)	0.0263 (0.0622)	-0.0051 (0.0301)	-0.1926 (0.3014)	-0.0035 (0.0317)	-0.0819* (0.0446)	-0.1566*** (0.0252)
Ref. group: energy and water sector (t)	-	-	-	-	-	-
Construction sector (t)	0.0147 (0.0621)	-0.0017 (0.0303)	-0.1815 (0.3031)	-0.0036 (0.0319)	-0.0829* (0.0450)	-0.1545*** (0.0297)
Goods trade sector (t)	0.0173	-0.0044	-0.2727	-0.0034	-0.0850*	-0.1527***

Table A.6 Continued from previous page

Dependent variable:	Employment	Employment	Employment	Employment	Employment	Employment
	≥ 0	< 0	< 0	$>$ sector mean	$< P50$	$< P25$
Sample - sales growth:	OLS	OLS	Probit	OLS	OLS	OLS
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS
Horeca sector (t)	(0.0621) -0.0015	(0.0301) -0.0123	(0.3014) -0.4655	(0.0317) -0.0132	(0.0447) -0.0907**	(0.0266) -0.1109***
Transport and communication sector (t)	(0.0623) 0.0155	(0.0306) -0.0129	(0.3061) -0.2128	(0.0322) -0.0131	(0.0457) -0.0962**	(0.0358) -0.1767***
Business services sector (t)	(0.0621) 0.0011	(0.0302) -0.0468	(0.3026) -0.2019	(0.0319) -0.0464	(0.0450) -0.1352***	(0.0293) -0.2142***
Ref. variable: year 2008	-	-	-	-	-	-
Dummy year 2009	0.0012 (0.0037)	-0.0046 (0.0041)	0.4081*** (0.0309)	-0.0068 (0.0043)	-0.0240*** (0.0072)	-0.0513*** (0.0134)
Dummy year 2010	-0.0291*** (0.0055)	-0.0192*** (0.0064)	0.2566*** (0.0459)	-0.0202*** (0.0063)	-0.0192* (0.0098)	-0.0318 (0.0195)
Dummy year 2011	-0.0115*** (0.0037)	-0.0056 (0.0053)	-0.0687* (0.0394)	-0.0082* (0.0049)	-0.0041 (0.0079)	-0.0090 (0.0161)
Dummy year 2012	-	-	-	-	-	-
Dummy year 2013	0.0380*** (0.0041)	0.0317*** (0.0060)	0.4923*** (0.0444)	0.0349*** (0.0056)	0.0345*** (0.0094)	0.0324* (0.0188)
Relation employment Growth - wage Growth						
Growth hourly wage stayers (in %) (t)	-0.0244 (0.0328)	-0.0274 (0.0364)	0.0264 (0.1734)	-0.0383 (0.0365)	-0.0561 (0.0488)	-0.0441 (0.1015)
Indicator downward nominal wage rigidity (t)	-0.3452*** (0.0596)	-0.3848*** (0.0661)	-4.4572*** (0.4166)	-0.4153*** (0.0660)	-0.5630*** (0.1043)	-0.7624*** (0.1889)
Indicator downward real wage rigidity (t)	-0.3479*** (0.0646)	-0.3448*** (0.0725)	-4.3806*** (0.4521)	-0.3734*** (0.0719)	-0.5243*** (0.1138)	-0.6987*** (0.2032)
Wage decrease below range indicator (t)	-0.1556**	-0.1933***	-0.1616	-0.2369***	-0.2811***	-0.3483**

Table A.6 Continued from previous page

Dependent variable:	Employment	Employment	Employment	Employment	Employment	Employment	
	≥ 0	< 0	< 0	$>$ sector mean	$< P50$	$< P25$	$< P10$
Sample - sales growth:							
Estimation technique:	OLS	OLS	Probit	OLS	OLS	OLS	OLS
	(0.0676)	(0.0629)	(0.2941)	(0.0668)	(0.0919)	(0.1470)	
Wage decrease above range indicator (t)	0.4161*** (0.0153)	0.2464*** (0.0178)	2.5855*** (0.0973)	0.2537*** (0.0166)	0.2591*** (0.0232)	0.2736*** (0.0390)	
Dummy missing obs.: wage rigidity indicator (t)	-0.1276***	-0.1335***	-0.5806***	-0.1307***	-0.1368***	-0.1762***	
	(0.0173)	(0.0192)	(0.0988)	(0.0174)	(0.0230)	(0.0419)	
Constant	0.3153*** (0.0946)	0.2150*** (0.0826)	3.8935*** (0.5812)	0.2387*** (0.0823)	0.4307*** (0.1265)	0.6759*** (0.2174)	
Observations	33,124	28,559	28,559	30,848	15,471	6,177	
R-squared	0.2932	0.2377		0.2454	0.2323	0.2255	
Log likelihood			1.30e + 05				

Notes: Data refer to all private sector firms with at least 25 employees that exist in two subsequent years and for which sales growth data are available, whereas firm-year combinations with firm dynamics (mergers etc.) are left out of the data. Significance levels: * : 5% ** : 1% *** : 0.1%. The table presents OLS-regressions for the nominal change in the employment of firms if sales are increasing (column 1) or decreasing (column 2). Column 3 gives the results of a probit regression of the probability that the employment growth exceeds that of the sector the firm is in. Columns 4, 5 and 6 show regressions performed on increasingly smaller samples with increasingly adverse sales growth, the samples respectively containing observations below the median, the 25th percentile and the 10th percentile of the sales growth distribution. Hence, the sixth column contains the least observations, only the ones that experience a severe shock in sales. Dummy 2012 drops out due to multicollinearity with 'dummy end of firm out of observed period (t)'.
Source: Own calculations using registration data from Statistics Netherlands.

Table A.7: OLS-regressions of employment growth and job flows by sales growth groups 2006–2013

Dependent variable:	Growth rate Employment	Share entrants	Share exiters	Growth rate Employment	Share entrants	Share exiters
Sample - sales growth:	<P50	<P50	<P50	<P10	<P10	<P10
State of business						
Growth rate sales (t)	0.3145*** (0.0125)	0.0384*** (0.0043)	-0.2760*** (0.0113)	0.3442*** (0.0372)	0.0272** (0.0111)	-0.3170*** (0.0336)
Growth rate sales, squared (t)	0.1376*** (0.0095)	0.0195*** (0.0028)	-0.1181*** (0.0088)	0.1543*** (0.0189)	0.0141*** (0.0054)	-0.1402*** (0.0173)
Growth rate sales (t-1)	0.0621*** (0.0052)	0.0096*** (0.0021)	-0.0525*** (0.0044)	0.0793*** (0.0111)	0.0085** (0.0037)	-0.0709*** (0.0094)
Dummy missing obs.: Growth sales (t-1)	-0.0001 (0.0028)	0.0042*** (0.0014)	0.0043* (0.0025)	0.0062 (0.0084)	0.0029 (0.0032)	-0.0032 (0.0073)
Ref. group: business result (t-1) < 0	-	-	-	-	-	-
Business result (t-1) ≥ 0	0.0608*** (0.0028)	0.0054*** (0.0012)	-0.0554*** (0.0025)	0.1007*** (0.0082)	0.0140*** (0.0025)	-0.0867*** (0.0074)
Ref. group: continuing firm (t)	-	-	-	-	-	-
Dummy firm ceases to exits next year (t)	-0.0273*** (0.0072)	-0.0112*** (0.0030)	0.0161** (0.0063)	-0.0456** (0.0185)	-0.0205*** (0.0064)	0.0251 (0.0160)
Dummy end of firm out of observed period (t)	0.0218*** (0.0032)	-0.0133*** (0.0014)	-0.0351*** (0.0029)	0.0461*** (0.0100)	-0.0133*** (0.0032)	-0.0595*** (0.0090)
Share of workers subject to part-time UB (t-1)	-0.0373* (0.0215)	-0.0039 (0.0069)	0.0334* (0.0199)	-0.0073 (0.0537)	0.0014 (0.0111)	0.0086 (0.0516)
Dummy missing obs.: Share part-time UB (t-1)	-0.0346*** (0.0060)	0.0195*** (0.0025)	0.0541*** (0.0054)	-0.0455** (0.0190)	0.0115** (0.0058)	0.0570*** (0.0170)
Type of job						
Share of open-term contracts (t-1)	0.0386***	-0.0431***	-0.0817***	0.0447***	-0.0236***	-0.0684***

Table A.7 Continued from previous page

Dependent variable:	Growth rate Employment	Share entrants	Share exiters	Growth rate Employment	Share entrants	Share exiters
Sample - sales growth:	<P50	<P50	<P50	<P10	<P10	<P10
	(0.0060)	(0.0033)	(0.0052)	(0.0170)	(0.0070)	(0.0145)
Share of regular jobs (t-1)	0.0402*** (0.0136)	-0.1961*** (0.0093)	-0.2363*** (0.0113)	0.0747** (0.0352)	-0.1881*** (0.0182)	-0.2628*** (0.0281)
Share of full-time jobs (t-1)	0.0427*** (0.0092)	-0.0208*** (0.0047)	-0.0635*** (0.0080)	0.1040*** (0.0313)	-0.0037 (0.0118)	-0.1078*** (0.0269)
Share of jobs hired from TWA's (t-1)	0.0022** (0.0011)	0.0040*** (0.0012)	0.0019** (0.0009)	-0.0054 (0.0313)	-0.0100 (0.0154)	-0.0046 (0.0176)
Share of hired self-employed (t-1)	-0.0012 (0.0032)	0.0033** (0.0017)	0.0044 (0.0028)	-0.0181 (0.0143)	-0.0047 (0.0072)	0.0134 (0.0147)
Dummy missing obs.: Share TWA (t-1)	-0.1125*** (0.0266)	-0.0742*** (0.0096)	0.0382* (0.0227)	-0.1452*** (0.0512)	-0.0967*** (0.0162)	0.0485 (0.0427)
Collective labour agreement						
CLA enterprise level (t-1)	-0.0029 (0.0045)	0.0042** (0.0018)	0.0070* (0.0042)	0.0056 (0.0162)	0.0112*** (0.0039)	0.0056 (0.0156)
CLA sector level, no extension (t-1)	-0.0195*** (0.0048)	0.0092*** (0.0027)	0.0287*** (0.0041)	-0.0190 (0.0159)	0.0084 (0.0070)	0.0274** (0.0135)
CLA enterprise extended to sector level (t-1)	0.0026 (0.0025)	0.0011 (0.0011)	-0.0015 (0.0022)	0.0001 (0.0089)	-0.0012 (0.0029)	-0.0014 (0.0080)
Ref. group: no collective labour agreement (CLA)	-	-	-	-	-	-
CLA unknown (t-1)	-0.0334** (0.0156)	0.0259*** (0.0075)	0.0593*** (0.0131)	-0.0163 (0.0440)	0.0209 (0.0180)	0.0373 (0.0346)
Composition of the labour force						
Share of male workers (t-1)	-0.0360*** (0.0085)	0.0126*** (0.0045)	0.0485*** (0.0073)	-0.0734*** (0.0274)	-0.0089 (0.0107)	0.0645*** (0.0232)
Share of workers aged 23-35 (t-1)	-0.0155 (0.0112)	0.0677*** (0.0053)	0.0832*** (0.0096)	-0.0318 (0.0352)	0.0616*** (0.0127)	0.0934*** (0.0303)
Ref. group: Share of workers aged 36-50 (t-1)	-	-	-	-	-	-

Table A.7 Continued from previous page

Dependent variable:	Growth rate Employment <P50	Share entrants <P50	Share exiters <P50	Growth rate Employment <P10	Share entrants <P10	Share exiters <P10
Sample - sales growth:						
Share of workers aged 51-65 (t-1)	-0.0574*** (0.0121)	0.0072 (0.0060)	0.0646*** (0.0111)	-0.0658 (0.0401)	0.0100 (0.0125)	0.0758** (0.0367)
Share of job tenure \geq 10 years (t-1)	0.0278*** (0.0065)	-0.0422*** (0.0028)	-0.0699*** (0.0060)	0.0109 (0.0200)	-0.0452*** (0.0059)	-0.0561*** (0.0187)
Ref. group: Dutch workers	-	-	-	-	-	-
Share of immigrants after EU-enlargement (t-1)	0.0933 (0.0644)	-0.0130 (0.0483)	-0.1063** (0.0520)	0.1420 (0.1320)	-0.0048 (0.0886)	-0.1468 (0.1056)
Share of immigrants other western countries	-0.1142*** (0.0220)	0.0006 (0.0100)	0.1148*** (0.0182)	-0.2015*** (0.0740)	-0.0178 (0.0243)	0.1837*** (0.0604)
Share of other non-western immigrants (t-1)	-0.0227 (0.0443)	0.0381** (0.0161)	0.0607* (0.0358)	-0.1788 (0.1601)	-0.0294 (0.0371)	0.1494 (0.1341)
Training, education and contractual wage						
Ratio training expenditures firm / sales (t-1)	0.0478 (0.1156)	0.1406** (0.0685)	0.0928 (0.0894)	0.1102 (0.2360)	0.1736 (0.1371)	0.0634 (0.1555)
Share low educated workers (t-1)	0.0091 (0.0069)	-0.0091*** (0.0033)	-0.0182*** (0.0059)	0.0001 (0.0210)	-0.0025 (0.0072)	-0.0026 (0.0185)
Share medium educated workers (t-1)	0.0043 (0.0062)	-0.0028 (0.0029)	-0.0072 (0.0055)	-0.0052 (0.0183)	-0.0029 (0.0064)	0.0023 (0.0163)
Ref. group: Share high educated workers (t-1)	-	-	-	-	-	-
Share workers with low wage (t-1)	-0.0318 (0.0245)	-0.0580*** (0.0122)	-0.0262 (0.0205)	-0.0805 (0.0752)	-0.0700** (0.0281)	0.0104 (0.0645)
Share workers with medium wage (t-1)	-0.0129 (0.0183)	-0.0536*** (0.0094)	-0.0406*** (0.0154)	-0.0173 (0.0527)	-0.0701*** (0.0203)	-0.0528 (0.0458)

Table A.7 Continued from previous page

Dependent variable:	Growth rate Employment <P50	Share entrants <P50	Share exiters <P50	Growth rate Employment <P10	Share entrants <P10	Share exiters <P10
Sample - sales growth:						
Ref. group: Share workers with high wage (t-1)	-	-	-	-	-	-
Average hourly wage of the firm (t-1)	0.0012 (0.0012)	-0.0031*** (0.0006)	-0.0043*** (0.0010)	-0.0005 (0.0037)	-0.0042*** (0.0014)	-0.0037 (0.0032)
Std. dev. of hourly wage in the firm (t-1)	0.0002 (0.0006)	0.0009*** (0.0003)	0.0007 (0.0005)	0.0035* (0.0019)	0.0015** (0.0007)	-0.0020 (0.0016)
Dummy missing obs.: training expenditures (t-1)	-0.0532** (0.0261)	-0.0339*** (0.0095)	0.0193 (0.0224)	0.0055 (0.0494)	0.0029 (0.0158)	-0.0026 (0.0414)
Other firm characteristics						
Ref. group: low Share of incidental wage (t-1)	-	-	-	-	-	-
Intermediate Share of incidental wage (t-1)	-0.0081*** (0.0024)	0.0073*** (0.0011)	0.0154*** (0.0022)	-0.0018 (0.0084)	0.0101*** (0.0026)	0.0119 (0.0076)
High Share of incidental wage (t-1)	-0.0007 (0.0030)	0.0045*** (0.0015)	0.0051* (0.0027)	0.0132 (0.0102)	0.0040 (0.0037)	-0.0092 (0.0091)
Ref. group: firm size 25 - 99 workers (t-1)	-	-	-	-	-	-
Firm size 100 - 500 workers (t-1)	-0.0031 (0.0022)	-0.0003 (0.0011)	0.0028 (0.0019)	0.0082 (0.0075)	-0.0038 (0.0028)	-0.0120* (0.0066)
Firm size \geq 500 workers (t-1)	0.0061 (0.0045)	-0.0162*** (0.0031)	-0.0223*** (0.0043)	0.0241 (0.0167)	-0.0176** (0.0079)	-0.0417*** (0.0159)
Ref. group: # establishments 1 (t-1)	-	-	-	-	-	-
# establishments 2 - 50 (t-1)	-0.0011 (0.0020)	0.0012 (0.0010)	0.0023 (0.0018)	0.0035 (0.0067)	0.0012 (0.0025)	-0.0022 (0.0059)
High # establishments \geq 50 (t-1)	0.0051 (0.0094)	0.0078* (0.0047)	0.0027 (0.0077)	0.0340 (0.0455)	0.0066 (0.0102)	-0.0275 (0.0425)

Table A.7 Continued from previous page

Dependent variable:	Growth rate Employment <P50	Share entrants <P50	Share exiters <P50	Growth rate Employment <P10	Share entrants <P10	Share exiters <P10
Ref. group: Dutch ownership (t-1)	–	–	–	–	–	–
UK/US ownership (t-1)	-0.0142*** (0.0046)	0.0024 (0.0017)	0.0165*** (0.0042)	-0.0152 (0.0144)	0.0115*** (0.0044)	0.0267** (0.0129)
Foreign ownership, no UK/US (t-1)	-0.0119*** (0.0035)	0.0023* (0.0014)	0.0142*** (0.0032)	-0.0264** (0.0125)	0.0006 (0.0033)	0.0270** (0.0114)
Ownership unknown (t-1)	0.0316** (0.0153)	-0.2581*** (0.0186)	-0.2897*** (0.0201)	0.0976** (0.0445)	-0.2339*** (0.0788)	-0.3315*** (0.0959)
Ref. group: non-exporting firm (t-1)	–	–	–	–	–	–
Exporting firm (t-1)	-0.0029 (0.0043)	-0.0161*** (0.0023)	-0.0132*** (0.0037)	0.0091 (0.0139)	-0.0118** (0.0057)	-0.0208* (0.0120)
Export unknown (t-1)	-0.0096** (0.0043)	-0.0203*** (0.0023)	-0.0107*** (0.0036)	-0.0167 (0.0136)	-0.0178*** (0.0054)	-0.0011 (0.0114)
Sectors of economic activity and years						
Mineral extraction sector (t)	0.0059 (0.0337)	-0.0082 (0.0201)	-0.0141 (0.0208)	-0.0883** (0.0404)	-0.0896*** (0.0182)	-0.0012 (0.0433)
Manufacturing sector (t)	-0.0035 (0.0317)	0.0200 (0.0193)	0.0235 (0.0176)	-0.1566*** (0.0252)	-0.0355*** (0.0095)	0.1211*** (0.0215)
Ref. group: energy and water sector (t)	–	–	–	–	–	–
Construction sector (t)	-0.0036 (0.0319)	0.0106 (0.0194)	0.0142 (0.0179)	-0.1545*** (0.0297)	-0.0470*** (0.0110)	0.1074*** (0.0253)
Goods trade sector (t)	-0.0034 (0.0317)	0.0219 (0.0193)	0.0253 (0.0176)	-0.1527*** (0.0266)	-0.0361*** (0.0100)	0.1167*** (0.0225)
Horeca sector (t)	-0.0132 (0.0322)	0.0331* (0.0196)	0.0463** (0.0182)	-0.1109*** (0.0358)	-0.0179 (0.0141)	0.0930*** (0.0306)
Transport and communication sector (t)	-0.0131 (0.0319)	0.0139 (0.0194)	0.0270 (0.0178)	-0.1767*** (0.0293)	-0.0481*** (0.0110)	0.1286*** (0.0251)

Table A.7 Continued from previous page

Dependent variable:	Growth rate Employment	Share entrants	Share exiters	Growth rate Employment	Share entrants	Share exiters
Sample - sales growth:	<P50	<P50	<P50	<P10	<P10	<P10
Business services sector (t)	-0.0464 (0.0318)	0.0224 (0.0194)	0.0688*** (0.0178)	-0.2142*** (0.0257)	-0.0335*** (0.0099)	0.1807*** (0.0219)
Ref. variable: year 2008	-	-	-	-	-	-
Dummy year 2009	-0.0068 (0.0043)	-0.0128*** (0.0019)	-0.0059 (0.0037)	-0.0513*** (0.0134)	-0.0166*** (0.0046)	0.0347*** (0.0117)
Dummy year 2010	-0.0202*** (0.0063)	0.0062** (0.0027)	0.0264*** (0.0056)	-0.0318 (0.0195)	0.0018 (0.0059)	0.0336* (0.0176)
Dummy year 2011	-0.0082* (0.0049)	0.0345*** (0.0021)	0.0427*** (0.0044)	-0.0090 (0.0161)	0.0305*** (0.0048)	0.0395*** (0.0144)
Dummy year 2012	-	-	-	-	-	-
Dummy year 2013	0.0349*** (0.0056)	-0.0202*** (0.0025)	-0.0551*** (0.0051)	0.0324* (0.0188)	-0.0141** (0.0057)	-0.0465*** (0.0169)
Relation employment Growth - wage Growth						
Growth hourly wage stayers (in %) (t)	-0.0383 (0.0365)	-0.0362** (0.0162)	0.0021 (0.0325)	-0.0441 (0.1015)	-0.0167 (0.0294)	0.0274 (0.0856)
Indicator downward nominal wage rigidity (t)	-0.4153*** (0.0660)	0.0511* (0.0295)	0.4665*** (0.0564)	-0.7624*** (0.1889)	0.0621 (0.0637)	0.8245*** (0.1631)
Indicator downward real wage rigidity (t)	-0.3734*** (0.0719)	0.0655** (0.0324)	0.4390*** (0.0613)	-0.6987*** (0.2032)	0.0863 (0.0697)	0.7850*** (0.1740)
Wage decrease below range indicator (t)	-0.2369*** (0.0668)	0.0123 (0.0204)	0.2492*** (0.0610)	-0.3483** (0.1470)	0.0253 (0.0278)	0.3737*** (0.1366)
Wage decrease above range indicator (t)	0.2537*** (0.0166)	0.5395*** (0.0118)	0.2858*** (0.0138)	0.2736*** (0.0390)	0.5391*** (0.0232)	0.2655*** (0.0311)
Dummy missing obs.: wage rigidity indicator (t)	-0.1307*** (0.0174)	-0.1020*** (0.0105)	0.0287** (0.0143)	-0.1762*** (0.0419)	-0.1085*** (0.0189)	0.0677** (0.0343)

Table A.7 Continued from previous page

Dependent variable:	Growth rate Employment	Share entrants <P50	Share exiters <P50	Growth rate Employment	Share entrants <P10	Share exiters <P10
Sample - sales growth:	<P50	<P50	<P50	<P10	<P10	<P10
Constant	0.2387*** (0.0823)	0.3063*** (0.0404)	0.0676 (0.0667)	0.6759*** (0.2174)	0.3528*** (0.0770)	-0.3231* (0.1865)
Observations	30,848	30,848	30,848	6,177	6,177	6,177
R-squared	0.2454	0.6958	0.4765	0.2255	0.6903	0.4189

Notes: Data refer to all private sector firms with at least 25 employees that exist in two subsequent years and for which sales growth data are available, whereas firm-year combinations with firm dynamics (mergers etc.) are left out of the data. Significance levels: * : 5% ** : 1% *** : 0.1%. The table explores the sensitivity of employment growth as well as the share of entrants and exiters in the workforce for sales shocks. The left three columns refer to sales below the median, the right three columns refer to the first decile of the sales growth distribution, representing a severe negative shock in sales. Note that the coefficients for employment are equal to the difference between the coefficients for the share of entrants en the share of exiters. Dummy 2012 drops out due to multicollinearity with 'dummy end of firm out of observed period (t)'.
Source: Own calculations using registration data from Statistics Netherlands.

Table A.8: Regressions of growth hourly wage job-stayers and employment growth: OLS, FE and RE-specifications, 2006–2013

Dependent variable: Estimation technique:	Hourly wage OLS	Hourly wage FE	Hourly wage RE	Employment OLS	Employment FE	Employment RE
Sales growth						
Growth rate sales (t)	0.0054*** (0.0008)	0.0034*** (0.0011)	0.0053*** (0.0009)	0.1124*** (0.0041)	0.0699*** (0.0046)	0.1036*** (0.0042)
Growth rate sales, squared (t)	0.0009 (0.0007)	0.0000 (0.0010)	0.0008 (0.0007)	-0.0293*** (0.0039)	-0.0250*** (0.0045)	-0.0298*** (0.0039)
Contract type						
Share of open-term contracts (t-1)	-0.0023* (0.0012)	0.0161*** (0.0032)	-0.0019 (0.0013)	0.0333*** (0.0043)	0.0606*** (0.0124)	0.0367*** (0.0049)
Share of regular jobs (t-1)	-0.0052** (0.0024)	-0.0034 (0.0090)	-0.0052** (0.0024)	0.0295*** (0.0099)	0.0491 (0.0455)	0.0271** (0.0110)
Collective labour agreement						
CLA enterprise level (t-1)	0.0058*** (0.0012)	0.0023 (0.0027)	0.0062*** (0.0013)	-0.0006 (0.0029)	-0.0023 (0.0082)	-0.0017 (0.0036)
CLA sector level, no extension (t-1)	-0.0016 (0.0011)	0.0028 (0.0033)	-0.0015 (0.0011)	-0.0180*** (0.0036)	-0.0011 (0.0135)	-0.0174*** (0.0043)
CLA enterprise extended to sector level (t-1)	0.0000 (0.0006)	-0.0020 (0.0023)	-0.0004 (0.0006)	0.0012 (0.0016)	0.0041 (0.0075)	0.0018 (0.0020)
Immigrant workers						
Share of immigrants after EU-enlargement (t-1)	-0.0260** (0.0116)	0.1447 (0.1280)	-0.0296*** (0.0113)	0.0601 (0.0404)	0.3249 (0.6631)	0.0713* (0.0408)
Share of immigrants other western countries	0.0004 (0.0039)	0.1936 (0.1403)	0.0016 (0.0042)	-0.1125*** (0.0145)	-0.1411 (0.5750)	-0.1134*** (0.0188)
Share of other non-western immigrants (t-1)	-0.0184*** (0.0056)	-0.0032 (0.2103)	-0.0211*** (0.0053)	-0.0296 (0.0237)	4.8307*** (1.5205)	-0.0330 (0.0340)
Wage rigidity						
Indicator downward nominal wage rigidity (t)				-0.3979*** (0.0457)	-0.2612*** (0.0655)	-0.3709*** (0.0478)

Table A.8 Continued from previous page

Dependent variable: Estimation technique:	Hourly wage OLS	Hourly wage FE	Hourly wage RE	Employment OLS	Employment FE	Employment RE
Indicator downward real wage rigidity (t)				-0.3712*** (0.0498)	-0.2573*** (0.0742)	-0.3463*** (0.0524)
Constant	0.0467*** (0.0130)	0.1945*** (0.0347)	0.0654*** (0.0143)	0.2953*** (0.0659)	0.0176 (0.1505)	0.2725*** (0.0701)
Observations	63,613	63,613	63,613	61,683	61,683	61,683
R-squared	0.2108			0.2618		
Number of firms		21,007	21,007		20,454	20,454

Notes: Data refer to all private sector firms with at least 25 employees, whereas firm-year combinations with firm dynamics (mergers etc.) are left out of the data. Significance levels: * : 5% ** : 1% *** : 0.1%. The table compares results using OLS, Fixed Effects (FE) and Random Effects (RE) estimations for a selection of covariates. The results of the OLS and RE-estimations are often similar. A Hausman specification test rejects that the underlying assumptions of the RE-model are satisfied. A test using an auxiliary OLS regression, which in addition includes the time-averages of all time-varying independent variables, shows that the averages of the variables are jointly significantly different from zero, therefore the RE-model is rejected. The FE-model only uses the within-variation of firms. Since my samples are confined to firm-year observations that satisfy certain restrictions regarding sales growth (positive/negative/below the Xth percentile of the sales growth distribution), the panel spells for firm observations are short. Therefore OLS-estimations are used in the main analysis.

Source: Own calculations using registration data from Statistics Netherlands.

Appendix B: Robustness checks

I have performed three robustness checks on the decomposition analysis with regard to the selections applied to the data: first, the selection of firms for which data regarding sales growth is available; second, the exclusion of firms that are subject to firm dynamics (e.g., mergers); and third, within firms, the exclusion of workers aged 18–22.

The first robustness check assesses the representativeness of the sub-sample for which sales growth data are available. The probability of being subject to the sales-survey increases with firm size. Table B.1 indicates that the decomposition results for this sub-sample agreed with those for the full sample of firms. The first two columns describe the wage-bill decompositions for all firms with respective growing and shrinking *wage bills*. Columns 5 and 6 repeat this for the sub-sample of firms for which the change in *sales* is available. The results for the β 's are quite similar, confirming that the selected sub-sample is representative for the entirety of private sector firms. Columns 9 and 10 show the decomposition already described in Table 2, with the results for the sub-sample sliced by sales growth. These results are much more mitigated, stemming from the mixture of firms with growing and declining wage bills (the categories presented in the first two sets of columns), since not all firms with decreasing sales reduce their wage bills.

The second robustness check concerns the exclusion of firm-year observations subject to firm dynamics, such as mergers. I repeat the decomposition by sales groups but now include these observations, which makes the sample about 4% larger. Table B.2 shows that the results of decomposition are largely comparable to those in Table 2.

As a third robustness check, I repeat the decomposition for one year (2009–2010), now including workers aged 18–22. This age group was excluded from the data because the Dutch mandatory youth minimum wage follows a steep profile from ages 15 to 23. Since this study examines, among other things, to what extent firms adjust wages of representative stayers in response to periods of negative sales growth, the inclusion of youth workers (with their high minimum wage increases) could partly mask this adjustment. The decomposition results for this robustness check are presented in the footnote to Table 5). Although job flows are larger, the overall picture remains the same: wage bills are primarily adjusted through job flows, while the wage changes of stayers are only slightly lower, remaining positive when sales growth is negative.

Regarding the regressions, Table A.8 explores Random Effects and Fixed Effects estimations, as alternatives to the OLS regressions used in the main analysis. The results are described in the note underneath this table.

Table B.1: Decomposition of wage-bill changes 2007–2013 for different sub-samples of the data

Sample:	All firms				ΔS available				ΔS available				
	$\Delta WB \geq 0$	$\Delta WB < 0$	$\hat{\beta}$		$\Delta WB \geq 0$	$\Delta WB < 0$	$\hat{\beta}$		$\Delta S \geq 0$	$\Delta S < 0$	$\hat{\beta}$		
Contribution to gross contractual wage-bill change by:													
-net change in empl.	7.61	-18.12	-25.14	***	6.94	-16.06	-22.67	***	0.51	-7.64	-6.99	***	
-hourly wage, stayers	2.69	1.21	-1.43	***	2.71	1.27	-1.39	***	2.27	1.84	-0.35	***	
-hourly wage, entrants	-2.71	-1.44	1.15	***	-2.54	-1.32	1.11	***	-2.32	-1.61	0.48	***	
-hourly wage, exiters	1.76	2.76	0.78	***	1.59	2.28	0.50	***	1.76	2.06	0.29	***	
-hours, stayers	0.95	0.04	-0.77	***	0.91	0.13	-0.61	***	0.71	0.40	-0.17	***	
-hours, non-stayers	+	0.24	0.97	0.74	***	0.17	0.80	0.63	***	0.36	0.53	0.21	**
Gross wage-bill change (in %):													
-contractual	10.55	-14.57	-24.63	***	9.78	-12.90	-22.20	***	3.30	-4.42	-6.33	***	
-contr+ overtime pay	10.38	-14.59	-24.54	***	9.60	-12.91	-22.10	***	3.30	-4.65	-6.61	***	
-idem + inc./extra pay	10.39	-14.53	-24.74	***	9.64	-12.84	-22.32	***	3.36	-4.62	-7.11	***	
# firm-year obs.	70046	54505			42909	32693			42997	32605			
# worker-year obs. (*mln)	7.5	8.0			5.5	6.7			6.7	5.5			

Notes: Data refer to all private sector firms with at least 25 employees, whereas firm-year combinations with firm dynamics (mergers etc.) are left out of the data. ΔWB = change in wage bill; ΔS = change in sales. ΔWB_2 includes contractual as well as overtime pay, ΔWB_3 includes incidental and extra wage on top of this. $\hat{\beta}$ is the estimation result for applying equation 5 to the wage bill and each of its components separately. The relationship between the items of the decomposition and equation 4 is explained in footnote 6. Significance levels: * : 5% ** : 1% *** : 0.1%.

Source: Own calculations using registration data from Statistics Netherlands

Table B.2: Decomposition of wage-bill changes by sales growth groups, including firm dynamics

Sample:	$\Delta S \geq 0$	$\Delta S < 0$	$\hat{\beta}$		P75-P100	$\hat{\beta}$		P25-P75	$\hat{\beta}$		P1-P25
Contribution to gross contractual wage-bill change by:											
-net change in empl.	3.34	-6.51	-7.55	***	3.72	-4.67	***	-1.51	-7.90	***	-10.52
-hourly wage, stayers	2.12	1.58	-0.34	***	2.42	-0.24	***	2.06	-0.33	***	1.81
-hourly wage, entrants	-2.74	-1.88	0.51	***	-2.78	0.61	***	-1.94	0.30	***	-1.52
-hourly wage, exiters	1.77	2.10	0.31	***	1.91	-0.15	*	1.59	0.72	***	2.40
-hours worked, stayers	0.81	0.48	-0.16	***	0.68	-0.03	n.s.	0.68	-0.16	***	0.26
-hours worked, non-stayers	+ -0.12	0.15	0.25	***	0.17	0.12	n.s.	0.43	0.17	**	0.55
Gross wage-bill change (in %):											
-contractual	5.18	-4.06	-6.79	***	6.11	-4.34	***	1.30	-7.13	***	-7.04
-contractual + overtime pay	5.18	-4.27	-7.06	***	6.17	-4.51	***	1.21	-7.38	***	-7.34
-idem + inc./extra pay	5.22	-4.28	-7.57	***	6.20	-4.71	***	1.21	-7.65	***	-7.20
# firm-year obs.	45,151	33,294			18,753			41,357			18,335
# worker-year obs. (*mln)	7.0	5.7			2.5			7.7			2.5

Notes: Data refer to all private sector firms with at least 25 employees for which Δ sales is available; contrary to other tables, firm-year combinations with firm dynamics (mergers etc.) are included in the sample. ΔS = change in sales, P1-P25, P25-P75 and P75-P100 are subsamples of firms based on the yearly percentile distribution of the change in sales. ΔWB_2 includes contractual as well as overtime pay, ΔWB_3 includes incidental and extra wage on top of this. $\hat{\beta}$ is the estimation result for equation 5, applied to the wage bill and each of its components separately: column 3 refers to $\Delta S < 0$ compared to $\Delta S \geq 0$; column 6 to P25-P75 compared to P75-P100; column 9 refers to P1-P25 compared to P25-P75. The relationship between the items of the decomposition and equation 4 is explained in footnote 6. Standard errors in parentheses. Significance levels: * : 5% ** : 1% *** : 0.1%.

Source: Own calculations using registration data from Statistics Netherlands

Table B.3: Descriptive statistics for the variables used in the regressions and in Figure 1

Sample - sales growth rate: Statistic:	Full Mean	Full SD	Full P25	Full P50	Full P75	dS< P50 Mean	dS< P25 Mean	dS< P10 Mean
Dependent variables/variables Figure 1								
growth rate sales	0.021	0.306	-0.081	0.022	0.125	-0.167	-0.297	-0.515
growth rate contractual wage bill	0.001	0.179	-0.054	0.016	0.081	-0.040	-0.071	-0.112
idem. incl. overtime, incidental and extra pay	0.001	0.191	-0.061	0.015	0.086	-0.042	-0.074	-0.115
growth contractual hourly wage	0.030	0.062	0.008	0.031	0.056	0.028	0.027	0.027
employment growth	-0.026	0.182	-0.078	0	0.054	-0.066	-0.098	-0.140
job exit rate	0.180	0.181	0.078	0.129	0.213	0.196	0.225	0.269
job entry rate	0.155	0.157	0.054	0.115	0.203	0.131	0.127	0.129
Explanatory variables regressions								
type of job								
share of open-term contracts (t-1)	0.792	0.246	0.724	0.877	0.965	0.792	0.791	0.780
share of regular jobs (t-1)	0.944	0.178	0.973	1	1	0.942	0.938	0.935
share of full-time jobs (t-1)	0.757	0.200	0.667	0.825	0.900	0.753	0.770	0.776
share of jobs hired from TWA's (t-1)	0.083	1.424	0	0.033	0.083	0.074	0.074	0.076
share of hired self-employed (t-1)	0.033	0.482	0	0	0.015	0.032	0.037	0.036
collective labour agreement								
CLA enterprise level (t-1)	0.369	0.483	0	0	1	0.368	0.367	0.382
CLA sector level. no extension (t-1)	0.063	0.242	0	0	0	0.056	0.052	0.048
CLA enterprise extended to sector level (t-1)	0.080	0.272	0	0	0	0.086	0.090	0.090
ref. group: no collective labour agreement (CLA)	0.477	0.499	0	0	1	0.480	0.481	0.471
CLA unknown (t-1)	0.011	0.104	0	0	0	0.009	0.010	0.010
composition of the labour force								
share of male workers (t-1)	0.727	0.223	0.606	0.802	0.898	0.723	0.744	0.753
share of workers aged 23-35 (t-1)	0.344	0.170	0.221	0.314	0.439	0.331	0.331	0.338
share of workers aged 51-65 (t-1)	0.208	0.122	0.117	0.200	0.285	0.217	0.219	0.216
share of jobs tenure over 10 years (t-1)	0.292	0.216	0.100	0.283	0.455	0.308	0.305	0.287
share of immigrants western countries	0.145	0.117	0.068	0.120	0.190	0.145	0.148	0.155
share of immigrants after EU-enlargement (t-1)	0.010	0.056	0	0	0.001	0.009	0.010	0.011

Table B.3 Continued from previous page

Sample - sales growth rate: Statistic:	Full Mean	Full SD	Full P25	Full P50	Full P75	dS< P50 Mean	dS< P25 Mean	dS< P10 Mean
share of other non-western immigrants (t-1)	0.032	0.062	0	0.016	0.038	0.031	0.032	0.034
predicted share western countries	0.114	0.120	0.027	0.087	0.162	0.112	0.115	0.116
predicted share EU-enlargement (t-1)	0.006	0.039	0	0	0	0.005	0.006	0.006
predicted share non-western (t-1)	0.025	0.058	0	0	0.029	0.023	0.024	0.024
training, education and contractual wage								
ratio training expenditures firm / sales (t-1)	0.006	0.010	0	0.004	0.008	0.006	0.006	0.006
share low educated workers (t-1)	0.277	0.233	0.070	0.238	0.433	0.274	0.267	0.257
share medium educated workers (t-1)	0.492	0.215	0.339	0.494	0.642	0.496	0.495	0.491
share high educated workers (t-1)	0.230	0.236	0.048	0.146	0.342	0.230	0.237	0.253
share workers with low wage (t-1)	0.256	0.253	0.052	0.163	0.400	0.256	0.234	0.219
share workers with medium wage (t-1)	0.539	0.207	0.400	0.566	0.697	0.540	0.552	0.551
share workers with high wage (t-1)	0.205	0.184	0.071	0.152	0.281	0.204	0.215	0.230
average hourly wage of the firm (t-1)	17.200	4.503	14.126	16.664	19.512	17.437	17.759	18.152
std. dev.of hourly wage in the firm (t-1)	6.738	3.134	4.519	6.261	8.360	6.849	6.962	7.113
state of business								
growth rate sales. squared (t)	0.094	0.368	0.002	0.011	0.045	0.093	0.181	0.409
growth rate sales (t-1)	0.034	0.241	-0.020	0.034	0.085	0.035	0.036	0.047
dummy business result (t-1) ≥ 0	0.811	0.391	1	1	1	0.798	0.767	0.745
ref. group: continuing firm (t)	0.188	0.391	0	0	0	0.172	0.183	0.194
dummy firm ceases to exits next year (t)	0.050	0.218	0	0	0	0.060	0.067	0.082
dummy end of firm out of observed period (t)	0.762	0.426	1	1	1	0.768	0.750	0.724
share of workers subject to part-time UB (t-1)	0.009	0.047	0	0.009	0.009	0.008	0.009	0.009
other firm characteristics								
indicator downward nominal wage rigidity (t)	0.189	0.141	0.103	0.153	0.224	0.208	0.211	0.210
indicator downward real wage rigidity (t)	0.747	0.138	0.700	0.767	0.834	0.720	0.718	0.720
indicator no downward wage rigidity (t)	0.065	0.033	0.040	0.062	0.087	0.072	0.071	0.070
wage decrease below range indicator (t)	0.012	0.032	0	0	0.016	0.013	0.013	0.015
wage decrease above range indicator (t)	0.155	0.141	0.063	0.122	0.206	0.137	0.134	0.138
other firm characteristics								
low share of incidental wage (t-1)	0.181	0.385	0	0	0	0.184	0.184	0.189

Table B.3 Continued from previous page

Sample - sales growth rate: Statistic:	Full Mean	Full SD	Full P25	Full P50	Full P75	dS< P50 Mean	dS< P25 Mean	dS< P10 Mean
intermediate share of incidental wage (t-1)	0.572	0.495	0	1	1	0.586	0.588	0.591
high share of incidental wage (t-1)	0.247	0.431	0	0	0	0.230	0.229	0.219
ref. group: firm size 25 - 99 workers (t-1)	0.705	0.456	0	1	1	0.699	0.731	0.764
firm size 100 - 500 workers (t-1)	0.249	0.433	0	0	0	0.252	0.233	0.208
firm size \geq 500 workers (t-1)	0.045	0.208	0	0	0	0.049	0.037	0.029
# establishments 1 (t-1)	0.614	0.487	0	1	1	0.591	0.609	0.630
# establishments 2 - 50 (t-1)	0.376	0.484	0	0	1	0.397	0.383	0.364
high # establishments \geq 50 (t-1)	0.011	0.103	0	0	0	0.012	0.008	0.006
Dutch ownership (t-1)	0.472	0.499	0	0	1	0.551	0.553	0.552
UK/US ownership (t-1)	0.043	0.203	0	0	0	0.054	0.055	0.058
foreign ownership. no UK/US (t-1)	0.329	0.470	0	0	1	0.391	0.389	0.388
ownership unknown (t-1)	0.156	0.362	0	0	0	0.004	0.004	0.002
non-exporting firm (t-1)	0.090	0.286	0	0	0	0.091	0.092	0.102
exporting firm (t-1)	0.124	0.329	0	0	0	0.124	0.117	0.114
export unknown (t-1)	0.787	0.410	1	1	1	0.785	0.791	0.785
sectors of economic activity and years								
mineral extraction sector (t)	0.001	0.026	0	0	0	0.001	0	0
manufacturing sector (t)	0.002	0.039	0	0	0	0.002	0.002	0.001
energy and water sector (t)	0.299	0.458	0	0	1	0.293	0.307	0.303
construction sector (t)	0.087	0.281	0	0	0	0.087	0.112	0.132
goods trade sector (t)	0.263	0.440	0	0	1	0.273	0.239	0.208
horeca sector (t)	0.022	0.147	0	0	0	0.024	0.015	0.011
transport and communication sector (t)	0.093	0.291	0	0	0	0.086	0.074	0.070
business services sector (t)	0.233	0.423	0	0	0	0.233	0.252	0.276

Notes: Data refer to all private sector firms with at least 25 employees for which Δ sales is available and no firm dynamics (mergers etc.). dS = sales growth rate, dS<P50, dS<P25 and dS<P10 are subsamples of firms based on the yearly percentile distribution of the change in sales. The statistics presented are the mean and standard error (sd) as well as the value of the variable at the 25th, 50th (the median) and the 75th percentile of its distribution.

Source: Own calculations using registration data from Statistics Netherlands

Appendix C: Creation of the dataset and description of variables

Creation of the dataset and applied selections

Yearly linked-employer–employee datasets (LEED) have been created by merging job data from the Social Statistical Datasets (SSD) with data on workers' characteristics from municipal registrations (GBA) and firm data, made available by Statistics Netherlands. The SSD (Bakker et al. (2014)) contain wages, hours worked and other job characteristics for all jobs in the Netherlands. Firm-level data, typically survey data, are often only available for a subset of firms. Firm-level variables from the Production Statistics data files, as sales, are available only for relatively large firms in the industrial, commercial services, retail trade, wholesale trade, construction and transport sector. Data on workers' attained level of education are available for only about two-thirds of workers. I use these data (applying the corresponding weights) to calculate the share of low, medium and highly educated workers at each firm.

The data are confined to jobs existing on October 1, since October is considered by Statistics Netherlands to be a representative month. Hourly contractual wages were derived based on gross contractual wages and contractual working hours. The contractual wage is the base wage as agreed in the labour contract, which in many cases increases according to pay scales stated in the collective labour agreement. Besides the contractual wages and hours, overtime hours and -payments are available in the data, as well as incidental wages (such as bonuses) and extra wages (agreed upon in the labour contract, collectively or individually). Holiday allowances—there is a legal requirement to pay holiday allowances of 8% of gross salary with some CLAs agreeing to a higher percentage—are included in these extra wages.

The job-level datasets have been combined pairwise to two-year datasets (2006–2007; 2007–2008, etc.), while firm-level variables, such as the number of stayers, entrants and exiters and the average contractual wage and hours worked per group (i.e., stayers, entrants, exiters) were generated before creating firm-level datasets. Wage-bill growth was then decomposed for each firm that existed in both years. In cases of firm dynamics (mergers, split-ups, etc.) firms' ID number may change from year to year. However, the data allow a firm's predecessor to be identified, in which case the observations for old and new ID numbers were treated as one firm. For entrant workers in enterprises characterised by firm dynamics, the predecessor firm is unknown, however; in those cases I have assigned entrants to the firm and sector that is the most frequent predecessor among the stayers in that particular firm.

The applied selections are best illustrated by closely examining a particular two-year dataset. The initial LEED set for 2010–2011, for example, contained

13.3 million jobs. After removing 0.4 million observations for which the contractual wage, the contractual hours worked or the hourly wage were very high or low²² and after removing 0.2 million observations of (generally very small) firms with zero stayers, 12.7 million observations remained: (6.3 million for 2010 and 6.4 million for 2011). Jobs in the (semi-)public sector (about 40%) were excluded, as were jobs in firms that did not exist in both years (fewer than 2%).

Converted to the firm-level, a dataset for 2011 was obtained with over 250,000 observations, containing wage-bill growth for 2010–2011 and its decomposed items. Putting the years together, the resulting 2007–2013 dataset comprised 1.94 million firm-year observations, out of which 1.80 million were not subject to firm-dynamics. Small firms comprise a large share of the latter dataset: only about 125,000 firms have 25 workers or more. For 75,602 of these observations, sales data are available for the two subsequent years (42,997 firm-year observations feature zero or increasing sales and 32,605 feature decreasing sales, see Table 2). A robustness check explores how similar are the decomposition results of firms for which sales growth data are available to those of all larger firms.

Description of variables

In the dataset used for the regression analyses, the explanatory variables typically refer to $(t-1)$ to address possible problems of reverse causality. Various covariates, such as variables regarding the level of workers' level of education, have some missing observations. I address this by imputing missing covariate data with their means in the particular year and by creating dummy variables that indicate whether a firm has a missing observation for that particular variable in that particular year. In this way, I include as many observations as possible in my regressions. Wherever relevant, the dummy-variables have been included in the regressions.

Some of the explanatory variables used in the regressions might require clarification. Open-term contracts are defined as agreements for an indefinite period of time, in contrast to fixed-term employment contracts which lasts for a specified period. The term 'regular jobs' refers to all jobs except for on-call workers, workers for temporary work agencies, workers under the Sheltered Employment Act ('WSW'), interns and directors/main shareholders. Full-time jobs are defined as those with at least 35 working hours each week. Migrant workers have at least one parent born outside the Nether-

²²I excluded observations for which the contractual monthly wage was (thresholds 2008) below €24 or above €25,000, the contractual hours worked per month below 8 or above 250 hours or for which the calculated hourly wage was below €3 or above €100

lands or were born abroad themselves. The level of education is categorised as ‘low’ if the highest-attained level is primary school or pre-vocational secondary education (‘VMBO’); as ‘medium’ in cases of senior general secondary education (‘HAVO’), pre-university education (‘VWO’) or vocational secondary education (‘MBO’); and as ‘high’ if a degree from a university of applied sciences (‘HBO’) or university (‘WO’) is obtained. Wage levels were classified as ‘low’ if the gross monthly wage is below the modal wage (€2315 in 2006), as ‘medium’ when between modal and 2*modal; and as ‘high’ if the gross wage exceeds 2*modal. Firms are classified as continuing if they still exist in the following year and as ceasing to exist if they do not. Firms that still exist in 2013 fall into the category, ‘end of firm out of observed period’. The share of workers subject to part-time UB reflects the extent to which a firm used the temporary (April 2009–July 2011) facility for part-time unemployment benefits. Firms meeting the requirements to participate in this facility could reduce the working hours of (some of) their employees by at most 50%, while these workers received UB for their reduced hours. The variable ‘share of incidental wage’ is based on a ranking of firms according to the share of workers receiving incidental wage. It is classified as ‘low’ if the firm belongs to the lowest 25%, ‘medium’ for percentiles 25–75, and as ‘high’ for firms that are in the top 25% of this distribution.

Immigrants are defined as workers who have at least one parent born outside the Netherlands. I distinguish three groups of immigrants: (1) immigrants from EU-enlargement countries, who originated from a country that entered the EU in 2004 or 2007 and who have been immigrating into the Netherlands in or after the year the country joined the EU; (2) other western immigrants, originating from western countries, except for those countries covered in Group 1, or Morocco, Turkey, the Republic of Suriname and the Netherlands Antilles; and (3) other, non-western immigrants. The group of native workers serves as a reference in the regressions.

To address possible endogeneity (i.e., firms that intend to reduce wages or increase job turnover could hire more migrant workers) I applied an instrumental variables (IV) approach. The instrument comprises the predicted shares of each type of immigrants in a firm. Following the approach proposed by D. Card (Altonji and Card (1991) and Card (2001)), I calculate the predicted share of foreigners in a certain geographical location in a certain year based on the distribution of foreigners across these locations in the previous year and the total net flows of foreigners since.²³ The rationale behind the

²³The shares of the groups of migrants in the total population show variation over regions. In 2006, the mean (standard deviation) of immigrants from EU-enlargement countries in my data is 0.2 % (0.1), while for other western immigrants these figures are 13.6 % (5.7) and for other, non-western immigrants they are 2.7% (1.5)

instrument is that foreigners from a certain origin tend to locate in the same location because of already-existing social networks. For this prediction, I use a version of the ‘shift-share’ instrument, in the sense that I depart from the actual share of immigrant workers in a firm in the base year, with the predicted stock of immigrants developing according to changes in the stock of immigrant citizens aged 23 to 65 located in the geographical area (the statistical agency distinguishes 40 so called ‘COROP-regions’) in which the firm resides. 2006 is used as a base year, unless the firm formed after 2006, in which case the founding year is taken as the base year. So, instead of using the actual changes in the share of migrant workers in the firm, I use as an instrument the changes in the share of migrant citizens in the area in which the firm is located.

Finally, I include indicators for nominal and real downward wage rigidity as explanatory variables in the regression in order to analyse the relationship between downward wage rigidity and employment growth. In the literature, a worker is considered subject to wage rigidity if he or she receives a real or nominal wage freeze during a period where he or she would have received a wage change below a certain threshold if wages would have been fully flexible. For nominal rigidity, this threshold is equal to zero, whereas for real downward wage rigidity, the threshold is the inflation expectation. Several methods for measuring wage rigidity are based on comparing the actual wage-growth distribution with a symmetric, so-called notional (theoretical) wage-growth distribution. In this study, I use the Maximum Likelihood method described by Goette et al. (2007), which controls for measurement error and endogenously estimates the inflation expectation. This method calculates for each job-year combination the probability of being subject to downward nominal wage rigidity, real wage rigidity or no wage rigidity. Wage changes are assumed to be generated according to a linear combination of covariates and a normally distributed error term. I use gender, age, company size and dummy variables for part-time employment, year and sector as covariates. The method was applied to the monthly wages of stayers whose wage growth was between -35% and 60% and who worked at least 12 hours a week as a regular worker (excluding interns, on-call workers, etc.). See Deelen and Verbeek (2015) for a description of these methods and their application to Dutch data. The firm-level indicators used in the regressions are averages of the indicators by jobs per firm, per year. For observations outside the applied selections, the indicators are missing values. Since the three indicators sum to 1, the indicator ‘not subject to wage rigidity’ serves as a reference group in the regressions. Two respective variables are included in the regressions regarding the shares of workers in the firm for which no wage rigidity indicator was calculated due to growth in monthly wages below -35% or above 60%.

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